Optimising Employee-Driven Innovation in Hybrid Work

A multi-study investigation extending media richness theory to examine how communication quality shapes social capital and knowledge sourcing behaviour

Natasha McDowell, BAS (Cum Laude), MSc (1st Class Honours)

Thesis submitted for the award of
Doctor of Philosophy (PhD)
to
Dublin City University Business School (DCUBS)

Research Supervisors:
Professor Edel Conway, Professor Claire Gubbins

May 2026

Declaration

I hereby certify that this material, which I now submit for assessment on the programme of study leading to the award of **Doctor of Philosophy** is entirely my own work, and that I have exercised reasonable care to ensure that the work is original and have conformed to the regulations on the use and declaration of Generative AI, and does not to the best of my knowledge breach any law of copyright, and has not been taken from the work of others save and to the extent that such work has been cited and acknowledged within the text of my work.

Signed: Natasha McDowell **ID No.:** 15210354 **Date:** 03 June 2026

AI Declaration

Tools:

ChatGPT (GPT-4 and GPT-5) and Google Gemini (2.0 Pro; Thinking and fast modes) were used between July 2023 and December 2025 as supplementary learning and writing-support tools. ChatGPT was accessed through publicly available interfaces, while Gemini Pro was accessed via the researcher's Google account, which is supported by Google's cloud through DCU's institutional license. Both were used within the limits of DCU's ethical guidance on Artificial Intelligence.

Outputs:

R Programming Support: ChatGPT was used to support my learning in *R programming*. It assisted in interpreting error messages, understanding coding concepts, and identifying potential solutions when I encountered difficulties. All outputs were used purely for learning and troubleshooting. All final code was written, tested, and verified by the researcher. The R scripts developed by the researcher for this research are available upon request.

Academic Writing, Comprehension, and Referencing Support

Both ChatGPT and Gemini were employed to:

- Provide guidance on referencing and formatting in accordance with *APA 7th edition* standards;
- Clarify complex academic terminology, rephrase dense material into plain language, and enhance clarity and flow in my own writing;
- Check sentence, grammar and coherence on occasion, particularly in response to supervisor feedback such as *"this is not a complete sentence"* or *"what is the overarching theme?" or "How does this fit with literature on distributed working?"*.

Research Exploration Support

Gemini and ChatGPT were used during the early stages of topic exploration to help identify publicly available research papers and to understand how key themes such as performance, innovation and knowledge management and remote working, were discussed across the literature. Both tools acted as conceptual search and exploration aids rather than for data collection or web scraping systems. All references suggested by the tools were independently verified by obtaining the original articles, adding them to Mendeley and checking them against the scoping review database developed for this thesis. Newly verified and relevant articles were added to the independently found category within the scoping review dataset. Any articles that could not be verified through this process were excluded and not used in the review.

Prompts:

Examples of prompts included:

- "Can you explain what this R error message means?"
- "What code helps to make a plot in R? Can you help [the researcher] understand how to use ggplot?"
- "Explain this snippet in simple terms."
- "Explain the meaning of this concept in plain language."
- "How should this journal article be formatted in APA7 as an in-text citation style?"

Iterations:

Each query typically involved one to three iterations for verification, refining prompts or asking follow-up questions to deepen understanding.

Dedication

This work is dedicated to my husband, Anton, whose love, patience, and unwavering belief in me sustained me throughout this journey. Thank you for standing beside me, always.

To my children, Isaac, Adam, Ethan, and Elora, who have shown exceptional understanding and patience. Your resilience and quiet support have meant more to me than you will ever know. Even in the moments when I could not be the mother I wished to be, you gave me grace, strength, and purpose. This achievement is as much yours as it is mine.

Acknowledgements

I wish to express my deepest gratitude to my exceptional supervisors, Professor Claire Gubbins and Professor Edel Conway. Their unwavering support, encouragement, kindness, and patience sustained me throughout this doctoral journey. Through every iteration, their thoughtful critique deepened my understanding of rigorous scholarship and continually guided me toward higher standards of academic excellence. I am particularly indebted to them for their combination of challenge and compassion, which sustained me through some of the most difficult periods of my doctoral journey, including the COVID-19 pandemic and times of family illness. I harbour no illusions that I could have reached this point without their dedicated mentorship and care, for which I remain profoundly grateful.

I reserve a special note of profound gratitude for Professor Yseult Freeney, who served as my third supervisor. Her influence dates back to the beginning of my academic journey at DCU, where she first inspired my passion for organisational psychology. More than a supervisor, she has been a foundational mentor who has generously shared her time, insight, and encouragement throughout key stages of my career. Most significantly, Professor Freeney instilled in me a lasting commitment to lifelong learning, facilitated collaborations with exceptional scholars, and ultimately connected me with my two primary PhD supervisors. Her unwavering support and belief in my potential have been a true gift, for which I remain deeply grateful.

I am also indebted to Professor Lisa van der Werff for her guidance, oversight, and timely direction, which were central to keeping my work on track. I greatly appreciate her attention to my progress, her encouragement, and her efforts to ensure that I was fully supported at each stage.

My sincere thanks go to Mr Gerry Conyngham, whose teaching and expertise provided me with essential analytical skills for this research. His willingness to devote additional time to discussing my work contributed directly to the methodological innovations in this thesis.

I am also grateful to Dr Brian Harney for his valuable guidance during the final stages of the PhD process, particularly his advice on preparing for completion and examination.

My sincere gratitude also goes out to Professor Declan O'Sullivan of Trinity College Dublin for his generous mentorship.

I extend my heartfelt appreciation to the three anonymous organisations and all the employees who generously participated in this research. Your openness, time and engagement made this project possible, and I remain deeply grateful for your contribution.

I would like to offer special acknowledgement to the DCU Business School Faculty Administration Team, particularly Ruth Finnegan, and to the Graduate Studies Office, and Jonny Hobson, for their guidance, administrative support, and assistance in navigating the required milestones and processes throughout my doctoral studies.

I would also like to acknowledge the collegial support of Siobhan Ayres, Richard Nana Boateng, Anna Keller, Sian Kelly and Colette Real, each of whom provided important critical support and encouragement at various stages of this journey.

To Kirsten McDowell, Johanna Morris, Annette Ryan, Anna Labianca, Karolina Kajak, and Olga Kuzmin, your love and encouragement lightened this journey and sustained me through its most challenging moments. I love you all.

Finally, I express my sincere thanks to Dublin City University for providing the scholarship that was instrumental in making this remarkable learning journey and research possible. I am deeply grateful for this opportunity and look forward to contributing to the continued growth and excellence of the DCU community.

Table of Contents

Declaration ii
AI Declaration iii
Dedication iv
Acknowledgements v
Table of Contents vii
List of Tables xi
List of Figures xii
List of Abbreviations xiii
Abstract xiv
CHAPTER 1: INTRODUCTION 15
1.1 Background 15
1.2 Theoretical Foundations of the Research 17
1.3 Research Question and Objectives 22
1.4 Research Methodology 23
1.5 Contributions of the Research 26
1.6 Outline of the Structure of the Thesis 27
1.7 Conclusion 28
CHAPTER 2: SCOPING REVIEW 29
2.1 Introduction 29
2.2 Scoping Review Rationale 30
2.3 Methodology 32
2.4 Conceptual Boundaries and Themes in Hybrid Work 37
2.5 Theoretical Frameworks for Employee-Driven Innovation in Hybrid Work 41
2.6 Conceptualising and Operationalising Employee-Driven Innovation 48
2.7 Mechanisms of EDI 54
2.8 Mapping the Hybrid Work Conditions to Employee-Driven Innovation 60
2.9 Discussion 66
2.10 Research Gaps 70
2.11 Directions for the Current Research 72
2.12 Conclusion 75
CHAPTER 3: METHODOLOGY 76

3.1 Introduction 76
3.2 Philosophical Foundations Underpinning the Study of Hybrid Communication and Employee-Driven Innovation 76
3.3 Research Strategy and Methodological Approach 78
3.5 Mitigation of Cross-Sectional Study Limitations 82
3.6 Ethical Considerations 83
3.7 Conclusion 84
CHAPTER 4: STUDY 1 86
4.1 Introduction 86
4.2 Theoretical Framework 88
4.3 Social Capital in Hybrid Employee Networks: Assessing HRCR Against Existing MRT Operationalisations 91
4.4 Methodology 104
4.5 Data Analysis Strategy 109
4.6 Results 113
4.7 Discussion 117
4.8 Implications for Practice 119
4.9 Limitations and Future Directions 120
4.10 Conclusion 122
CHAPTER 5: STUDY 2 123
5.1 Introduction 123
5.2 Theoretical Framework: Social Capital in Personal Networks as a Catalyst for Innovative Work Performance 126
5.3 Innovative Work Performance in Hybrid Environments: An extended Media Richness Theory Lens via HRCR 132
5.4 The Moderating Role of HRCR on Social Capital Mobilisation and Innovative Work Performance 136
5.5 Conceptual Model 141
5.6 Methodology 142
5.7 Data Analysis Strategy 147
5.8 Results 153
5.9 Discussion 163
5.10 Implications for Practice 167
5.11 Limitations and Future Directions 168
5.12 Conclusion 169

CHAPTER 6: STUDY 3 171
6.1 Introduction 171
6.2 Theoretical Framework 173
6.3 Innovative Work Performance in Hybrid Environments: An extended media richness theory Lens via task virtuality 176
6.4 The Moderating Role of Task Virtuality in the Knowledge Sourcing and Innovative Performance Relationship 180
6.5 Conceptual Model 184
6.6 Methodology 185
6.7 Data Analysis Strategy 189
6.8 Results 192
6.9 Discussion 198
6.10 Implications for Practice 202
6.11 Limitations and Future Directions 203
6.12 Conclusion 205
CHAPTER 7: DISCUSSON AND CONCLUSIONS 206
7.1 Introduction 206
7.2 Synthesis of Findings 206
7.3 Research Contributions 209
7.4 Practical Implications 213
7.5 Research Limitations 215
7.6 Future Research Directions 217
7.7 Conclusion 220
REFERENCES 222
APPENDIX A Scoping Review Tables and Figures 330
A1 Search Query Inventory and Screening Summary 330
A.2 Inclusion Criteria for Study Selection 347
A.2 Exclusion Criteria for Study Selection 351
A.4 Sample of the Data Extraction illustrating study-level metadata and thematic categorisation codes 353
A.5 Glossary of Terms with Thematic Classification Relating to Remote-Enabled Work Environments 355
APPENDIX B: Research Documentation and Instruments 249
B1. SURVEY 1 249

B2. SURVEY 2 266
B3. SURVEY 3 276
APPENDIX C: Calculation Methods for Study Variables 297
C1. Calculating Network Diversity - Range of Resources (weighted) 297
C2. Calculating Employee Task Virtuality Levels 300
C3. Calculating Employee Digital Information Communication Quality (DICQ) Levels 301
C4. Calculating the Hybrid Relational Communication Ratio (HRCR) 303
C5. Calculating Threshold for DICQ via Process of Interpolation 305
C6. Calculating proportion of knowledge resources (weighted) 307

List of Tables

Table 2.1 *Analytical themes and disciplinary orientations in the literature on remote and hybrid work.* *38*
Table 2.2 *Analytic framework of EDI-relevant measures mapped against behavioural specificity, breadth of coverage, and collective stage coverage criteria.* *50*
Table 4.1 *Descriptive Statistics for Study 1 (N = 141)* *105*
Table 4.2 *Power estimates (Study 1)* *112*
Table 4.3 *Correlation Table (Study 1)* *113*
Table 4.4 *Welch's t-Tests and Linear Regression Analyses of Social Capital Resources across Media Richness Operationalisations (Study 1)* *116*
Table 5.1 *Descriptive Statistics for Study 2 (N = 204)* *143*
Table 5.2 *Confirmatory Factor Analysis (CFA) Model Fit Indices and Validity Statistics for Latent Constructs (Study 2)* *149*
Table 5.3 *Correlation Table (Study 2)* *153*
Table 5.4 *Hierarchical Regression Results for Shared Language (Study 2)* *155*
Table 5.5a *Hierarchical Regression Results for Trust Reliance (Study 2)* *155*
Table 5.5b *Hierarchical Regression Results for Trust Disclosure (Study 2)* *156*
Table 5.5c *Hierarchical Regression Results for Trust Composite (Study 2)* *156*
Table 5.6 *Hierarchical Regression Results for Knowledge Resources (Study 2)* *156*
Table 6.1 *Descriptive Statistics for Study 3 (N=102)* *187*
Table 6.2 *Correlation Table (Study 3)* *192*
Table 6.3 *Hierarchical Regression Results for Innovative Work Performance (Study 3)* *194*
Table 6.4 *Linear regression results across segmented levels of task virtuality (Study 3)* *195*
Table A.1 *Search Query Inventory and Screening Summary* *330*
Table A.2 *Inclusion Criteria for Study Selection* *347*
Table A.3 *Exclusion Criteria for Study Selection* *351*
Table A.4 *Sample of the Data Extraction: Study-level metadata and thematic categorisation* *353*
Table A.5 *Glossary of Terms with Thematic Classification* *355*

List of Figures

Figure 2.1 *PRISMA-ScR Flow Diagram Depicting the Two-Phase Study Selection Process 36*
Figure 4.1 *Conceptual Model Detailing The Proposed Relationship Between MRT Operationalisations of Communication Quality and Shared Capital (Study 1)..... 91*
Figure 5.1 *Conceptual Model (Study 2) - Innovative work performance shaped by HRCR and social capital dimensions 141*
Figure 5.2a *Moderation Model of the Interaction between HRCR and Shared Language influence on IWP 157*
Figure 5.2b *Effect of Shared Language and IWP at low, medium and high HRCR levels (plot)..... 158*
Figure 5.3a *Moderation Model of the Interaction between HRCR and Trust reliance influence on IWP 159*
Figure 5.3b *Effect of Trust Reliance and IWP at low, medium and high HRCR levels (plot) 159*
Figure 5.4a *Moderation Model of the Interaction between HRCR and Trust disclosure influence on IWP 160*
Figure 5.4b *Effect of Trust Disclosure and IWP at low, medium and high HRCR levels (plot)..... 160*
Figure 5.5a *Moderation Model of the Interaction between HRCR and Trust (two factor construct) influence on IWP..... 161*
Figure 5.5b *Effect of Trust (two factor construct) and IWP at low, medium and high HRCR levels (plot)..... 161*
Figure 5.6a *Moderation Model of the Interaction between HRCR and Knowledge resources influence on IWP 162*
Figure 5.6b *Effect of Knowledge Resources and IWP at low, medium and high HRCR levels (plot). 162*
Figure 6.1 *Conceptual Model (Study 3) 184*
Figure 6.2 *Moderated Regression Model (Study 3) 196*
Figure 6.3 *Interaction between Knowledge Sourcing and Innovative Work Performance at Low and High Levels of Task Virtuality (plot)..... 196*
Figure 6.4 *Interactions between Knowledge sourcing and task virtuality on innovative work performance at above average levels (plot) 197*

List of Abbreviations

Abbreviation	Definition
DICQ	Digital Information Communication Quality
DUI	Doing, Using and Interacting (Innovation Model)
EDI	Employee-Driven Innovation
HRCR	Hybrid Relational Communication Ratio
ICT	Information and Communication Technology
IWP	Innovative Work Performance
KM	Knowledge Management
MRT	Media Richness Theory
RI	Remote Intensity
RTO	Return-to-Office
SN	Social Networks
SCAP	Social Capital
TV	Task Virtuality

Abstract

Optimising Employee-Driven Innovation in Hybrid Work

A multi-study investigation extending media richness theory to examine how communication quality shapes social capital and knowledge sourcing behaviour

Natasha McDowell

Hybrid work, which blends office and remote flexibility, presents both challenges and opportunities for organisations aiming to support employee-driven innovation (EDI). In this thesis, EDI is operationalised as innovative work performance (IWP), reflecting employees' proactive generation and implementation of ideas in everyday work. Despite widespread adoption, its impact remains unclear, often resulting in ineffective policies. This thesis aims to examine how hybrid work conditions shape employees' social capital, knowledge sourcing behaviours, and ultimately IWP. Hybrid work conditions are operationalised using the of structural (Remote Intensity), technological (Digital Information Communication Quality), and spatial (Task Virtuality), influence employees' social capital and knowledge sourcing behaviours, and how these contribute to IWP. It also introduces the Hybrid Relational Communication Ratio (HRCR), an MRT-informed construct that captures the balance of face-to-face and technology-mediated communication across hybrid settings. HRCR was developed following a scoping review that identified conceptual and methodological gaps in existing MRT-based operationalisations for understanding hybrid communication quality. These hybrid work conditions are examined across three studies. Study 1 evaluates the predictive utility of MRT-based measures and HRCR for cognitive, relational, and structural dimensions of social capital. Study 2 examines how HRCR moderates the social capital-IWP relationship. Study 3 applies the Task Virtuality construct to test how hybrid conditions moderate the relationship between knowledge sourcing and IWP. Using cross-sectional surveys across three organisations, Study 1 (N = 141; approximately 846 alters, defined as individuals in participants' personal networks) found that lower HRCR scores (indicating richer communication) were associated with stronger social capital. Study 2 (N = 204; approximately 1,224 alters) found that HRCR moderated the negative social capital-IWP relationship. Study 3 (N = 102) showed that knowledge sourcing supported innovation at specific levels of task virtuality. Findings demonstrate that communication quality influences how employees engage with social capital and knowledge sourcing behaviours, and, under certain conditions, can buffer the effects of communication strain in supporting innovation. HRCR offers a practical lens for evaluating communication quality in hybrid contexts. Together, these studies extend media richness theory into hybrid work environments and clarify how communication conditions shape the social and knowledge practices that underpin employee-driven innovation.

CHAPTER 1: INTRODUCTION

1.1 Background

Organisations worldwide are increasingly challenged to sustain innovation within their hybrid workforces (Bloom et al., 2024; Gibbs et al., 2024; Ibec, 2024). What began as an efficiency-driven adaptation has evolved into a complex organisational challenge that threatens the fundamental conditions on which innovation depends (Keppler & Leonardi, 2023; Van Dijcke et al., 2024). The central tension lies in maintaining the interpersonal dynamics that enable new ideas when physical presence is inconsistent and communication becomes fragmented (Keppler & Leonardi, 2023). Hybrid models, in which staff divide their time between remote and on-site settings (Bloom et al., 2024; Iqbal et al., 2021; Vartiainen & Vanharanta, 2024), introduce vulnerabilities into the social and communicative processes essential for sustained innovation (Taskin & Bridoux, 2010; Yang et al., 2021). However, limited understanding of how these communicative processes operate within hybrid models leaves organisations uncertain and ill-equipped to manage the interpersonal interactions that drive innovation.

Hybrid work has emerged as a mainstream model as organisations and employees reassess how, when, and where work is best performed. Employees increasingly seek improved work-life balance, job satisfaction, and reduced commuting demands (Barrero et al., 2021; Bloom et al., 2024), while organisations have adopted hybrid arrangements to enhance retention, widen talent pools, reduce real-estate pressures, and support more adaptive ways of working. This transition is particularly pronounced in Ireland, where hybrid work has become a dominant and seemingly durable pattern. Findings from the 2023 *Remote Working in Ireland* Survey by McCarthy et al. (2023) illustrate the scale of this shift. Among nearly six thousand remote-capable employees, 59 per cent worked in hybrid arrangements which typically involve two or three remote days. Central Statistics Office data from 2025 reinforce this picture, showing that approximately 35 per cent of the overall workforce engages in hybrid or fully remote work. Similar global trends have been observed, with work-from-home practices stabilising at around 1.2 days per week for college-educated workers by 2025, representing approximately 25 per cent of their total workdays (Aksoy et al., 2025). This global plateau suggests that hybrid models are likely to persist, highlighting the importance of understanding their organisational implications.

Given the growing permanence of hybrid work, organisations now face a fundamental challenge, often described as the *hybrid paradox*. This refers to the tension between employees' desire for flexibility and organisations' need for connection and innovation (Ibec, 2024). Hybrid models can enhance agility and respond to strong employee demand by offering greater autonomy and flexibility (Kattenbach et al., 2010; Naqshbandi et al., 2024; Wang et al., 2021). However, their distributed nature can reduce spontaneous interactions and informal knowledge exchange, both of which are central to innovation (Keppler & Leonardi, 2023; Tröster & Brosi, 2025; Wu et al., 2023; Wut et al., 2022). These concerns underpin arguments for maintaining the importance of the physical office (Sailer et al., 2021) and have motivated some organisations to curb hybrid arrangements through return-to-office (RTO) mandates. Yet such mandates are increasingly met with employee resistance due to the perceived loss of autonomy and work-life flexibility (Van Dijcke et al., 2024). Consequently, organisations must navigate the hybrid paradox by balancing employees' desire for flexibility with their own need for connection and innovation (Ibec, 2024).

However, this navigation is hindered by a critical research gap. Relatively limited research has examined how the interpersonal dynamics that underpin innovation occur in hybrid environments (Waizenegger et al., 2020), even though communication becomes more fragmented in hybrid settings (Mesmer-Magnus et al., 2011; Szulanski, 2000). Organisations are increasingly concerned that the everyday interpersonal dynamics that support learning and knowledge exchange may weaken (Bartel et al., 2012; Gajendran & Joshi, 2012). These concerns highlight the need to understand how interpersonal dynamics function within hybrid environments. Because research across remote, distributed, and hybrid work remains fragmented (Waizenegger et al., 2020), a conceptual gap persists, leaving organisations without a consistent basis for assessing hybrid environments. Methodologically, employers lack a reliable foundation for evaluating the interpersonal dynamics on which innovation depends. As a result, organisations struggle to create the communicative conditions that support innovation (Bloom et al., 2024). Addressing this gap therefore motivates the present research.

By relying on structural assumptions in hybrid policy design and emphasising location patterns over interpersonal communication dynamics (Bloom et al., 2024), organisations create significant vulnerabilities. This focus neglects the communicative and relational conditions, the very interactional processes, on which innovative work and long-term capacity depend (Ibec, 2024; Van Dijcke et al., 2024). Research consistently shows that the conditions supporting

innovation depend more on these dynamics than on physical structures. However, innovation deteriorates when spontaneous encounters decline (Gibbs et al., 2024; Hiller & Zarnow, 2024), social capital weakens when face-to-face interaction does not translate into meaningful interpersonal contact (Keppler & Leonardi, 2023; van Zoonen et al., 2024), and knowledge exchange becomes constrained when communication is fragmented, even within shared workplaces (Høyrup, 2010; Waizenegger et al., 2020). These risks highlight the practical urgency of developing a more relationally grounded understanding of hybrid communication quality to sustain the mechanisms that support long-term innovative capacity.

In this thesis, innovation is conceptualised as employee-driven rather than formal or R&D-led (Høyrup, 2010). Because hybrid work reshapes employees' everyday interactions, the thesis focuses on how communicative conditions influence employees' ability to mobilise the interpersonal resources needed for innovative work performance behaviour. This motivates the theoretical foundations outlined in Section 1.2.

1.2 Theoretical Foundations of the Research

This section outlines the theoretical foundations used to examine communication in hybrid work environments. Hybrid work alters employees' patterns of interaction, yet existing theories, which tend to focus on structural or media-choice assumptions, struggle to account for how innovation occurs when communication shifts between face-to-face and technology-mediated modes. Media richness theory (MRT) provides the central communication framework for examining these dynamics (Daft & Lengel, 1986). This section introduces MRT, outlines its limitations for hybrid contexts, and discusses the MRT-based operationalisations used in this thesis, including task virtuality and the newly developed Hybrid Relational Communication Ratio (HRCR). Together, these provide the basis for identifying relevant measures of communication quality and for constructing the theoretical frameworks that guide the empirical studies.

1.2.1 Media Richness Theory as the Foundational Lens

Media richness theory, developed by Daft and Lengel (1986), posits that communication media differ in their capacity to convey multiple cues, enable immediate feedback, support natural language, and provide personal focus. Effective communication depends on achieving a fit between the demands of a task and the capacity of the medium. Richer media, such as face-to-face interaction, are suited to tasks involving ambiguity, interdependence, and tacit

knowledge, while leaner media are more appropriate for routine, unambiguous tasks (Kirkman et al., 2004).

These principles mirror the communicative conditions that support employee-driven innovation, which is characterised by informal exchanges, interdependence, and the sharing of tacit knowledge (Høyrup, 2010). The effectiveness of such interaction depends on clarity and interpersonal responsiveness, the very conditions that MRT identifies as essential for rich communication. MRT therefore provides a relevant theoretical basis for understanding how communicative conditions influence employees' ability to exchange knowledge that is critical for innovation.

In this thesis, MRT functions as the foundational theory for explaining how communication quality shapes the interpersonal dynamics that underpin innovation and the interaction-based mechanisms of social capital mobilisation and knowledge sourcing.

1.2.2 A Critique of Media Richness Theory: Limitations and the Theoretical Gap

Although MRT provides a strong starting point for understanding communication quality, its application to contemporary hybrid environments is significantly limited (Ishii et al., 2019; Wu et al., 2023). Its usefulness is constrained by its structural orientation and its assumption that media possess fixed richness characteristics. It does not fully account for the relational and cumulative complexities that characterise hybrid work (Bartel et al., 2012; Waizenegger et al., 2020). Hybrid arrangements rely on shifting combinations of synchronous, asynchronous, face-to-face and technology-mediated communication, conditions that extend beyond MRT's original focus on fixed media choice. Later operationalisations of MRT, including constructs such as team virtuality and task virtuality (Kirkman & Mathieu, 2005; Orhan et al., 2016), broaden the framework by considering the spatial distribution of work. However, these extensions continue to emphasise structural configuration, such as electronic dependence or physical distance, rather than the interpersonal dynamics that shape communication quality in practice and in doing so they overlook the informal exchanges that are central to innovation (Høyrup, 2010).

As a result, communication quality can vary substantially across and within digital and in-person interactions, shaping how employees leverage relationships to mobilise resources for innovation. These limitations make it necessary to assess whether MRT-based operationalisations adequately represent hybrid communication conditions, including

comparison with newer, relationally attuned alternatives. The following section outlines the measurement approaches used in this thesis and establishes the basis for evaluating their utility.

1.2.3 Media Richness Operationalisations for Hybrid Work

To investigate communication quality in hybrid environments, this thesis draws on four operationalisations that develop from or extend media richness theory. Each provides a different means of representing communication quality as employees work across physical and technologically mediated contexts. Their conceptual focus, measurement logic and relevance to hybrid work are outlined below.

- Remote Intensity (RI) reflects the proportion of time employees work away from the organisational site (Virick et al., 2010). It captures the structural distribution of work and is typically used as a proxy for communication conditions by inferring that time spent off-site involves greater reliance on technology-mediated interaction and that on-site work provides more opportunities for face-to-face communication (Bloom et al., 2024; Choudhury et al., 2021). RI therefore represents communication quality indirectly through location-based assumptions rather than by assessing the characteristics of interaction itself.
- Digital Information Communication Quality (DICQ) represents communication quality by assessing the richness characteristics of employees' dominant technology-mediated channels. It classifies written, audio, avatar and video communication according to the level of cues, immediacy and synchronicity they afford, following MRT assumptions about information capacity (Daft & Lengel, 1986; Kirkman & Mathieu, 2005). In doing so, DICQ captures communication quality through the richness of the digital media employees use most frequently.
- Task virtuality (TV) reflects the extent to which work and communication occur without physical co-presence (Orhan, 2014; Orhan et al., 2016). It captures communication conditions through the structural pattern of interaction, particularly the degree to which employees rely on technology-mediated communication rather than face-to-face contact (Kirkman & Mathieu, 2005). Communication quality is represented indirectly by indicating the reduction in collocated communication.
- The Hybrid Relational Communication Ratio (HRCR) is introduced in this thesis as a relationally grounded extension of media richness theory tailored to hybrid work. It

captures communication quality by combining employees' level of face-to-face interaction with their interpersonal quality of technology-mediated communication in a weighted composite index. HRCR represents communication quality directly by reflecting the cumulative interpersonal dynamics that occur across both physical and digital modalities.

Together, these four operationalisations provide complementary perspectives on communication conditions in hybrid environments. The next section explains the need to compare their conceptual and empirical utility, which forms the basis of the first empirical study.

1.2.4 Strategy for Determining Relevant Constructs for Hybrid Work

Hybrid work creates communication conditions that differ significantly from those assumed in traditional face-to-face or fully remote settings (Barrero et al., 2021). It is therefore necessary to assess which existing operationalisations of media richness theory are appropriate for analysing communication in hybrid environments. Although RI, DICQ and TV each provide an established means of representing communication, it is unclear whether any of them adequately capture the dynamic and relational characteristics of communication observed in hybrid environments (Begemann et al., 2024; Waizenegger et al., 2020). These measures were developed under assumptions of spatial separation or stable media choice and may not reflect how communication shifts across modalities in hybrid arrangements. The HRCR was introduced in this thesis to address this limitation, but its conceptual and empirical value must be examined in relation to existing approaches. This requires assessing how well each measure captures the communication conditions that influence interaction-dependent mechanisms, particularly social capital mobilisation. Social capital is a key mechanism through which hybrid communication conditions exert their effects. It therefore serves as the dependent variable in Study 1, making it the appropriate basis for evaluating the utility of each operationalisation. While the first study in this research tests the predictive power of the communication measures using social capital, the ultimate central focus of this research is employee-driven innovation (EDI), hereafter referred to as innovative work performance (IWP), which is addressed in the following section.

1.2.5 Employee-Driven Innovation in Hybrid Contexts

Employee-driven innovation (EDI) can be defined as "the generation and implementation of new ideas, products and processes originating from employees who are not assigned to this task as their primary function" (Høyrup, 2010, p. 143). This definition

emphasises the proactive, self-initiated nature of employees' efforts to improve their work practices and organisational routines through everyday interactions and experiential learning.
In this thesis, EDI is represented by the term innovative work performance (IWP) and is operationalised through Griffin et al.'s (2007) framework of proactive performance, reflecting employees' discretionary behavioural efforts to initiate, develop, and apply new approaches in routine tasks to bring about "innovative change" (Griffin et al., 2007, p. 34)[1]. The measure's three interrelated dimensions of individual, team and organisational proactivity recognise that innovation should occur at all levels of the organisation. They also capture the behavioural essence of EDI, distinguishing it from related constructs centred on effort, persistence or compliance. The framework also embodies an *active construct* perspective consistent with Campbell et al.'s (1993) view that "performance is what the organisation hires one to do, and do well. Performance is not the consequence or result of action; it is the action itself".

EDI is a form of innovation rooted in social and learning processes (Høyrup, 2010). The Doing, Using and Interacting (DUI) model proposed by Jensen et al. (2007) provides the theoretical basis for understanding how IWP emerges. The DUI perspective views innovation as emerging from ongoing interaction, experiential learning and the informal exchange of tacit knowledge (Harmaakorpi et al., 2017; Jensen et al., 2007). Through everyday conversations and informal ties, employees identify problems, access diverse viewpoints and generate solutions. Innovation, in this sense, is interaction-driven rather than dependent on formal processes. Hybrid work alters these interactional foundations. Reduced shared physical presence limits opportunities for spontaneous encounters and informal learning, making it more difficult to sustain the routine exchanges through which knowledge flows and ideas develop (Qureshi et al., 2018; Waizenegger et al., 2020; Yang et al., 2021). These changes can weaken access to critical resources and disrupt the problem-solving dynamics that support innovation. However, such effects depend on the quality of interpersonal communication. High-quality communication can preserve the interactional conditions needed for IWP, even when employees alternate between physical and virtual settings.

Despite the centrality of interaction for innovation, relatively little is known about how employee-driven innovation unfolds under hybrid conditions (Gibbs et al., 2024). Existing

[1] Employee-Driven Innovation (EDI) was operationalised using Griffin, Neal and Parker's (2007) proactive performance measure, which captures a form of work role performance "in which an individual engages in self-starting, future-oriented behaviour" (Griffin et al., 2007, p. 34). To ensure consistency with the established EDI framework, this is uniformly referred to as Innovative Work Performance (IWP) throughout this document.

research on hybrid work has focused largely on outcomes such as performance and well-being (Mazzei et al., 2023; Naqshbandi et al., 2024), leaving the interactional mechanisms that enable IWP underexamined. Understanding how these mechanisms operate in hybrid contexts therefore represents a significant gap in the EDI literature.

Two interaction-dependent mechanisms underpin employee-driven innovation in hybrid settings: social capital mobilisation and knowledge sourcing. The first, social capital, comprises the structural, relational and cognitive resources embedded in work-relevant networks (Nahapiet & Ghoshal, 1998). As Nahapiet and Ghoshal (1998) argue, these resources support shared understanding, trust and access to expertise, enabling employees to combine knowledge and develop ideas. Because hybrid communication conditions reduce face-to-face interaction and limit the informal exchanges that sustain relational ties (Keppler & Leonardi, 2023; van Zoonen et al., 2024), employees' ability to mobilise social capital becomes increasingly dependent on communication quality across both face-to-face and technology-mediated contexts.

The second mechanism is knowledge sourcing, which refers to employees' proactive efforts to seek and exchange information through informal interaction (Gray & Meister, 2004, 2006). As an interaction-based knowledge management behaviour, knowledge sourcing helps employees obtain tacit insights and practical know-how that support creative problem-solving. Hybrid environments can constrain these behaviours by reducing spontaneous contact and dispersing informational cues. Under these conditions knowledge sourcing becomes more dependent on communication quality in hybrid settings.

Social capital mobilisation and knowledge sourcing represent the two DUI-grounded interaction mechanisms through which hybrid communication conditions can influence employee-driven innovation. These two mechanisms form the distinct focus for Studies 2 and 3, allowing for a comprehensive examination of how both communication quality dynamics shape EDI.

1.3 Research Question and Objectives

Building on the theoretical foundations outlined, this thesis is guided by the following overarching research question: *How do hybrid environments shape employee-driven innovation (EDI) directly and indirectly, through social capital mobilisation (structural, relational, cognitive) and employees' knowledge sourcing behaviours?*

The objectives of the thesis are as follows:

1. To establish the Hybrid Relational Communication Ratio, a relationally grounded extension of media richness theory tailored to hybrid work.
2. To investigate how hybrid communication conditions influence structural, relational, and cognitive social capital mobilisation and knowledge sourcing behaviour for the purposes of EDI (as enacted through IWP).
3. To provide practical guidance for organisations on how to design human-centred hybrid policies that foster interpersonal conditions essential for EDI.

To address the research question, the thesis adopts a multi-study design consisting of a scoping review and three empirical studies. These are outlined in detail in Section 1.4.

1.4 Research Methodology

This thesis adopts a quantitative, multi-study research design grounded in a post-positivist, theory-testing orientation. The overarching aim is to examine how communication conditions in hybrid work environments influence employee-driven innovation directly and through the interaction-dependent mechanisms of social capital mobilisation and knowledge sourcing. This methodology follows a deductive logic, drawing on established frameworks, media richness theory, social capital theory, and knowledge management to test theoretically derived hypotheses that reflect the dynamics of interpersonal communication in hybrid work. Guided by this post-positivist stance, the research seeks probabilistic explanations of how hybrid communication attributes such as RI, DICQ, TV and HRCR shape employees' access to social resources and their subsequent innovative work performance. This aligns with the goal of identifying generalisable associations while recognising variation across organisational settings.

Prior to the empirical studies, a scoping review is presented to synthesise existing research on hybrid work, communication, social capital, knowledge sourcing, and employee-driven innovation. This review maps the conceptual boundaries of hybrid work and identifies theoretical and empirical gaps in how EDI, social capital, and knowledge sourcing are understood. This provides the rationale for the MRT-based operationalisations used in the empirical studies and establishes the conceptual foundation for the quantitative research programme.

1.4.1 Overview of *the Research Design*

Across the thesis, a multi-study, cross-sectional strategy is used to examine complementary facets of hybrid communication and their effects on social capital, knowledge behaviours, and innovative output. Each empirical study functions as an independent investigation while contributing to a cumulative understanding of how interpersonal communication quality enables or constrains EDI. Together, the studies create a coherent quantitative programme of research that examines both the conditions (communication quality) and mechanisms (social capital, knowledge sourcing) underlying innovative performance in hybrid contexts.

1.4.2 Justification for the Methodological Approach

The post-positivist paradigm provides the foundation for adopting a quantitative, deductive approach. This philosophy assumes an objective but imperfectly knowable organisational reality, making it suitable for research aiming to identify probabilistic relationships among measurable constructs (Creswell, 2014; Phillips & Burbules, 2000). The approach enables systematic testing of theoretical propositions derived from MRT and social capital theory while allowing for contextual variability across hybrid environments. A pragmatic orientation further supports the methodological choices made. Pragmatism emphasises the usefulness of knowledge and the application of theory to real organisational problems, aligning well with the thesis' aim of generating insights relevant to the design and management of hybrid workplaces. Cross-sectional survey designs were therefore selected as the most feasible and informative approach for accessing diverse samples and capturing employees' lived communication experiences across organisational contexts.

1.4.3 Overview of Empirical Studies

The empirical research comprises three cross-sectional studies conducted across diverse hybrid-working organisational contexts. Each study examines a different aspect of communication dynamics in hybrid settings while building on a shared theoretical foundation:

- **Study 1** examines how four MRT-based operationalisations: RI, DICQ, TV, and the novel HRCR, influence employees' social capital mobilisation, measured through cognitive, relational, and structural dimensions of personal networks.

- **Study 2** investigates how communication conditions, operationalised through HRCR, shape the translation of social capital (cognitive, relational, structural), into innovative work performance.
- **Study 3** investigates how hybrid communication conditions, operationalised through task virtuality, shape knowledge sourcing behaviours and their relationship with innovative work performance drawing on a time-separated data collection design.

Together, the studies allow for a cumulative examination of how hybrid communication quality affects interaction-based resources and innovation across varied organisational environments.

1.4.4 Data and Analytical Approach

Primary data were collected using individual-level online surveys administered to knowledge-intensive professionals working in hybrid roles. The surveys included validated scales and theory-driven indices. Across the studies, analysis primarily involved regression-based techniques to test predictive and moderating relationships, supplemented by appropriate validity checks for the measurement models.

Analytical strategies were regression-based, consistent with the deductive research design:

- **Study 1** employs linear regression and threshold-based group comparisons (using Welch's *t*-tests) to compare the explanatory strength of the four operationalisations. Validity is ensured through Confirmatory Factor Analysis (CFA) and reliability checks.
- **Study 2** utilises moderated linear regression and advanced interaction modelling (including the Johnson-Neyman technique and flip point calculation) to identify specific HRCR thresholds and map conditional regions of significance. This design is supported by CFA, reliability analyses, and Intraclass Correlation (ICC) checks to justify individual-level analysis.
- **Study 3** combines a two-wave, temporally separated cross-sectional design (to mitigate common method bias) with moderated regression and groupwise regression across task virtuality thresholds to test the conditional effects. Model integrity is ensured via CFA, ICC checks, and power analysis.

Comprehensive methodological justification, construct development, sampling procedures, ethical considerations, and full analytical protocols are provided in Chapter 3 (Methodology), with study-specific procedures detailed in the methods sections of each empirical chapter.

1.5 Contributions of the Research

This thesis addresses the key problem of sustaining employee-driven innovation in hybrid work environments. Existing research provides limited insight into when and how interpersonal communication quality, through the mobilisation of social capital and knowledge sourcing across physical and digital boundaries, enables or constrains EDI. The core purpose of this research is therefore to explain EDI through communication processes by extending and reconceptualising media richness theory so that it captures the interpersonal dynamics of hybrid communication. By moving MRT beyond a narrow focus on media choice and technological solutions, it provides a new conceptual lens and empirical evidence for how EDI occurs in hybrid conditions. Theoretically, this research advances several key areas of study. It extends MRT to hybrid environments where face-to-face and technology-mediated communication coexist (Daft & Lengel, 1986; Orhan et al., 2016). HRCR extends MRT by incorporating the quality of employees' interpersonal interactions across face-to-face and technology-mediated contexts, offering a more relationally attuned analysis of hybrid communication (Dennis et al., 2008; Leonardi, 2011; Wu et al., 2023). This theoretical extension is further strengthened through integration with complementary perspectives. Specifically, the thesis combines MRT with social capital theory (Nahapiet & Ghoshal, 1998) and EDI theory (Høyrup, 2010; Renkema et al., 2021), to explain how communication mobilises social capital for innovation. Separately, it integrates MRT, knowledge management theory (Alavi & Leidner, 2001; Kesting & Ulhøi, 2010; Nonaka & Takeuchi, 1995), and EDI theory to examine how hybrid communication conditions shape employee knowledge sourcing behaviours. Together, these frameworks provide a comprehensive foundation for how communication quality in hybrid environments enables innovation.

Methodologically, the thesis introduces and validates HRCR as a new relationally grounded measurement extension of MRT specifically tailored to hybrid environments. This new measure allows researchers to capture the quality of cumulative interpersonal communication more accurately. *Empirically*, the research makes three key contributions. First, it empirically demonstrates HRCR's validity, showing that it explains variation in social capital in hybrid conditions when compared to proxies such as remote intensity and task virtuality. Second, it reveals a contingent relationship between social capital and EDI, uncovering a threshold where social capital's influence on innovation switches from detrimental negative to positive once communication quality (HRCR) is sufficiently high. Finally, the findings show a

non-linear relationship between knowledge sourcing and EDI, revealing conditions where higher levels of task virtuality can transform knowledge sourcing into a positive driver of IWP, the behavioural realisation of employee-driven innovation.

Practically, the findings provide guidance for organisations on how to design hybrid work strategies that move beyond a narrow focus on media choice and technological solutions (Bloom et al., 2024; Waizenegger et al., 2020). They highlight the importance of strengthening relational bonds among colleagues and enabling interpersonal communication to mobilise social capital and informal knowledge exchange, which are essential to sustaining employee-driven innovation (Allen et al., 2015; Kirkman et al., 2004; Leonardi & Treem, 2020).

These contributions highlight several practical implications. These findings demonstrate that sustaining employee-driven innovation in hybrid environments depends on managing the relational dynamics of communication rather than relying on structural indicators such as location mandates. The findings further indicate that organisations should benefit from diagnosing communication needs, tailoring hybrid arrangements accordingly, and establishing clear day-to-day communication practices that support trust, clarity, and knowledge flow. They also show that the value of social capital and knowledge sourcing depends on the interpersonal conditions under which they occur.

Collectively, these contributions lay a foundation for future research and offer actionable insights for sustaining EDI in hybrid environments.

1.6 Outline of the Structure of the Thesis

The thesis is structured as follows. *Chapter 2* presents a scoping review of the literature on hybrid work, mapping key concepts, mechanisms, and gaps, and highlighting the role of social capital, knowledge sourcing, and communication quality as central themes for the empirical studies. *Chapter 3* outlines the overarching research methodology, including the philosophical stance, research design, and ethical considerations. Chapter 4 reports the first empirical study, which extends media richness theory with a relational perspective on communication quality through the HRCR and tests this measure against established MRT approaches in explaining social capital variations in hybrid employee networks. Chapter 5 presents the second empirical study, which examines how social capital and the HRCR interact to shape innovative work performance, the behavioural realisation of EDI, testing both direct and moderating effects in hybrid contexts. Chapter 6 details the third and final empirical study,

which adopts a knowledge management perspective to investigate how knowledge sourcing and task virtuality influence innovative work performance. Finally, Chapter 7 synthesises the findings from all three empirical studies, highlighting the theoretical, methodological, and practical contributions of the thesis, addressing its limitations, and identifying directions for future research.

1.7 Conclusion

This chapter has established the need for a relationally grounded understanding of communication in hybrid work environments. It outlined how the rise of hybrid work has intensified the hybrid paradox, creating a critical gap in understanding how everyday interpersonal dynamics support employee-driven innovation. By reviewing the limitations of traditional media richness theory and its existing operationalisations, including remote intensity, digital information communication quality and task virtuality, the chapter showed that structural or media choice assumptions are insufficient for explaining how innovation unfolds when communication shifts continuously across physical and digital settings. In response, the Hybrid Relational Communication Ratio (HRCR) was introduced as a new, theoretically informed metric designed to capture the cumulative interpersonal quality of hybrid communication more accurately. Positioning HRCR alongside established MRT-based measures provided the conceptual basis for examining how hybrid communication conditions shape the two interaction-based mechanisms that underpin employee-driven innovation, social capital mobilisation and knowledge sourcing. Building on this foundation, the chapter outlined the overarching research question, theoretical logic, methodological approach and multi-study design that guide the thesis. The next chapter presents the scoping review, which maps existing research on hybrid work, social capital, knowledge sourcing and employee-driven innovation to clarify conceptual boundaries, identify gaps and establish the empirical and theoretical groundwork for the studies that follow.

CHAPTER 2: SCOPING REVIEW

2.1 Introduction

Despite the widespread adoption of hybrid work (Bloom et al., 2024; Gibbs et al., 2024), organisations continue to struggle to sustain innovation when employees are no longer co-located (Carmody et al., 2022; Waizenegger et al., 2020). As hybrid models become the norm, the informal and spontaneous interactions that once supported learning, collaboration, and change have become fragmented and uneven (Allen et al., 2015; Bailey & Kurland, 2002). This disruption undermines organisational adaptability and competitiveness by weakening employee-driven innovation (Kesting & Ulhøi, 2010), which depends on knowledge sharing and collaboration across boundaries (Jensen et al., 2007). Yet, despite the practical urgency of these challenges, there is limited conceptual and empirical understanding of how employee-driven innovation, defined as the self-initiated contributions employees make to improvement and learning (Høyrup, 2010), can be sustained in hybrid contexts where traditional, co-located interaction is no longer the norm (Darban, 2024; Keppler & Leonardi, 2023). This reflects broader trends in virtual and hybrid work research, which remains conceptually fragmented and empirically uneven, with limited theoretical integration and inconsistent attention to hybrid contexts (Bell & McAlpine, 2023).

Research on hybrid work has expanded rapidly, but theoretical applications are inconsistent with many studies conflating hybrid, remote, and telework (Sarker et al., 2011; Weber & Kim, 2015). EDI is particularly sensitive to hybrid conditions because it is rooted in the informal, interaction-based processes of the doing, using and interacting (DUI) mode of innovation, which rely on high-quality interpersonal exchanges for knowledge sharing and learning (Høyrup, 2010; Jensen et al., 2007). When hybrid work arrangements disrupt these exchanges, the everyday social and communicative foundations of EDI are weakened, leaving managers uncertain about how to sustain employee-led innovation in this context. As a result, it remains unclear how the social and knowledge-sharing mechanisms that underpin EDI operate when physical and virtual interactions are interwoven creating risk to its capacity to remain a source of competitive advantage (Kesting & Ulhøi, 2010).

The aim of this chapter is to clarify how employee-driven innovation operates in hybrid work environments, with particular attention to the mechanisms that sustain it. Social capital mobilisation, typically analysed in structural, relational and cognitive terms (Nahapiet &

Ghoshal, 1998), and knowledge sourcing, understood as employees' proactive efforts to seek and exchange information informally (Gray & Meister, 2004, 2006), are both widely recognised as important for innovation. However, little is known about how these mechanisms function when physical and virtual interactions are interwoven, leaving their contribution to EDI in hybrid contexts poorly understood (e.g., Darban, 2024; Keppler & Leonardi, 2023). This chapter addresses these gaps by systematically reviewing the literature to clarify how EDI operates in hybrid contexts and to identify the conceptual and methodological limitations that currently constrain understanding.

A central issue for this review is that many theories used to explain EDI, including social capital and knowledge management frameworks, were developed for co-located work settings (Nahapiet & Ghoshal, 1998; Nonaka & Takeuchi, 1995). Their relevance to hybrid environments, where physical and virtual interactions are interwoven, remains uncertain (Carmody et al., 2022; Waizenegger et al., 2020). This uncertainty is compounded by methodological shortfalls, as little guidance exists on how to adapt established frameworks or create new approaches for hybrid contexts (Carmody et al., 2022; Kniffin et al., 2021). Without a coherent theoretical basis, studies risk relying on frameworks that under-specify the relational and communicative dynamics of hybrid work (Bartel et al., 2012). As a result, cohesive strategies to support the mechanisms underpinning EDI in such environments cannot be developed (Cadeddu et al., 2023; Lauring & Jonasson, 2025). The lack of clear guidance leaves managers with limited direction for designing systems that sustain informal social mechanisms and support EDI, leaving employees without the resources, expertise, or support needed to generate ideas, solve problems, and implement change (Che et al., 2019; Gray & Meister, 2006). Together, these issues limit understanding of how employees informally access social resources and engage in innovation-related activities that sustain bottom-up innovation (Bloom et al., 2024; Lauring & Jonasson, 2025; Vartiainen & Vanharanta, 2024). To address these conceptual and empirical inconsistencies, the following section outlines the rationale for adopting a scoping review approach.

2.2 Scoping Review Rationale

The fragmented and conceptually inconsistent state of research on hybrid work and EDI stems from a limited number of quantitative studies, an underdeveloped EDI literature, and inconsistent terminology for hybrid and related work arrangements (Lauring & Jonasson, 2025).

This hinders the development of a cohesive understanding of how work arrangements shape EDI and its informal mechanisms (Cadeddu et al., 2023; Lauring & Jonasson, 2025). A review of research therefore requires a methodology capable of mapping scattered evidence and clarifying definitional boundaries. To address this fragmentation and lack of conceptual clarity, this study adopts a scoping review methodology following the guidelines proposed by Arksey and O'Malley (2005) and refined by Tricco et al. (2016) and Munn et al. (2018). Scoping reviews systematically map diverse bodies of research, clarify boundaries, and highlight theoretical gaps, making them especially well-suited for synthesising the scattered literature on hybrid work and EDI (Munn et al., 2018; Tricco et al., 2016). This review establishes a cohesive conceptual foundation for a more rigorous research agenda. To address inconsistent terminology, it adopts 'remote-enabled' as a unifying term for any work setting in which digitally mediated interaction and/or the conditions of the working arrangement inherently involve an element of remoteness, for example spatial, temporal, or organisational dispersion (Maznevski & Chudoba, 2000; Orhan et al., 2016). This definition responds to ongoing inconsistencies in how hybrid, remote, and related work arrangements are conceptualised (Carmody et al., 2022; Lauring & Jonasson, 2025) and reflects recognition that similar remote-type dynamics can also occur in co-located contexts (Keppler & Leonardi, 2023). This integrative lens supports synthesis across models and provides a shared vocabulary for analysing work-innovation dynamics (Munn et al., 2018).

Drawing on insights from EDI, social capital theory, and knowledge management, the review will map how EDI manifests in remote-enabled environments, capturing the complex and interconnected nature of contemporary work (Maznevski & Chudoba, 2000). Based on this overarching research aim this review is guided by the following research questions:

- RQ1: How have remote-enabled work environments been *defined and theorised*, and how do these perspectives inform and underpin theoretical understanding of the conditions that enable employee-driven innovation (EDI)?
- RQ2: What is the current conceptual and operational understanding of EDI in the literature, and what roles do social capital mobilisation and knowledge sourcing behaviours play in enabling it?
- RQ3: What factors and conditions in hybrid work environments influence EDI and shape the informal mechanisms that support it?

This chapter begins by outlining the scoping review methodology before synthesising evidence across key dimensions: conceptual foundations, mechanisms of employee-driven innovation, and how hybrid work conditions shape these mechanisms. The scoping review concludes with a discussion that synthesises insights across the research questions, followed by the identification of key research gaps. These gaps inform the directions for the current research, which link the review findings to the empirical focus of the thesis.

2.3 Methodology

This review is guided by the five-stage protocol developed by Arksey and O'Malley (2005), which includes: (1) identifying the research question; (2) finding relevant studies; (3) selecting studies; (4) charting the data; and (5) synthesising the findings. It also incorporates methodological refinements proposed by Levac et al. (2010) and Peters et al. (2015), including refinement of the research questions, transparent eligibility criteria, systematic study selection, structured data charting, and basic quality appraisals. In addition, the review draws on the methodological guidance of Munn et al. (2018), who argue that scoping reviews are particularly useful in fields that are broad, fragmented and poorly conceptualised. They advocate extending scoping reviews beyond descriptive mapping to identify conceptual gaps, synthesise across adjacent literatures and inform future research directions. To ensure transparency and replicability in reporting, this review adheres to the Preferred Reporting Items for Systematic Reviews and Meta-Analyses Extension for Scoping Reviews (PRISMA-ScR), as outlined by Tricco et al. (2018). In line with this combined guidance, the review not only maps core constructs but also draws on related domains to uncover underexplored intersections. This approach is especially important because the literature in this area is interdisciplinary and conceptually fragmented, with key terms and ideas often applied inconsistently.

2.3.1 Search Strategy

The search strategy was theory-led and guided by the research questions. A structured protocol was implemented using Boolean logic in the Scopus database, which was selected for its broad coverage of psychology, sociology, and business literature. The search was conducted across four central domains: EDI, social networks/social capital, knowledge management, and remote-enabled work. Following foundational scoping review procedures (Arksey & O'Malley, 2005; Levac et al., 2010; Peters et al., 2015), the strategy was designed for transparency and breadth. In Phase 1, the objective was to map the literature on workplace-based EDI, knowledge

processes, and social networks/social capital. Search queries were informed by preliminary scans and expert-informed keyword selection, following systematic review guidelines (e.g., Tranfield et al., 2003; Webster & Watson, 2002). Keywords were chosen to reflect each domain's conceptual scope, including terms such as "ego-centric" for social networks (Nahapiet & Ghoshal, 1998), "knowledge sourcing" for knowledge management, and "job crafting" (Wrzesniewski & Dutton, 2001) for EDI. The search also included adjacent outcomes such as well-being and informal learning (Amenduni et al., 2022; Berraies et al., 2020). In Phase 2, the focus shifted to exploring how remote-enabled work affects employee behaviours and experiences. The search queries focused specifically on this theme in relation to EDI, knowledge management and social networks/social capital. Targeted keywords such as "task virtuality," "teleworking," and "virtual teams" were used to broaden the search beyond general terms like "remote" or "hybrid" (Allen et al., 2015; Gibson & Gibbs, 2006; Kirkman & Mathieu, 2005; Martins et al., 2004), in response to ongoing fragmentation in the field (Lauring & Jonasson, 2025; Raghuram et al., 2019). All identified articles were compiled into an Excel database. Key features, such as research methods and the identification of relevant domains within each article, were coded to streamline the screening process and identify the most pertinent sources. Only studies offering meaningful conceptual or empirical insights relevant to the research questions were examined in full. A full list of search terms is provided in Appendix A, Table 1.

2.3.2 Criteria for Data Selection

A structured screening process was applied across two search phases to ensure methodological rigor and thematic consistency. All articles were assessed using a common set of eligibility criteria aligned with the review's research objectives. Studies were included if they:

- Addressed EDI, knowledge behaviours, or social networks/social capital within remote-enabled work contexts (including hybrid, remote, and virtual environments);
- Were situated in formal organisational settings and examined individual- or group-level mechanisms that support innovation, such as knowledge sharing, informal learning, or interpersonal network structures;
- Covered a broad range of constructs, including proactive work behaviours (e.g., taking charge), cognitive enablers (e.g., autonomy), and contextual or relational factors (e.g., communication quality);

- Investigated communication dynamics, including the role of digital tools, virtuality, or media richness, or were seminal theoretical contributions relevant to the review's aims.

Studies were excluded if they:

- Focused on non-employee populations, were outside of organisational contexts, or conceptualised innovation as a top-down process.
- Lacked theoretical grounding, showed weak methodological quality, were not peer-reviewed, or were unavailable in English or full-text format.

Details regarding the predefined eligibility criteria are provided in Appendix A, Tables 2 and 3.

2.3.3 Screening Process

A structured, multi-phase strategy guided by methodological refinements from Levac et al. (2010) and Peters et al. (2015) was followed. The process was recorded using a Preferred Reporting Items for Systematic Reviews (PRISMA-ScR) flow diagram, which details the number of records identified, screened, excluded, and included at each stage. The PRISMA-ScR guideline, developed through a 24-member expert consensus process (Tricco et al., 2018), is widely used to enhance transparency and consistency in scoping reviews. Metadata from Phases 1 and 2 was exported into an Excel-based system and compiled into separate databases to reflect their distinct query sets and support comparative analysis. A consistent two-stage screening process was applied: first, duplicates were identified and tagged, and second, remaining entries were screened by title and abstract using the predefined eligibility criteria. Studies addressing individual-level behaviours and experiences in remote-enabled work were flagged for full-text review. Additional studies located through manual searches underwent the same screening process. Although PRISMA-ScR treats critical appraisal as optional (Tricco et al., 2018), a basic assessment of methodological soundness and conceptual relevance, aligned with the updated guidance of the Joanna Briggs Institute (JBI) (Peters et al., 2020), was incorporated to ensure a minimum level of rigour before studies progressed to the charting stage.

2.3.4 Data Charting

A systematic charting process was conducted to document and categorise key study attributes, supporting synthesis and thematic analysis in alignment with scoping review standards (e.g., PRISMA-ScR). An Excel-based classification system was used, with custom

column headings to capture essential features and tag each article for its conceptual relevance. For included studies, columns tracked study aims, population, sample size, and their relevance to key thematic areas, including EDI, knowledge management (KM), and social networks/social capital. Remote-enabled work was charted separately, capturing structural arrangements, contextual factors, communication dynamics, and mediums. Notes were documented to support interpretive analysis during synthesis. This preliminary charting facilitated the prioritisation of articles for full-text review, supported further screening for conceptual and methodological fit, and enabled the thematic grouping essential for comparative analysis. It also allowed for efficient filtering of studies during analysis, streamlining data handling and enhancing the targeted focus of full-text reading for each research question. Full-text articles that met the inclusion criteria were reviewed in detail. Key information, such as research design, sample characteristics, core constructs, and main findings, was systematically extracted and added to a structured charting matrix. This process facilitated organised comparison across studies and supported the thematic and comparative synthesis presented in the findings.

2.3.5 Search Outcomes and Sample Characteristics

Figure 2.1 presents the PRISMA-ScR flow diagram detailing the screening and selection procedures. A total of 3,583 records were identified: 3,319 from database searches (Scopus) and 264 through supplementary methods such as reference lists and expert recommendations. After removing duplicates, titles and abstracts were screened for relevance to EDI, knowledge behaviours, and social networks or social capital in remote-enabled work contexts. The resulting pool of studies reflects the structured, multi-phase approach informed by Arksey and O'Malley's (2005) five-stage protocol and reported in line with PRISMA-ScR guidelines (Tricco et al., 2018).

- Phase 1, which focused on the theoretical and conceptual landscape of EDI, social networks / social capital (SN/SCAP), and knowledge management (KM) literature domains, yielded 2,063 articles: 1,886 from Scopus and 177 from independent sources. After screening for duplicates and irrelevant studies, 231 articles were retained for categorisation.
- Phase 2 targeted research on remote-enabled working structures and conditions and the application of the research domains (EDI, SN/SCAP, KM) within these contexts, generating 1,520 articles: 1,433 from Scopus and 87 from independent sources. After screening, 215 articles were retained.

A secondary review for duplication across the two phases identified four duplicate articles. After removing these, 442 unique articles remained in the final dataset for categorisation, analysis, and synthesis. The final sample included 420 journals, 19 conference papers, and 3 book chapters, published between 1986 and 2025. These included both empirical and conceptual investigations. Publication activity peaked in 2022, reflecting heightened scholarly interest in remote-enabled work following the COVID-19 pandemic. Sample sizes ranged from single-case reports to datasets involving tens of thousands of participants, with medium-sized samples (around 100-300 participants) being most common. The studies also varied in geographic coverage, organisational context, and participant backgrounds. Research was conducted across diverse regions, including Africa, Asia, Europe, and the Americas, with the United Kingdom being particularly well-represented. The investigations spanned a wide range of sectors, such as healthcare, IT, and multinational corporations, though certain regions and industries were more frequently represented, suggesting potential research biases. A sample of the data extraction table is provided in Appendix A, Table 4. The full table is available upon request.

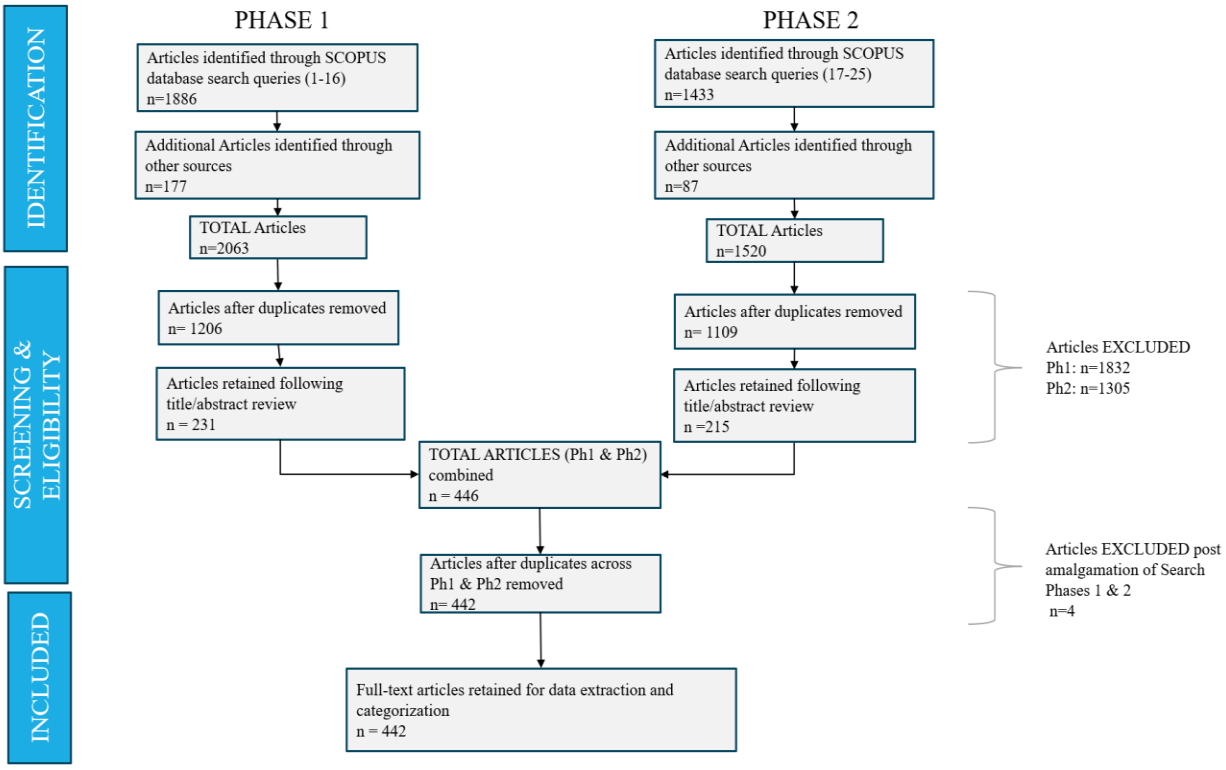


Figure 2.1 PRISMA-ScR Flow Diagram Depicting the Two-Phase Study Selection Process

2.4 Conceptual Boundaries and Themes in Hybrid Work

Hybrid work generally refers to a flexible arrangement in which employees divide their time between remote and in-office work (e.g., Bloom et al., 2024; Iqbal et al., 2021; Vartiainen & Vanharanta, 2024). Despite its widespread implementation, there remains no unified conceptualisation of hybrid work (Lauring & Jonasson, 2025). As Bell and McAlpine (2023) observe, this lack of definitional clarity extends across the broader virtual work literature, where hybrid, remote, and flexible arrangements are often conflated, producing inconsistent boundaries and measures. This lack of clarity has produced a wide range of definitions that vary in scope and emphasis. Some scholars define hybrid work in narrowly structural terms. Bloom et al. (2024), for example, describe it as "a fixed schedule balancing days at home and days in the office", framing the concept around rigid divisions of on-site and remote time (see also Beno, 2022; Bissani, 2024). Others adopt broader framings that emphasise flexibility across both time and place, typically supported by digital infrastructures (Vartiainen & Vanharanta, 2024). Some see hybrid work as the blending of physical and virtual spheres (Kane et al., 2021; Wevers, 2021), while Wang et al. (2021) highlight employee autonomy, describing it as "a mode in which employees could decide how to divide their time working from home and in the office." This definitional ambiguity reflects longer-standing inconsistencies in research on remote work. Remote work has similarly been defined narrowly as ICT-mediated tasks (e.g., Dittes & Smolnik, 2019; Pyöriä, 2011; Sanchez et al., 2021) and more broadly as flexible arrangements of time and place supported by digital infrastructures (e.g., Allen et al., 2015; Di Martino & Wirth, 1990; Jämsen et al., 2022). These inconsistencies complicate both the scope and the theoretical approaches used in studies. This reinforces the need for systematic mapping through a scoping review (Lauring & Jonasson, 2025; Peters et al., 2020).

To address the lack of a clear and consistent definition of hybrid work, this review systematically extracted and thematically coded existing definitions to clarify conceptual boundaries. An inductive thematic analysis was applied, consistent with scoping review methodology that often incorporates qualitative synthesis to map key concepts and identify patterns (Peters et al., 2020). This approach enabled analytical dimensions to emerge directly from the data rather than being constrained by predefined categories (Braun & Clarke, 2006; Thomas & Harden, 2008). Definitions were coded across all thematically relevant elements, allowing overlap where appropriate while still distinguishing recurring patterns in the literature. The analysis yielded three overarching themes, presented in Section 2.4.1.

2.4.1 Findings: Three Analytical Themes Defining Hybrid Work

This process identified three analytical themes, each representing a distinct way of defining remote and hybrid work. Table 2.1 summarises the analytical synthesis emerging from this review. It highlights how distinct disciplinary lenses frame hybrid and remote work.

Table 2.1 Analytical themes and disciplinary orientations in the literature on remote and hybrid work.

Analytical Theme	**Definition**	**Example Terms**	**Illustrative References**	**Typical Disciplinary Areas**
Theme 1: Work Modality/ Structural Arrangement	Refers to how work is configured in terms of *where*, *when*, and *how* it is performed, highlighting flexibility in location, scheduling, and autonomy.	Blended work; remote work; telework, hybrid work; flexible work arrangements.	Beno (2022); Kane et al. (2021); Van Yperen & Wörtler (2017); Wang et al. (2021).	Management; Human Resource Management; Organisational Studies; Industrial Relations.
Theme 2: Communication and Technology Use	Captures the role of digital technologies in mediating collaboration, coordination, and interaction, positioning ICTs as key enablers of virtual connectivity and workflow integration.	E-communication; mediated communication; electronic networks of practice; ICT use; virtual collaboration.	Bos et al. (2004); Hoch & Kozlowski (2014); Wasko & Faraj (2005); Van Wart et al. (2019).	Information Systems; Communication Studies; Organisational Behaviour; Management Science
Theme 3: Dispersion and Separation	Encompasses structural and relational distances, spatial, temporal, and psychological, between individuals and teams, foregrounding issues of coordination and cohesion across boundaries.	Geographic dispersion; virtuality; spatial separation; temporal distance; psychological distance.	Baruch (2000); Gibson & Gibbs (2006); O'Leary & Cummings (2007); Wilson et al. (2008).	Organisational Psychology; Management; Sociology of Work; Virtual Team Research.

The three analytical themes in Table 2.1 provide complementary, yet distinct perspectives on hybrid and remote work. The research landscape reveals a multidisciplinary convergence of scholarly interest, even though some disciplines focus more strongly on certain themes. This pattern is visible in the range of journal publications in which employee-level innovation is examined. Theme 1 is rooted primarily in organisational behaviour, human resource management, and labour or employment studies. Key examples include *Human Resource Management Review*, *European Journal of Work and Organisational Psychology*, and

Applied Psychology. Themes 2 and 3 show significant interdisciplinary engagement. Research draws on organisational theory (e.g., *Administrative Science Quarterly*) and information systems (*MIS Quarterly* and *Information Systems Journal*). These are complemented by studies in core management outlets such as *Human Relations* and *Academy of Management Annals*. Collectively, this cross-disciplinary engagement underscores both the complexity of remote-enabled work and its enduring academic relevance.

As concepts are adopted across diverse disciplinary, policy, and organisational contexts, the convergence of fields has yielded both significant conceptual overlap and subtle, yet important distinctions in scope. This is evident in the wide diversity of definitions and terms that highlight varying emphases. For example, hybrid work has been defined broadly as flexibility across time and place (e.g., Vartiainen & Vanharanta, 2024), but also more narrowly as a structured weekly division between remote and on-site days (e.g., Bloom et al., 2024). Definitions of remote and telework similarly emphasise structural flexibility (e.g., Jämsen et al., 2022), though others emphasise employee autonomy over time and location (e.g., Kattenbach et al., 2010) or frame telework as a redistribution of work hours outside a central workplace (Allen et al., 2015). Within Communication and Technology Use (Theme 2), most definitions highlight ICTs as central to communication, information exchange, and workflow integration, but they diverge in emphasis. Some definitions stress digital infrastructures, focusing on how ICTs enable connectivity and interaction (e.g., van Zoonen et al., 2024), while others emphasise coordination and knowledge exchange in digitally mediated settings (e.g., Yozi & Mbokota, 2024). In Dispersion and Separation (Theme 3), definitions also vary, with configurational dispersion referring specifically to the spatial distribution of team members (e.g., O'Leary & Cummings, 2007), whereas virtuality extends beyond geography to include electronic dependence (e.g., Hacker et al., 2019). These examples illustrate how overlapping labels, divergent emphases, and disciplinary perspectives generate both common ground and important distinctions in scope.

Examining how definitions cluster around the three themes shows that most combine only two. Work modality or structural arrangement (Theme 1) is the most consistently emphasised. For instance, hybrid work (e.g., Vartiainen & Vanharanta, 2024) and remote work (e.g., Beno, 2022) highlight flexibility in work location (Theme 1) enabled by digital technologies (Theme 2). Telework is similarly defined, though its scope ranges from regular substitution of hours (e.g., Allen et al., 2015) to broader flexibility across sites via ICT (e.g.,

Eurofound & ILO, 2017). These definitions diverge further in how telework is conceptualised. Some treat it as a professional activity (e.g., Taskin & Bridoux, 2010), while others treat it as an arrangement or modality (e.g., Vinueza-Cabezas et al., 2022). Location specificity also varies, from home-based work (e.g., Park et al., 2023) to any non-employer site such as satellite offices or remote locations (e.g., Vinueza-Cabezas et al., 2022).

A second prominent pairing links communication technology (Theme 2) with dispersion and separation (Theme 3). These definitions describe work contexts where geographic distance and ICT reliance make coordination across distance central, though they also differ in scope and emphasis. Some highlight cultural and temporal diversity, stressing linguistic, cultural, and time-zone differences (e.g., Eisenberg et al., 2019). Others converge on a structural focus, emphasising settings where employees are located across different sites and coordinate across distance through ICT. This includes dispersed, geographically distributed, and virtual teams (e.g., Magni et al., 2018) and definitions of virtual work that frame it as an arrangement reliant on ICT across dispersed locations (e.g., Raghuram et al., 2019). This structural focus extends to virtuality, which examines the degree of technology-mediated communication in the absence of co-located interaction (Gibson & Gibbs, 2006; Kirkman & Mathieu, 2005) at other times more abstractly as a higher-order construct that integrates dispersion, electronic dependence, and diversity into a multidimensional measure of work intensity (e.g., Cohen & Gibson, 2003). A comprehensive glossary of definitions and their classification across the three identified themes is provided in Appendix A, Table 5.

Overall, the analysis demonstrates that no single conceptualisation fully captures the complexity of hybrid work, as existing definitions remain fragmented and difficult to compare across studies (Lauring & Jonasson, 2025). More expansive definitions typically combine two of the three themes, for example, linking work modality with technology use (Themes 1 and 2), or technology use with dispersion (Themes 2 and 3). Taken together, these patterns indicate that hybrid work is best understood at the intersection of structural arrangements, technology use, and dispersion dynamics, rather than as a single, stable category (Vartiainen & Vanharanta, 2024). This intersection is especially important for innovation processes that depend on coordination and communication (Zhao et al., 2022). Structural conditions shape where and when collaboration occurs (Orhan et al., 2016), technology enables interaction and knowledge flow across sites (Al-Qdah & Salim, 2013), and dispersion influences the relational quality of these interactions (Magni et al., 2013). The alignment of these elements creates the conditions

in which interpersonal processes can flourish, making innovation possible (Sinnemann & Weiss, 2025).

By mapping and synthesising definitions of hybrid and remote-enabled work, this review addresses RQ1 by clarifying how these work environments are conceptualised. Because EDI is inherently interpersonal (Echebiri et al., 2020; Høyrup, 2010; Renkema et al., 2021), this section establishes the contextual conditions under which interpersonal dynamics and innovative processes unfold. However, it does not yet explain how these conditions shape the mechanisms that enable EDI. The next section, therefore, examines theoretical frameworks that illuminate these mechanisms and introduces the conceptual tools needed to analyse how hybrid communication conditions influence EDI dynamics.

2.5 Theoretical Frameworks for Employee-Driven Innovation in Hybrid Work

This section critically evaluates how existing theoretical frameworks explain the interpersonal and behavioural mechanisms that underpin employee-driven innovation (EDI) in hybrid work environments. Prior research on remote and hybrid work largely privileges structural conditions or individual adaptation, leaving the informal and relational processes through which innovation emerges insufficiently explained. Comparing these perspectives enables assessment of their explanatory value and identifies those best suited to analysing how hybrid conditions shape the mechanisms driving EDI. Several frameworks, such as boundary theory (Ashforth et al., 2000; Kreiner et al., 2009), the Job Demands-Resources (JD-R) model (Kumar et al., 2023; Naqshbandi et al., 2024) and presenteeism theory (Schmitz et al., 2023), adopt an intrapersonal or actor-centred focus. However, their focus on internal processes limits their ability to explain the interpersonal dynamics that support knowledge sharing and collaboration (Kumar et al., 2023; Mihalca et al., 2024; Naqshbandi et al., 2024), which are critical to EDI (Høyrup, 2010; Jamal et al., 2024). This review focuses on inherently interpersonal theories that explain the communicative and collaborative dynamics through which EDI develops in hybrid contexts. It is structured around three thematic categories: work modality and structural arrangement, communication and technology use, and dispersion and separation. The synthesis of these limitations highlights the need for an integrated analytical lens to understand EDI in hybrid environments. The section therefore considers cross-thematic frameworks, concluding with an evaluation of media richness theory (MRT) and task virtuality, which offer relevance for analysing interpersonal communication in hybrid work.

2.5.1 Findings: Theoretical Perspectives by Theme

Several theoretical approaches speak to how hybrid conditions influence the interpersonal dynamics central to EDI, but many privilege a single thematic angle. For instance, within the Work Modality and Structural Arrangement (Theme 1) category, four theories have been used to show how the design and structure of work arrangements shape outcomes in remote-enabled contexts. Each spotlights a different structural angle. Coordination theory highlights how formal mechanisms such as standards, routines, and task dependencies underpin collaboration in distributed environments (Hinds & McGrath, 2006; Malone & Crowston, 1994; Stray & Moe, 2020), while relational coordination theory (Gittell, 2002) extends this by emphasising trust, mutual respect, and shared goals in sustaining coordination under conditions of high interdependence. Organisational discontinuity theory by Lauring et al. (2022) draws attention to how structural breaks create coordination challenges in dispersed settings. Other structurally oriented models include the model of teleworking (Baruch & Nicholson, 1997), which focuses on how job and organisational design shape telework outcomes, and the crisis-induced telework adjustment framework (Carillo et al., 2020), which integrates individual and organisational factors influencing remote work adjustment. While these perspectives provide valuable structural frameworks for understanding how remote-enabled work is organised, they largely overlook the interpersonal dynamics central to EDI, particularly the spontaneous communication and collaboration that hybrid contexts enable but that structurally oriented research struggles to capture (Hill & Bartol, 2016; Høyrup, 2010).

Other studies explicitly centre on communication and technology use (theme 2). These theories position digital technologies as the central focus, functioning as the medium through which human communication and interaction unfold. Theories such as cues-filtered-out theory, which highlights how text-based media remove non-verbal cues (Sproull & Kiesler, 1986), communication visibility theory, which demonstrates how digital tools render interactions visible and support collaboration (Leonardi, 2011), and media synchronicity theory, which emphasises the alignment of media capabilities with communication processes to ensure effectiveness (Dennis & Valacich, 1999; Dennis et al., 2008), are grouped here because they share concern with communication quality being shaped by the medium. Complementing these are theories that highlight the role of user adaptation and the affordances of digital technologies in shaping how technology-mediated communication unfolds. For instance, channel expansion theory shows how experience with media, partners, and contexts enhances perceptions of

richness and effectiveness (Carlson & Zmud, 1999), while affordance theory explains how technology features enable or constrain action depending on user perceptions and social context (Treem & Leonardi, 2013). Collectively, these theories underscore the critical role of media's technical properties in shaping communication quality and effectiveness. Yet, their focus on technology-mediated interaction offers limited insight into the interpersonal dynamics that unfold in hybrid environments. Research shows that digital platforms do not automatically generate meaningful interaction, as relational dynamics may remain constrained even when technically suitable tools are available (Keppler & Leonardi, 2023; Maznevski & Chudoba, 2000; Qureshi et al., 2018). At the same time, by highlighting the importance of user adaptation, experience, and capability (Carlson & Zmud, 1999; Hao et al., 2022), these theories point to communication as an inherently personal process, producing variability in how technologies are used. Accordingly, broader investigations that move beyond a narrow focus on the technical properties of digital tools to also consider user adaptation and the inherently personal variability in technology use are needed to capture the interpersonal conditions of communication within hybrid environments.

Finally, two theories - social isolation theory (Wiesenfeld et al., 2001), which emphasises the psychological consequences of separation, and team perceived virtuality (TPV) (Costa et al., 2024), which captures the subjective perception of separation - can be classified within the dispersion and separation (Theme 3) category as they relate to employees' relational perspectives in remote-enabled environments. While employees may experience negative psychological responses to feelings of dispersion and separation (Windeler et al., 2024), additional contextual and relational conditions, such as empowering leadership (Hill & Bartol, 2016) and justice climate (Magni et al., 2018), can mitigate them. Moreover, these frameworks provide limited insights into the interpersonal dynamics of tacit knowledge circulation and spontaneous exchanges that enable collaboration, which are critical for supporting EDI.

Overall, the analysis demonstrates that structural, technological and dispersion-oriented perspectives each capture an important dimension of remote-enabled work. However, when applied in isolation, they offer only partial insights into how hybrid environments shape the dynamics essential for EDI and are insufficient in explaining the complex processes through which innovation unfolds. Structural views overlook informal interaction; technology-centred theories ignore user adaptation; dispersion-focused concepts offer limited insight into the tacit knowledge circulation and everyday exchanges that spark new ideas. An integrated approach is

therefore critical where hybrid work is understood as the intersection of structural arrangements, technology use and dispersion dynamics. EDI depends on how these forces combine to shape opportunities, communication quality and relational closeness. Capturing these intersections therefore requires moving beyond single-theme frameworks towards integrative theoretical approaches that more effectively represent the dynamic conditions enabling EDI in hybrid environments.

2.5.2 Findings: Integrative Concepts and Theories with Cross-Thematic Coverage

Several theories and concepts demonstrate cross-thematic coverage, linking more than one of the categories. For instance, some theories bridge Work Modality and Structural Arrangement (Theme 1) and Communication and Technology Use (Theme 2). Virtual work intensity (Powell et al., 2004) shows that greater reliance on ICTs is associated with changes in coordination and performance in distributed teams. Team coordination theory (Malhotra & Majchrzak, 2014) highlights that coordination effectiveness depends not only on how much ICT is used but also on how it is configured and enacted (e.g., selecting media to support shared mental models and boundary-spanning). Adaptive Structuration Theory (AST) (DeSanctis & Poole, 1994) extends this perspective by modelling how groups adapt their structures, workflows, and jobs around ICTs, emphasising that technology's effects are mediated by social and organisational contexts. Together, these perspectives show technology's dynamic role in shaping work arrangements and highlight the need to monitor how employees use technology for communicating with others for structured collaboration. However, because these theories emphasise formal team processes and operate at the group level, they under-specify the individual level interpersonal interactions through which EDI practices can unfold in hybrid environments.

A second set of theories bridges Communication and Technology Use (Theme 2) with relational conditions linked to Dispersion and Separation (Theme 3). Social Presence Theory (SPT) (Short et al., 1976) demonstrates that relational quality is associated with the cue-carrying capacity of media. This perspective reflects an early technologically deterministic view, suggesting that the medium's inherent properties dictate relational outcomes. Other theories emphasise social adaptation. Social Information Processing Theory (SIPT) (Walther, 1992) shows that relationships can develop through computer-mediated communication as communicators adapt over time, illustrating that relationship development is not static but accumulates through ongoing interaction. Media Multiplexity Theory (MMT) (Haythornthwaite

& Wellman, 1998) highlights the relational benefits of technology choices, showing that stronger ties are supported using multiple channels. Reinforcing this focus on user practices and choice, Communication Accommodation Theory (CAT) (Gallois et al., 2005) explains how style shifting helps manage social distance and group identity, highlighting the value of giving employees autonomy to select appropriate communication technologies. These theories offer valuable insights into how communication technologies support relational quality and adaptation in dispersed settings. However, they assume a stable media environment and overlook that employees use multiple tools with differing affordances, moving across phone, chat, video and email depending on interaction needs. They also emphasise gradual relationship development, which risks overlooking the everyday exchanges and spontaneous encounters that drive EDI in hybrid work. These remain important, but partial, lenses for understanding the dynamic interpersonal processes through which EDI emerges.

Notably, virtuality is a key integrative construct. Rooted in seminal models such as Team Virtuality (Kirkman & Mathieu, 2005) and the Multidimensional Virtuality Model (Schweitzer & Duxbury, 2010), it is defined as a multidimensional condition involving electronic dependence, spatial separation and shifting team membership (Kirkman & Mathieu, 2005; Orhan et al., 2016). Virtuality attempts to unify structural, technological and cognitive-affective dimensions by combining indicators such as dispersion and remote frequency with perceptual factors such as experienced distance and reduced synchronicity (Costa et al., 2021; Gupta et al., 2020; Hoch & Kozlowski, 2014). However, empirical applications rely heavily on structural proxies such as team distribution or remote frequency (Hoch & Kozlowski, 2014; Orhan et al., 2016). However, by focusing primarily on the presence or absence of face-to-face interaction, empirical applications risk oversimplifying technology use and underrepresenting the quality dimension of interaction.

2.5.3 Findings: Media richness theory and task virtuality as Explanatory Frameworks for Interpersonal Dynamics in Hybrid Contexts

The limitations noted in existing integrative constructs, particularly their reliance on structural proxies over the quality dimension of interaction, expose a critical gap: existing frameworks lack the capacity to fully explain the rich interpersonal dynamics through which employee-driven innovation emerges in hybrid environments. Interpersonal dynamics in hybrid environments are inherently relational and context sensitive. The theoretical lens taken must therefore be responsive to capture the context-sensitive dynamics of resource exchange upon

with EDI depends. Media richness theory (Daft & Lengel, 1986) and its extension, task virtuality (Orhan et al., 2016), offer a promising analytical lens for examining the interpersonal communication conditions that shape resource exchange and, ultimately, explain how EDI emerges (Dennis & Valacich, 1999; Kirkman et al., 2004; Littlejohn & Foss, 2009).

The foundational premise of media richness theory (MRT) is that effective communication requires a match between media capacity and task demands. This makes it especially suitable for explaining the communicative processes that underpin innovation and knowledge sharing. These processes are often ambiguous, interdependent, and reliant on tacit knowledge, which are all central to EDI. In this sense, MRT serves as a direct and foundational framework for analysing communication in hybrid work contexts. According to MRT, communication media vary in their capacity to convey rich information, and communication is most effective when media choice aligns with task complexity (Daft & Lengel, 1986; Ishii et al., 2019; Marques-Quinteiro et al., 2022). Rich media, such as face-to-face interaction, are therefore best suited to tasks involving ambiguity, uncertainty, or high interdependence. These conditions mirror the communicative demands of EDI, which often depends on informal, interpersonal exchanges and the sharing of tacit knowledge (Kirkman et al., 2004; Littlejohn & Foss, 2009, 2012).

Much of the empirical literature applies MRT through distinct lenses, each offering insights into how communication processes shape the conditions for EDI in hybrid work environments (Choi, 2019; Dennis & Kinney, 1998). A structural-modality lens applies MRT using proxies like remote work frequency to infer communication richness, which is then linked to interpersonal processes foundational to EDI, such as collaboration and social support (e.g., Allen et al., 2015; Wiesenfeld et al., 2001; Wu et al., 2023). A second approach, the technology-mediated lens, focuses on how specific communication tools shape interaction quality and knowledge flows. For instance, Peltokorpi (2015) shows that media richness mediates knowledge transfer, while Choi (2019), finds that smartphone-based social networking services enhance social capital and user satisfaction through perceived richness. These studies illustrate how digital media can enable or hinder exchange processes which are critical for EDI. Finally, a dispersion-separation lens considers how communication media can mitigate challenges posed by physical and temporal distance. Wang, Chen, and Yin (2024) argue that richer media help virtual teams overcome dispersion, thereby enhancing creativity and innovation. Extending this perspective, Rico et al. (2011) emphasise that communication quality plays a central role in

supporting relational dynamics and innovation-supportive behaviours. Their findings suggest that communication quality is central to overcoming the effects of dispersion and separation that can impede EDI, particularly by supporting the positive psychological and relational conditions that enable EDI-related behaviours.

While this evidence highlights MRT's relevance for exploring conditions that shape EDI in remote-enabled contexts, the theory's application also faces limitations when applied to hybrid environments (Begemann et al., 2024). In hybrid arrangements, structural or technology-focused proxies are increasingly limiting in hybrid contexts. This is because employees often rely on digital tools regardless of location, combining synchronous and asynchronous modes in ways that proxies cannot capture. Moreover, treating media features as deterministic overlooks employee agency. In hybrid work, employees typically choose among multiple tools and adapt them in practice; for instance, a video call may be used for a meeting and an instant message for a quick question to a colleague. From an affordances perspective, the possibilities a tool offers in relation to users' goals, skills, and context shape communication quality. Thus, effectiveness depends not only on its features but on how employees enact them in practice. These gaps matter for EDI because even small communication shifts can reshape interpersonal dynamics that mobilise knowledge sharing, and social capital (Kirkman et al., 2004; Littlejohn & Foss, 2009, 2012).

Task virtuality, defined as the extent to which work relies on non-face-to-face interaction, has been shown to affect coordination effectiveness in interdependent tasks (Orhan et al., 2016). This represents the kinds of communicative conditions in which EDI typically occurs (Høyrup, 2010). This construct effectively extends the principles of MRT by linking the absence of face-to-face interaction to variations in coordination effectiveness, particularly for complex tasks such as innovation (Kirkman & Mathieu, 2005; Orhan et al., 2016). Although task virtuality advances understanding by linking communication modality to face-to-face variation, employees' use of technology is oversimplified. Tools like video conferencing can partly approximate face-to-face cues and, when used intentionally, enhance interaction quality; however, important differences often remain (Gilson et al., 2015; Olson & Olson, 2000; Waizenegger et al., 2020; Wang et al., 2021). Overlooking this quality dimension reduces interpersonal interaction in hybrid environments to a matter of presence or absence of face-to-face contact, which fails to capture the context-sensitive communication practices that underpin EDI.

While the analysis shows that existing frameworks remain limited in explaining how interpersonal dynamics operate within hybrid environments, it identifies MRT and its extension, task virtuality, as providing the most suitable theoretical basis for understanding how communication quality shapes interaction and the emergence of EDI. MRT establishes the conceptual foundation for representing hybrid communication conditions within this thesis. The next section builds on this foundation by reviewing how EDI has been conceptualised and operationalised in existing research, thereby providing the behavioural foundation needed to integrate communication dynamics with innovation processes in subsequent sections.

2.6 Conceptualising and Operationalising Employee-Driven Innovation

Employee-driven innovation (EDI) is defined by Høyrup (2010) as "the generation and implementation of new ideas, products and processes originating from employees who are not assigned to this task as their primary function" (p. 143). Building on this foundational definition, EDI is broadly understood as a form of bottom-up innovation that emerges through employees' continuous and informal adaptation of work practices beyond formally assigned innovation roles (Echebiri et al., 2020; Høyrup, 2010; Renkema et al., 2021). While closely related to proactive behaviour and individual innovativeness (Do et al., 2018; Parjanen et al., 2020), proactivity alone does not necessarily yield innovation (Tornau & Frese, 2013). Rather, EDI is realised through observable behaviours that collectively drive and sustain workplace change, consistent with Unsworth and Parker's (2003) view of innovation as the process of engaging in behaviours to generate and implement new ideas, regardless of their eventual success.

The conceptual link between EDI and proactive behaviour is further highlighted by Unsworth and Parker (2003), who noted: *"Defining innovation in terms of behaviours designed to generate and implement new ideas brings it very close to the definition of proactivity as a set of self-starting, action-oriented behaviours designed to change one's environment or oneself. However, proactivity is broader than innovation; it can result in creativity and innovation, but it can also result in other outcomes such as effective problem-solving and coping with demands. Nevertheless, proactivity is likely to be an important driver of innovation. The self-starting component of proactivity is relevant to creativity, particularly in identifying problems and generating novel solutions. Persistence and the focus on pushing change is particularly relevant to idea implementation,*

which involves behaviours such as seeking sponsorship for ideas and building support (e.g. Kanter, 1983).”

Although the concept of EDI is well established, scholars highlight ongoing challenges in specifying the behavioural mechanisms through which it occurs. Existing approaches often struggle to represent EDI’s discretionary and self-initiated nature, which forms its behavioural core. They also underrepresent its collective, distributed enactment within organisational systems, which defines its broader scope (Renkema et al., 2021). Høyrup (2010) argues that innovation is embedded in employees’ everyday work practices and social interactions and is developed through collective learning rather than occurring as isolated acts of idea generation. The absence of a unified operational framework has led researchers to question whether current behavioural constructs adequately reflect EDI’s defining features (Echebiri et al., 2020). Building on these conceptual insights, which establish a precedent for representing EDI behaviourally, the present study draws on prior definitions and empirical measures to identify the operationalisation that best captures EDI’s essence.

Therefore, this section maps how EDI has been conceptualised and operationalised in existing research to assess how behavioural constructs capture, or overlook, its discretionary, distributed and collectively embedded nature, and to identify remaining conceptual and operational gaps. Three analytical criteria were applied to assess how existing behavioural measures capture the defining features of EDI. In line with Høyrup’s (2010) conceptualisation of EDI as a distributed, change-oriented process embedded in everyday practice, this review includes only measures involving discretionary behaviours. It also considers innovative actions captured in established innovation process scales (e.g., idea generation, promotion, implementation), given their recognised role as behavioural foundations of innovation (De Jong & Den Hartog, 2010; Janssen, 2000, 2001; Scott & Bruce, 1994). The analytical framework comprises three criteria that reflect EDI’s definitional essence, which represent: (1) discretionary, (2) distributed and (3) collectively embedded behaviour. The first criterion, behavioural specificity, assesses whether measures clearly refer to individual employee actions, since EDI is grounded in observable, voluntary behaviours rather than abstract intentions (Echebiri et al., 2020). The second criterion, breadth of coverage, examines the level at which change occurs - consistent with EDI’s distributed nature - that can manifest at the individual, team or organisational level (Felstead et al., 2020; Parjanen et al., 2020). The third criterion, collective stage coverage, evaluates whether measures capture the full innovation process from

idea generation to implementation in ways that represent collectively enacted and continuous change rather than isolated individual acts (De Jong & Den Hartog, 2010; Høyrup, 2010; Tornau & Frese, 2013).

Høyrup (2010) notes that EDI's distributed and embedded nature underpins all three criteria. Applying these criteria clarifies how current constructs represent the behavioural essence of EDI and reveals overlaps, divergences and gaps in coverage. This provides the conceptual foundation for examining EDI within hybrid work contexts, and the following section presents the mapping findings. Table 2.2 summarises the mapping results that inform the comparative synthesis below.

Table 2.2 Analytic framework of EDI-relevant measures mapped against behavioural specificity, breadth of coverage, and collective stage coverage criteria.

Source & Scale	Behavioural Specificity	Breadth of Coverage	Collective Stage Coverage
Felstead et al. (2020) Employee Driven Innovation (8 items)	Individual	Partial: Implied (task to department). Extent unclear; no organisational scope.	Full: Implementation weak. Fragmented (distinct sub-dimensions).
Echebiri, Amundsen & Engen (2020) Employee Driven Innovation (13 items)	Mixed: individual & collective	Partial: Implied (task to department). No organisational scope.	Full: Unidimensional but attributions blurred.
Janssen (2001) Innovative Work Behaviour (9 items)	Individual	Partial: Primarily individual; some promotion to others; no organisational level.	Full: All stages, but implementation weaker. Fragmented; can be treated as unidimensional.
Griffin et al. (2007) Proactivity (9 items)	Individual	Full: Multi-level (task, team, organisation).	Full: Distinct stages but can be framed as collective.
Scott & Bruce (1994) Innovative Behaviour (6 items)	Individual	Partial: Primarily individual; some championing/mobilising; no organisational scope.	Partial: Implementation weak. Fragmented; can be unidimensional.
Holman et al. (2012) Innovation Process (9 items)	Individual	Partial: Primarily individual; some persuasion; no organisational scope.	Full: All stages, but implementation weaker. Fragmented; can be unidimensional.
Hanneman & Riddle (2005) Daily Innovative Work Behaviour (2 items)	Individual	Partial: Task-level only; no team/organisational scope.	Partial: Generation only. Unidimensional.
Messmann & Mulder (2012) Innovative Work Behaviour (26 items)	Individual	Partial: Individual & team (colleagues/supervisors); no organisational scope.	Partial: Omits implementation. Fragmented; can be unidimensional.

Source & Scale	Behavioural Specificity	Breadth of Coverage	Collective Stage Coverage
De Jong & Den Hartog (2010) Innovation (10 items)	Individual	Partial: Primarily individual; some defending/advocacy; no organisational scope.	Full: All stages, but implementation weaker. Fragmented; can be unidimensional.
Ding et al. (2024) Bootleg Innovation	Individual: count-based	Partial: Individual, rule-bending; no organisational scope.	None: No generation or implementation. Unidimensional.
Lee (2020) Task Crafting (5 items)	Individual	Partial: Role/task-level only; no team/ organisational scope.	Partial: Captures role-level implementation. Unidimensional.
Frese et al. (1997) Personal Initiative (8 items)	Individual	Partial: Some interaction; no organisational scope.	Partial: Strong on generation; weak on implementation. Unidimensional.
Morrison & Phelps (1999)Taking Charge (10 items)	Individual	Full: Implied from task to department & organisation.	Full: Implementation strong; generation weaker (mainly suggestions). Unidimensional.
Farh et al. (2007)Voice (2 items)	Individual	Partial: Team/organisational improvement focus.	Partial: Idea generation only; no implementation. Unidimensional.
Dewett (2006) Risk-Taking Behaviour (2 items)	Individual	Partial: Individual/task level only; no team/organisational scope.	Partial: Experimentation/early implementation only. No generation. Unidimensional.
Tierney et al. (1999)Creative Idea Generation (8 items)	Individual	Partial: Primarily individual; some championing; unclear team scope; no organisational scope.	Partial: Generation and preparation; weak implementation. Unidimensional.
Farmer et al. (2003)Employee Creativity (4 items)	Individual	Partial: Individual; “role model” implies influence, but no clear team/organisational scope.	Partial: Idea generation focus; no implementation.
Baer (2012)Breakthrough Idea Generation (3 items)	Individual	Partial: Individual breakthrough ideas; organisational impact implied only.	Partial: Only radical idea generation; no promotion or implementation. Unidimensional.
Tsai & Zheng (2021) Service Creativity (8 items)	Individual	Partial: Primarily individual; some promotion; unclear team scope; no organisational scope.	Partial: Generation, promotion, planning; implementation weak. Unidimensional.
George & Zhou (2001) Creative Behaviour (8 items)	Individual	Partial: Individual focus; unclear team scope; no organisational scope.	Partial: Generation, promotion, planning. Implementation weak (preparation/advocacy only). Unidimensional.

2.6.1 Findings: Comparative Synthesis of Behavioural EDI-relevant Measures

Across the reviewed literature, existing behavioural measures show limited alignment with EDI’s distributed, collective and end-to-end nature. Most constructs focus on individual

initiative rather than collectively embedded change processes. The synthesis below is organised around the three analytic criteria of (1) behavioural specificity; (2) breadth of coverage; and (3) collective stage coverage, followed by an integrative summary that identifies areas of overlap and remaining gaps.

Behavioural specificity: Most reviewed measures are anchored at the individual level. The scales largely operationalise innovation as a set of individualised, observable actions such as suggesting, implementing or improving work methods (e.g., De Jong & Den Hartog, 2010). This consistency reflects a long-standing emphasis on personal initiative and creativity within the innovation behaviour literature. Echebiri et al. (2020), whose EDI-13 scale includes both individual and collective phrasing, illustrate a recurring issue in the EDI literature: the conflation of collective and individual behaviours, which obscures individual contributions.

Breadth of coverage: The reviewed measures generally have a narrow scope. Most capture innovation only at the individual or task level and seldom extend to team or organisational domains (e.g., Baer, 2012 ; Ding et al., 2024; George & Zhou, 2001; Lee, 2020). Some instruments hint at broader engagement through items on collaboration or idea championing or collaboration (e.g., De Jong & Den Hartog, 2010; Janssen, 2001; Scott & Bruce, 1994). Similarly, the two measures explicitly designed to capture EDI (Echebiri et al., 2020; Felstead et al., 2020) imply movement from task to departmental levels but do not capture system-wide innovation. Morrison and Phelps's (1999) Taking Charge also aspires to multilevel change in being conceptually framed to encompass change across job, unit and organisational levels; however, it remains confined to individual task-level actions. Griffin et al. (2007) offers the broadest coverage, linking proactivity across task, team and organisational levels.

Collective stage coverage: The measures differ in how completely they capture the stages of the innovation process. Many focus on early phases such as idea generation and problem solving (e.g., Baer, 2012; George & Zhou, 2001; Messmann & Mulder, 2012; Scott & Bruce, 1994). Others highlight idea promotion or implementation (e.g., Ding et al., 2024; Frese et al., 1997; Lee, 2020; Tsai & Zheng, 2021). A smaller group of measures seeks to capture the full process. Echebiri et al. (2020) and Felstead et al. (2020) focus on initiation and suggestion, while Morrison and Phelps (1999) emphasise implementation and change enactment. Janssen (2001), De Jong and Den Hartog (2010) and Holman et al. (2012) are intended to include all stages but tend to show an empirical bias towards the early phases, with implementation items

underdeveloped or less predictive. Griffin et al. (2007), although not innovation-specific, provide the most balanced representation, linking discretionary actions to both idea generation and implementation.

Integrative summary: Across the reviewed measures, a clear pattern emerges in that few achieve comprehensive coverage across all three dimensions of behavioural specificity, breadth of coverage, and collective stage completeness. Only four measures demonstrate relatively full behavioural coverage across the innovation process (Echebiri et al.; 2020; Felstead et al., 2020; Griffin et al., 2007; Morrison & Phelps, 1999). However, each displays notable limitations, particularly in breadth of coverage. Although Echebiri et al. (2020), Felstead et al. (2020) and Morrison & Phelps (1999) imply reach from task to departmental levels, both the scale and attribution of impact remain unclear, with the two EDI-specific measures showing particularly weak operationalisation of the implementation stage. Ambiguities in item wording, for example "group problem solving" and "consultation contributions" (Felstead et al., 2020) or "There is a process for identifying ideas in the department/unit" (Echebiri et al., 2020), suggest innovation beyond the task level without clarifying how far change extends or who drives it. Although Echebiri et al.'s (2020) EDI-13 scale conceptualises innovation as a continuous process, its collective "we" phrasing makes it difficult to distinguish the individual employee's contribution or determine whether the reported actions genuinely reflect EDI outcomes. In contrast Griffin et al.'s (2007) multidimensional model aligns closely with the criteria, capturing self-initiated, discretionary behaviours across multiple work levels and implicitly linking actions to both generation and implementation. Items such as "suggested ways to make your work unit more effective" and "developed new and improved methods to help your work unit perform better" exemplify observable, change-oriented actions spanning task, team, and organisational levels, consistent with EDI's essence (Høyrup, 2010).

Overall, this mapping shows that while recent EDI-specific measures (Echebiri et al., 2020; Felstead et al., 2020) claim to advance conceptual clarity, they remain limited in capturing EDI's distributed, collectively embedded, and process-spanning nature. Across the literature, behavioural constructs vary widely in specificity, scope, and stage coverage, reflecting fragmented understandings of how innovation emerges from employees' everyday practices. Among the behavioural constructs reviewed, Griffin et al.'s (2007) multidimensional model of proactivity demonstrates the strongest conceptual alignment with EDI, encompassing self-initiated, change-oriented actions across task, team, and organisational levels.

While this synthesis clarifies how EDI is behaviourally represented in existing research, it does not yet explain how such behaviours emerge, spread, and become embedded in organisational practice. Understanding these enabling mechanisms is therefore essential for explaining how EDI unfolds in practice. The next section builds on this conceptual foundation by examining the roles of social capital and knowledge sourcing in supporting EDI.

2.7 Mechanisms of EDI

Different modes of innovation reflect distinct learning logics through which knowledge is created and applied. These range from the formal, research-driven Science, Technology and Innovation (STI) mode to the experiential, practice-based learning captured by the Doing, Using and Interacting (DUI) framework (Jensen et al., 2007). The DUI framework provides the collaborative foundation for employee-driven innovation (EDI), which emerges through tacit, practice-based learning embedded in interpersonal and work-based processes (Høyrup, 2010). In the Mode 2b framework, the DUI mode comprises three interrelated dimensions: Doing, which entails learning from work experience and developing skills through internal knowledge exchange (Jensen et al., 2007); Using, which involves incorporating feedback from users and engaging them in improving or co-creating products and services (Rosenberg, 1982); and Interacting, which involves learning through participation, collaboration, and inquiry into work situations (Høyrup, 2010; Jensen et al., 2007).

The interaction dimension is particularly critical for EDI because it captures the collective learning and tacit knowledge exchanges that underpin innovation (Harmaakorpi & Melkas, 2012; Parjanen et al., 2020). Two mechanisms operationalise this dimension: social capital, referring to relational structures that facilitate knowledge exchange, and knowledge sourcing, reflecting employees' self-initiated behaviours to seek, share, and apply knowledge (Gray & Meister, 2004; Nahapiet & Ghoshal, 1998). Through informal, socially embedded learning, these mechanisms enable employees to generate and implement ideas, forming the foundation of EDI (Kesting & Ulhøi, 2010; Parker et al., 2010).

While interrelated, social capital and knowledge sourcing represent distinct mechanisms through which EDI unfolds. Examining them separately clarifies how collective and individual learning mechanisms interact to enable bottom-up innovation. This distinction is particularly relevant in hybrid contexts, where evolving relational and interpersonal conditions reshape

relationships and how employees access and exchange knowledge (e.g., Alavi & Leidner, 2001; Men & Jia, 2021).

Building on these foundations, the following sections synthesise empirical evidence on how EDI emerges through interaction-based learning processes, focusing on social capital and knowledge sourcing as key mechanisms within the interaction dimension of the DUI framework.

2.7.1 Findings: Social Capital as a Mechanism of Employee-Driven Innovation

This section synthesises empirical evidence on how the cognitive, relational, and structural dimensions of social capital (Nahapiet & Ghoshal, 1998) enable the interactive learning dynamics that drive employee-driven innovation (EDI). The synthesis is organised around these three dimensions: (1) cognitive, (2) relational, and (3) structural social capital. It aims to clarify how each supports informal communication, collaboration, and knowledge sharing, which are central to the interaction dimension of the DUI mode.

Cognitive: Across empirical studies, shared language emerges as a key component of the cognitive dimension of social capital and a central mechanism through which shared sensemaking and collective problem-solving occur. It represents the common vocabulary, codes and meanings that shape how individuals understand and communicate with one another (Nahapiet & Ghoshal, 1998). Shared language reduces communication barriers and fosters mutual understanding (Levin et al., 2006; Petter et al., 2020) and shapes how employees interpret and act on information (Mohammed & Kamalanabhan, 2019a), making it highly relevant to the interaction dimension of the Doing-Using-Interacting (DUI) framework. Shared language also functions as a cognitive mechanism that connects mutual understanding with proactive and innovative behaviour. Evidence indicates that shared goals, values and visions establish collective interpretive frames that encourage initiative and innovation (e.g., Den Hartog & Belschak, 2007; Zhou et al., 2020). Within these cognitively aligned contexts, employees exchange knowledge more readily, as shared meanings reduce ambiguity and support coordinated action (Berraies et al. 2020). These interaction patterns correspond to the learning processes described in the Doing-Using-Interacting framework, where innovation emerges through the recombination of experiential knowledge. Empirical findings further show that shared cognition contributes to psychological safety, creating conditions in which employees are willing to take interpersonal risks, express ideas and engage in experimentation (Carmeli & Gittell, 2009; Frazier et al., 2017). Shared language reflects these underlying

cognitive processes by minimising collaboration barriers (Akahori et al., 2023; Müller et al., 2022) and facilitating the knowledge exchanges that support collaborative processes for innovation (Eiteneyer et al., 2019). Overall, this evidence highlights shared language as a cognitive resource that activates the interaction processes of the DUI framework through which EDI occurs.

Relational: Across empirical studies, trust consistently appears as a defining element of the relational dimension of social capital. This dimension, which encompasses trust, reciprocity and mutual respect, underpins collaboration and supports the exchange of ideas and experience (Colquitt et al., 2007; Lin, 1999; Nahapiet & Ghoshal, 1998). Evidence shows that trust reduces interpersonal risk and promotes cooperation, enabling employees to share knowledge and engage in informal learning through which new ideas are generated and refined (Hsu et al., 2007; Parra-Requena et al., 2022). Within the DUI framework, trust therefore operates as a relational mechanism that enables interaction by creating the psychological and social conditions necessary for employee-driven innovation.

Empirical findings consistently identify trust as an antecedent of innovative and proactive behaviour, collective effectiveness and engagement (e.g., Afsar & Umrani, 2020; Breuer et al., 2016; Janssen, 2000; Parker et al., 2006). At the team and organisational levels, trust facilitates collaboration, knowledge integration and collective innovativeness (Cheung et al., 2016; Parra-Requena et al., 2022). At the individual level, vertical trust between employees and supervisors and horizontal trust among peers enhance knowledge sharing and innovative behaviour (Kmieciak, 2020). Studies further show that benevolence-, competence- and integrity-based trust within teams increase voluntary knowledge contribution and seeking behaviours, strengthening creative performance (Mohammed & Kamalanabhan 2019a). Trust also establishes the relational and psychological contextual conditions that allow employees to share experiential and tacit knowledge that is difficult to formalise, which strengthens collective learning and idea generation (Ardichvili et al., 2003; Fang & Chiu, 2010; Hsu et al., 2007). At the wider organisational level, trust in top management supports communication and employee involvement, reinforcing commitment to innovation goals and enhancing perceived workplace performance (Hughes et al., 2018; Mahajan et al., 2012). Overall, the evidence demonstrates that trust functions as a relational mechanism that activates the interaction dimension of the DUI mode, through which EDI is mobilised.

Structural: Across the reviewed studies, network diversity and the proportion of knowledge-based ties emerge as core elements of structural social capital that enable the interaction dimension of the DUI framework through which employee-driven innovation is mobilised. These factors represent two distinct and important ways in which the configuration of relationships within a social system shapes opportunities for interaction and knowledge exchange (Nahapiet & Ghoshal, 1998).

Evidence across studies shows that network diversity enhances opportunities for interaction by connecting employees with heterogeneous groups, roles and knowledge domains (Burt, 2000; Dobrow et al., 2012). Research increasingly conceptualises diversity as a continuous characteristic reflecting the range of expertise, experience and information accessible through an individual's network (Lai et al., 1998; Rodan & Galunic, 2004; Yang et al., 2021). Such diversity broadens access to non-redundant knowledge and perspectives, strengthening the informal learning, collaboration and problem-solving (Chen et al., 2010; Cross et al., 2002; Perry-Smith & Mannucci, 2017). When it supports boundary-spanning interactions, network diversity becomes particularly valuable for combining and refining ideas across work groups and knowledge domains (Beretta & Søndergaard, 2021; Cross et al., 2018) while increasing exposure to novel information and reinforcing the conditions required for innovation (Abbasi et al., 2014; Burt, 1992).

The proportion of knowledge-based ties, defined as the share of an employee's network connections that provide access to expertise, advice and skill-related knowledge (Ganguly et al., 2019; Parjanen et al., 2020), emerges across studies as a key element of structural social capital. Evidence shows that such ties enhance individual innovativeness and performance by connecting employees with colleagues who possess the expertise needed for the exchange of both tacit and explicit knowledge (Rodan & Galunic, 2004). Access to diverse knowledge resources fosters creativity, collaboration and effective problem-solving by enabling the integration of varied perspectives and specialist insights (Ganguly et al., 2019; Kuo et al., 2014; Liu, 2013; Tsai & Zheng, 2021). These interpersonal interactions reflect the learning processes central to the DUI framework, through which employees generate, refine and apply ideas that drive employee-driven innovation (Hinds & McGrath, 2006; Renkema et al., 2021).

Although network diversity and knowledge-based ties are conceptually distinct, evidence across studies examining their combined effects reinforces the knowledge-sharing and

collective learning mechanisms central to the DUI framework. Studies show that the exchange of diverse forms of knowledge within informal and boundary-spanning relationships enhances employees' innovative capacity (Che et al., 2019; Beretta & Søndergaard, 2021; Cross et al., 2018). Research on structural holes further indicates that broader, heterogeneous networks provide access to novel insights, reduce redundancy and promote developmental feedback (Abbasi et al., 2014; Burt, 1992; Murphy & Kram, 2010). Consistent evidence also links exposure to varied perspectives with improved problem-solving, idea generation and innovation outcomes (van der Vegt & Janssen, 2003; Mumford et al., 2002; Widmann et al., 2016). Collectively, this evidence shows that network diversity and knowledge-based ties function as network-based mechanisms that create the interactional opportunities required for knowledge exchange and informal learning, the processes through which the DUI mode generates EDI.

Overall, the synthesis of evidence across the cognitive, relational and structural dimensions of social capital shows that shared language, trust and access to diverse, knowledge-rich connections jointly facilitate the informal knowledge flows through which employees generate, share and apply ideas. These mechanisms collectively yet distinctly activate the interaction dimension of the DUI framework, supporting the experiential and collaborative learning processes that underpin EDI.

2.7.2 Findings: Knowledge Sourcing Behaviours Supporting EDI

Knowledge sourcing represents a distinct yet complementary mechanism within the interaction dimension of the DUI framework. It captures the proactive, self-initiated aspect of knowledge management behaviour through which employees acquire, exchange, and co-develop knowledge via socially driven and informal interactions (Gray & Meister, 2004). As an intrinsically motivated and self-directed form of informal learning, knowledge sourcing enables individuals to draw on colleagues' ideas and expertise to enhance performance at individual, team, and organisational levels (e.g., Cerasoli et al., 2018; Constant et al., 1996; Gubbins & Dooley, 2021). Through these everyday exchanges, employees engage in experiential learning and shared problem-solving that foster both knowledge creation and application. Collectively, these socially embedded processes exemplify the DUI mode of learning and innovation, whereby knowledge and innovation emerge through practice-based collaboration and collective experience (Høyrup, 2010; Jensen et al., 2007).

From a knowledge management perspective, knowledge sourcing occurs through informal processes of socialisation, experiential learning and communication that sustain the creation, exchange and application of knowledge (Alavi & Leidner, 2001; Davenport & Prusak, 1998; Nonaka & Takeuchi, 1995). These interactions enable the acquisition, retention and creative use of both explicit and tacit knowledge (Nonaka & Takeuchi, 1995). Tacit knowledge consists of experiential, context-sensitive insights shared outside formal channels, for example through peer exchange, mentoring and spontaneous collaboration (Gagné et al., 2019; Nonaka & Takeuchi, 1995). By drawing on shared experiences and informal advice, employees can recombine tacit knowledge in novel ways to develop context-specific solutions and foster innovation (Alavi & Leidner, 2001; Jashapara, 2003; Tsai & Lee, 2006). These informal and relational knowledge flows mirror the interactional learning processes described in the DUI framework, whereby innovation emerges from practice-based collaboration and the collective mobilisation of experiential knowledge (Høyrup, 2010; Jensen et al., 2007). Tacit knowledge thus underpins adaptive thinking and problem-solving, making the exchanges arising from knowledge sourcing fundamental to employee-driven innovation (Høyrup, 2010).

Across varied organisational contexts, evidence consistently demonstrates that knowledge sourcing contributes to learning and innovation. Gray and Meister (2006) report that dyadic sourcing is significantly related to adaptation, supporting behavioural evolution and problem-solving through personalised, context-rich exchanges. Similarly, they found that group sourcing predicts replication, adaptation and innovation, highlighting the value of multi-party interactions for integrating diverse perspectives. By enabling employees to exchange and recombine knowledge through everyday collaboration, these findings demonstrate that knowledge sourcing supports both the refinement of existing practices and the generation of new ideas that drive adaptive and innovative learning. These outcomes reflect the interactional dynamics of the DUI framework, which underpin employee-driven innovation.

These findings are consistent with broader empirical evidence demonstrating that comparable knowledge management behaviours foster innovation across diverse organisational settings. Across studies, proactive knowledge-seeking and reflective learning emerge as key behavioural enablers of innovation. For instance, Sparr et al. (2017) show that feedback-seeking and reflection help employees translate formal training into innovative work practices, while Van der Heijden et al. (2013) find that frontline workers who actively source knowledge from customers are more likely to generate service innovations, indicating that everyday exchanges

stimulate idea generation. Complementary evidence by Escribá-Carda et al. (2023) and Tsai and Zheng (2021) further illustrate that active knowledge-seeking, sharing, and donation behaviours are positively associated with creativity and innovation, reinforcing the behavioural link between knowledge management practices and EDI. Similarly, Renkema et al. (2021) provide quantitative evidence that employees' proactive knowledge-seeking behaviours are positively associated with innovation-related outcomes such as idea generation, problem-solving and the implementation of new or improved work practices. Collectively, the evidence demonstrates that knowledge sourcing functions as a distinct mechanism within the interacting dimension of the DUI framework. By facilitating experiential and collaborative learning, it enables employees to generate, refine, and apply ideas that drive EDI.

Integrating insights across both mechanisms, this section shows that social capital and knowledge sourcing jointly underpin the interaction dimension of the DUI framework through which EDI emerges. The effectiveness of these mechanisms, however, depends on the contextual conditions under which interaction occurs (Hartley et al., 2013). Empirical work by Kaše et al. (2009) illustrates this relationship, showing that HR practices such as teamwork design and training enhance the quality of co-worker relationships, which in turn facilitates tacit knowledge exchange. These findings indicate that relational conditions are shaped by structural and organisational contexts, highlighting the need to examine how contemporary hybrid configurations may alter these dynamics. Research on remote work similarly shows that hybrid arrangements transform the structural and relational conditions in which interaction unfolds (de Lucas Ancillo et al., 2021). This raises questions about how micro-level communicative and behavioural exchanges, including dialogue, responsiveness and emotional tone, affect opportunities for informal learning, collaboration and proactive engagement that underpin EDI. The next section therefore examines hybrid working as a contextual condition, synthesising empirical evidence on how remote-enabled environments influence EDI, the mobilisation of social capital and the enactment of knowledge sourcing behaviours, while identifying gaps and enabling or constraining factors.

2.8 Mapping the Hybrid Work Conditions to Employee-Driven Innovation

This section synthesises evidence from the remote-enabled work literature to examine how hybrid working conditions influence employee-driven innovation (EDI). Building on the theoretical evaluation in Section 2.5, it applies the same three thematic domains within the

interacting dimension of the DUI framework to explore how structural, relational and interpersonal conditions shape EDI-relevant behaviours and the mobilisation of social capital and knowledge sourcing. The analysis follows the thematic structure outlined in Chapter 2: *Work Modality and Structural Arrangement*, *Communication and Technology Use*, and *Dispersion and Separation*. Mapping evidence across these themes identifies convergence, divergence and conceptual gaps, establishing a foundation for understanding how EDI unfolds in hybrid contexts.

2.8.1 Work Modality and Structural Arrangement (Theme 1)

Evidence from the reviewed literature shows that EDI-relevant outcomes are shaped by structural conditions linked to work modality and organisational arrangement, which concern how work is configured in terms of where, when and how it is performed. Evidence consistently identifies autonomy as a core property of structural arrangements that enable innovative behaviour (Hackman & Oldham, 1980; Theurer et al., 2018). Large-scale field studies extend this pattern by showing that flexible and work-from-anywhere arrangements enhance productivity and innovation by expanding autonomy and reducing structural constraints (Choudhury et al., 2021).

Findings across research on remote and telework arrangements further support this relationship, showing that autonomy, feedback, social support and work-life balance enhance performance, engagement and motivation (Al Mohamed et al., 2024; Delanoeije and Verbruggen, 2020; Felstead and Henseke, 2017; Wang et al., 2021). These factors reinforce the proactive orientation and self-initiated behaviours that underpin EDI (Janssen, 2000; Parker et al., 2010). Evidence also indicates that remote roles structured with autonomy, organisational support and role clarity promote adaptation, engagement and performance, reinforcing the self-directed behaviours central to employee-driven innovation (Baruch & Nicholson, 1997; Carillo et al., 2020; Costantini et al., 2022; Mihalca et al., 2024). Such adaptive and self-directed behaviours align closely with the experiential and participatory nature of employee-driven innovation (Høyrup, 2010; Wrzesniewski & Dutton, 2001).

Research examining hybrid work extends these insights by showing that flexible arrangements offering autonomy and task variety enhance engagement and performance, both recognised antecedents of innovative behaviour (Naqshbandi et al., 2024; De Spiegelaere et al., 2016; Janssen, 2000). Studies further highlight that hybrid configurations which combine

remote flexibility with opportunities for in-person collaboration foster creativity and sustain the relational conditions necessary for innovation (Almasradi et al., 2023; Bloom et al., 2024). These findings suggest that well-structured hybrid models, when coupled with effective communication systems and supportive leadership, can maintain coordination and collaboration despite physical dispersion. Conversely, evidence also shows that fragmented communication channels and weak decision structures can constrain coordination, reduce engagement and hinder knowledge exchange in virtual teams (Soroka-Potrzebna, 2022). Taken together, the reviewed studies indicate that structural configurations promoting autonomy, clarity and connectedness, when underpinned by high communication quality, create the motivational and relational conditions through which EDI emerges.

2.8.2 Communication and Technology Use (Theme 2)

Evidence across the reviewed literature shows that technology-mediated communication shapes the conditions under which EDI can emerge. This theme, focusing on communication and technology use, examines how digital tools mediate collaboration, coordination and interaction, positioning ICTs as enablers of connectivity and workflow integration. The influence of technology-mediated communication depends on how employees perceive, adapt and use digital tools for collaboration. Studies show that while digital platforms enhance coordination and accessibility in remote work, they can also weaken social connection and spontaneous interaction if not intentionally managed (Waizenegger et al., 2020; Walden & Zeng, 2024). Extending this evidence, Marques-Quinteiro et al. (2022) found that intentional and adaptive interaction supports collaboration and innovation, with team reflexivity helping virtual teams sustain collective learning. Steizel and Rimbau-Gilabert (2013) similarly observed that employees adapt communication strategies to different technologies, using asynchronous tools for information exchange and synchronous platforms to strengthen relationships.

The effectiveness of digital collaboration also depends on communication dynamics and relational conditions that sustain interaction processes. Sarker et al. (2011b) found that communication centrality enhances performance when mediated by trust in global virtual teams, while Havakhor and Sabherwal (2018) showed that reputation signals and network density improve expertise coordination by increasing visibility and reducing uncertainty. Maurer et al. (2022) similarly reported that flatter, self-managing structures and cohesive internal networks enable teams to maintain coordination through digital communication. Cohesion, team

identification, and broker roles facilitated information flow and mitigated coordination challenges, illustrating how relational and communicative factors shape the effective use of technology.

At the interpersonal level, digital communication also influences social capital and knowledge management behaviours, indicating that communication quality is critical for the informal knowledge exchange and learning that underpin EDI. Qureshi et al. (2018) found that frequent and meaningful digital interactions foster competence-based trust even without physical proximity. Choi (2019) similarly reported that media richness and social presence in social networking services strengthen both bonding and bridging ties. Research on cross-boundary knowledge flows provides further evidence that communication ability and media choice are central to knowledge transfer in distributed contexts. For example, Peltokorpi (2015) found that language proficiency and rich media use enhance interpersonal knowledge exchange between subsidiaries and headquarters.

Recent studies reinforce the central role of communication quality in shaping these relational dynamics. Keppler and Leonardi (2023) showed that specific patterns of enterprise social media (ESM) use that increase the visibility of colleagues' activities strengthen relational confidence and expertise exchange in hybrid teams. Chen et al. (2020) found that an open and collaborative communication climate offsets the negative effects of virtuality on knowledge sharing, although higher virtuality can weaken transactive memory systems that support communication openness. Cichobłaziński (2023) similarly reported substantial changes in knowledge production, distribution, and exchange when face-to-face interaction is limited. Studies also identified socio-emotional effects, showing that high-quality interpersonal communication can sustain cohesion, engagement, and identification at a distance, allowing collaborative exchanges to continue (Robert & You, 2018; Weber & Kim, 2015). Collectively, the literature suggests that communication quality, supported by effective and adaptive technology use, shapes both relational conditions and knowledge exchange processes, which enable the interactional learning central to EDI.

2.8.3 Dispersion and Separation

Evidence across the reviewed studies shows that dispersion and separation produce structural, relational and psychological effects relevant to EDI. This theme captures the spatial, temporal and relational distances between individuals and teams, highlighting challenges of

coordination, cohesion and shared identity across boundaries. Physical and social isolation weaken organisational identification and belonging (Bartel et al., 2012; Orhan et al., 2016), while higher task virtuality increases isolation and reduces satisfaction, performance and innovation capability (Orhan & Altili, 2017). Among Generation Z employees, remote work also blurs work-life boundaries and heightens stress, diminishing motivation (Robak, 2022). Collectively, these findings suggest that dispersion can erode engagement and wellbeing, conditions central to EDI (Carmeli & Spreitzer, 2009; Wörtler et al., 2021).

Across studies, communication consistently emerges as a central mechanism shaping relational conditions under dispersion. When communication is poor or fragmented, dispersion undermines the interpersonal foundations of knowledge exchange and collaboration. Temporal distance and limited immediacy constrain coordination and mutual understanding (Colazo, 2014; Cramton, 2001), while barriers in virtual contexts further restrict trust, cohesion and knowledge flow (Cichobłaziński, 2022). Conversely, effective communication enables dispersed employees to sustain the relational structures that support EDI. Transparent, responsive and frequent exchanges foster trust, cohesion and shared identification, strengthening coordination and innovation in remote teams (Alsharo et al., 2017; Dang et al., 2020; Hao et al., 2022; Hill & Bartol, 2016).

Hao et al. (2022) show that trust and shared identification improve performance through communication quality, while other studies link high-quality communication to psychological safety and shared understanding, conditions associated with innovative behaviour (Gibson & Gibbs, 2006; Hill & Bartol, 2016). Qualitative research also highlights employees' deliberate efforts to reactivate dormant ties and rebuild trust under remote conditions, reflecting the adaptive role of communication in sustaining relational resources (Darban, 2024). At the structural level, cohesive social networks mitigate the coordination challenges created by physical dispersion, as network density and centralisation shape the quality of social relationships and team performance (Cummings et al., 2007). Together, the evidence shows that communication-rich, cohesive social networks function as structural mechanisms through which dispersed employees access and exchange resources for coordination, collaboration and knowledge sharing, underscoring the importance of cultivating these conditions to sustain relational quality and innovation during physical separation.

A further strand of research indicates that supportive relational conditions, when combined with effective communication, sustain EDI even under dispersed configurations. Inclusive and communicative leadership has been shown to strengthen the positive effects of team diversity on innovation performance in global virtual teams (Batarseh et al., 2017). Relational quality more broadly enhances wellbeing and motivation (Akahori et al., 2023; Mishra & Bharti, 2024), both antecedents of innovative work behaviour (e.g., Carmeli & Spreitzer, 2009; Den Hartog & Belschak, 2007; Montani et al., 2017; Wörtler et al., 2021). Evidence from organisational and inter-firm studies shows that social capital fosters collaboration and innovation performance by extending relational connections beyond formal structures and enabling knowledge sharing across organisational boundaries (Lawson et al., 2009). Research on social capital similarly demonstrates that trust, reciprocity and shared understanding strengthen participation, collective learning and collaboration performance across digital and hybrid contexts (Ardichvili et al., 2003; Dittes & Smolnik, 2019; Hung et al., 2020; Lawson et al., 2009). Overall, the evidence indicates that under conditions of dispersion and separation, communication quality and relational cohesion operate as compensatory mechanisms that sustain the social capital and interactional-based learning through which EDI unfolds.

2.8.4: Findings: Synthesis of Patterns

Collectively, the evidence highlights interpersonal communication as the connective infrastructure linking structural design, technology use and social relationships. Through these communicative processes, the motivational and behavioural foundations of EDI are activated. Remote conditions can both enable and constrain EDI depending on how structural, technological and relational arrangements are designed and supported. Flexible and autonomous work structures promote engagement and proactive behaviour that underpin innovation (Choudhury et al., 2021; Hackman & Oldham, 1980; Wang et al., 2021). Communication technologies enhance coordination and accessibility but may weaken social connection and trust if not intentionally managed. Communication quality and visibility remain central to collaboration and knowledge exchange (Chen et al., 2021; Keppler & Leonardi, 2023; Marques-Quinteiro et al., 2022; Waizenegger et al., 2020). Under conditions of dispersion, high-quality communication plays a central role in combating isolation and preserving belonging, with transparent and cohesive exchanges rebuilding trust and psychological safety that sustain innovation (Batarseh et al., 2017; Gibson & Gibbs, 2006; Hao et al., 2022).

Across the evidence base, interpersonal communication dynamics form the key mechanism linking structural, technological and spatial dimensions of remote-enabled work to the social and motivational foundations of EDI. Communication acts as a structural amplifier when clarity, feedback and coordination determine whether formal design supports mutual learning or leads to misalignment (Almasradi et al., 2023; Bloom et al., 2024; Soroka-Potrzebna, 2022). In technology-mediated settings, communication quality, shaped by adaptability, clarity, responsiveness and trust, transforms digital affordances into socially meaningful channels that sustain visibility, openness and knowledge exchange (Chen et al., 2020; Choi, 2019; Marques-Quinteiro et al., 2022). Under dispersion, communication reconstitutes relational foundations by fostering trust, shared understanding and psychological safety, mitigating the structural and psychological costs of distance (Alsharo et al., 2017; Gibson & Gibbs, 2006; Hao et al., 2022). It also mitigates the structural and psychological costs of distance by maintaining coordination systems and enabling boundary-spanning collaboration and knowledge flow across distributed networks (Cummings, 2004; Lawson et al., 2009; O'Leary & Cummings, 2007).

A consistent pattern across the structural, technological and dispersed themes shows that the mobilisation of social capital and knowledge sourcing depends on the quality of interpersonal communication (Cummings et al., 2007; Qureshi et al., 2018). Relational elements of social capital, such as trust, reciprocity and identification, vary with the quality and intentionality of interaction (Ardichvili, 2008; Ardichvili et al., 2003; Hao et al., 2022). Parallel contingencies appear in knowledge exchange processes, where communicative visibility, openness and responsiveness shape how knowledge is sourced and shared (Chen et al., 2020; Keppler & Leonardi, 2023; Peltokorpi, 2015). The effectiveness of digital tools, particularly their richness, synchronicity and social presence, determines how well relationships form and expertise circulates (Choi, 2019; Cichobłaziński, 2023; Marques-Quinteiro et al., 2022). These findings align with media richness theory, indicating that interaction quality and the way employees enact communication media, rather than tool availability alone, shape the relational and knowledge processes that underpin EDI (Chen et al., 2020; Choi, 2019; Daft & Lengel, 1986; Keppler & Leonardi, 2023).

2.9 Discussion

The following discussion integrates the findings across the three research questions to interpret how different ideas, theories, and workplace conditions in hybrid settings influence the

operation of employee-driven innovation. Building on the structural, technological, and relational three conceptual dimensions identified, this discussion interprets how these conditions jointly shape the operation of EDI.

The review addressed the first research question by examining how remote-enabled work environments have been defined and theorised. It identified significant conceptual limitations that constrain understanding of how EDI operates under hybrid conditions. Definitions of hybrid and remote work remain fragmented and inconsistent across disciplines (Bloom et al., 2024; Lauring & Jonasson, 2025; Vartiainen & Vanharanta, 2024; Wang et al., 2021). When interpreted through the three analytical themes identified in the review, namely work modality, communication and technology use, and dispersion and separation, it becomes clear that most research privileges structural (Beno, 2022; Bissani et al., 2024) and technological conditions (Malhotra & Majchrzak, 2014; Van Wart et al., 2019), while overlooking interpersonal dynamics. This narrow orientation limits theoretical integration because divergent definitions and measurement practices (Bloom et al., 2024; Orhan et al., 2016) reinforce a structural rather than social understanding of hybrid work (Malhotra & Majchrzak, 2014), which in turn obscures how employees coordinate, learn, and innovate within these environments (Gibson & Gibbs, 2006).

The review showed that these conceptual limitations extend into the theoretical frameworks underlying much of the empirical research on remote-enabled work. No single framework fully captures the socially embedded nature of hybrid work or the interpersonal conditions that enable EDI. Media richness theory (Daft & Lengel, 1986) and task virtuality (Orhan, 2014) remain useful but partial lenses: both conceptualise communication quality primarily in structural or technological terms, which means the adaptive, relational dynamics that characterise hybrid environments are understated. Consequently, empirical studies often measure communication effectiveness through structural proxies and overlook the interactional practices through which employees shape communication in hybrid contexts (Leonardi, 2021; Malhotra & Majchrzak, 2014; Van Wart et al., 2019). Even though task virtuality incorporates electronic dependence, it still offers limited insight into the interpersonal dynamics central to knowledge sharing and innovation (e.g., Gupta et al., 2020; Orhan et al., 2016). These dynamics are essential for knowledge sharing and the emergence of EDI (Høyrup, 2010). As a result, current applications of MRT and task virtuality do not fully capture how employees communicate and innovate within hybrid environments. Extending these frameworks to account

for adaptive, relational communication practices provides clearer theoretical leverage for explaining how hybrid conditions enable employee-driven innovation.

To answer research question two, this scoping review next explored how EDI is conceptualised. While there is broad agreement that EDI represents the voluntary generation and implementation of ideas by employees beyond their formal roles, the field still lacks a unified conceptual and measurement framework. A critical insight emerging from this synthesis is that EDI is inextricably linked to employee behaviour; it is enacted through self-initiated, discretionary actions that extend beyond formal job requirements. Understanding how EDI is represented behaviourally is essential for achieving consistent conceptualisation and measurement. The review evaluated existing measures using an analytic framework informed by Høyrup's (2010) definition of EDI. This framework emphasised behavioural specificity, breadth and collective scope, reflecting Høyrup's (2010) conceptualisation of EDI. Most behavioural scales capture only isolated stages of the innovation process or focus narrowly on individual actions disconnected from team and organisational innovation. The multidimensional proactivity model (Griffin et al., 2007) offers the most conceptually aligned behavioural representation of EDI, as its focus on self-initiated, change-oriented actions across task, team and organisational domains reflects the distributed and discretionary nature of this process.

The review further found that EDI unfolds as a process of innovation, identifying the mechanisms that enable employees' discretionary behaviours associated with it. Theory situates EDI within the Doing-Using-Interacting learning mode (Høyrup, 2010; Jensen et al., 2007), framing it as an interaction-based process of experiential and tacit learning. Two distinct yet complementary mechanisms, social capital and knowledge sourcing, were identified as central to this process (Gray & Meister, 2004; Nahapiet & Ghoshal, 1998). The evidence shows that social capital - through its cognitive (shared language and understanding), relational (trust), and structural (diverse, knowledge-rich networks) dimensions - underpins EDI by supporting idea exchange and integration (Levin et al., 2006; Parjanen et al., 2020; Renkema et al., 2021). Similarly, evidence highlights that knowledge sourcing functions as a behavioural mechanism that allows employees to seek, exchange, and apply knowledge in ways that generate, refine, and implement innovative ideas (Gray & Meister, 2004; 2006; Nonaka & Takeuchi, 1995; Renkema et al., 2021). Taken together, these mechanisms illustrate that EDI represents a socially embedded form of innovation sustained by informal, interaction-based learning (Kesting & Ulhøi, 2010; Parker et al., 2010). This understanding highlights the importance of

examining EDI in hybrid environments, where interactional dynamics are particularly sensitive to changes in relational and communicative patterns (De Lucas Ancillo et al., 2021; Liu et al., 2020).

Finally, this review addressed research question 3. This was done by examining the factors and conditions within hybrid work environments that shape EDI and its informal enabling mechanisms, particularly those related to social-capital mobilisation and knowledge sourcing behaviours. Evidence across structural, technological and dispersion domains (Hao et al., 2022; Marques-Quinteiro et al., 2022; Naqshbandi et al., 2024) indicates that structural foundations such as autonomy, clarity and organisational support function as key enablers of proactive and innovative behaviour (Costantini et al., 2022; Hackman & Oldham, 1980; Parker et al., 2010). These findings suggest that hybrid conditions can effectively foster EDI when such elements are intentionally embedded in work design (Almasradi et al., 2023; Bloom et al., 2024; Choudhury et al., 2021). However, the effectiveness of these structural supports depends on relational conditions sustained through high-quality interpersonal communication, particularly where interactions are marked by clarity, responsiveness and trust (Breuer et al., 2016; Hao et al., 2022; Sarker et al., 2011b). These qualities of communication define how employees coordinate, collaborate and maintain cohesion across digital and physical settings, thereby shaping whether hybrid structures translate into behaviours for EDI. Reduced co-presence and fragmented communication undermine both structural-motivational and relational-communicative mechanisms by weakening coordination, trust and knowledge exchange, preventing formal design features from translating into engagement and innovation (Colazo, 2014; Cramton, 2001; Orhan & Altili, 2017; Soroka-Potrzebna, 2022; Waizenegger et al., 2020). Across the reviewed evidence, high-quality communication emerges as the cross-cutting mechanism that integrates structural, technological and relational domains. It transforms formal affordances into socially cohesive and knowledge-rich environments that sustain engagement, learning and innovation (Chen et al., 2020; Choi, 2019; Gibson & Gibbs, 2006; Marques-Quinteiro et al., 2022). In turn, this enables the mobilisation of social capital and the behaviours that drive EDI in hybrid settings (Batarseh et al., 2017; Cichobłaziński, 2023; Qureshi et al., 2018).

While these interpretations consolidate understanding of how EDI operates under hybrid conditions, they also expose several areas where theoretical and empirical knowledge remains

incomplete. The following section therefore summarises the key research gaps identified through this review.

2.10 Research Gaps

While research on remote work and digital collaboration offers valuable insights, the hybrid context introduces distinct communicative, relational, and structural complexities that are not yet well understood. Accordingly, four main research gaps relevant to this study are identified.

The first main gap concerns the underdeveloped understanding of the communicative dynamics that underpin EDI in hybrid environments. Remote-enabled conditions fundamentally reshape interpersonal dynamics (De Lucas Ancillo et al., 2021) and can erode the communicative bonds that sustain collaboration and learning (Radaelli et al., 2014). Yet the communicative dynamics that underpin EDI in hybrid environments remain conceptually and empirically underdeveloped. Specifically, we lack understanding of how communication quality varies as employees alternate between physical and digital interactions in hybrid work settings, and how such variation affects EDI (Hao et al., 2022; Keppler & Leonardi, 2023). Research on remote work clarifies some effects of virtuality (Choudhury et al., 2021). However, it cannot capture the cadence of co-presence and modality-switching unique to hybrid work (Kniffin et al., 2021). Addressing this gap advances the thesis objectives by clarifying how variations in hybrid communication quality shape employees' navigation of interpersonal conditions that support EDI and, in turn, the mobilisation of social capital and knowledge sourcing that sustain it.

The second main gap relates to how interpersonal dynamics operate under hybrid conditions. Evidence from remote work shows that interpersonal dynamics depend on employees' communication goals, agency, and the relational bonds that shape interaction (Hao et al., 2022; Marques-Quinteiro et al., 2022; Steizel & Rimbau-Gilabert, 2013). These findings underline the importance of informal communicative mechanisms - such as spontaneous interaction and trust-based collaboration - that sustain knowledge exchange and collaboration, forming the interpersonal basis for the social capital mobilisation and knowledge sourcing mechanisms examined in this thesis (Chen et al., 2020; Høyrup, 2010; Qureshi et al., 2018). However, the interpersonal dynamics that enable these mechanisms tend to be volatile under technology-mediated and individually enacted conditions (Gibson & Gibbs, 2006; Hao et al.,

2022; Waizenegger et al., 2020). It remains unclear how such dynamics are reshaped in hybrid contexts, where relational challenges associated with trust, reciprocity, and cohesion observed in remote work may persist but take new forms (Ardichvili, 2003; 2008; Choudhury et al., 2021; Kniffin et al., 2021). Resolving this gap advances theoretical understanding of how interpersonal communication dynamics shape EDI in hybrid contexts and lays the foundation for examining social capital and knowledge sourcing.

The third main gap concerns the operation of social capital under hybrid conditions. Social capital remains foundational for innovation; however evidence summarised in the review shows that its operation under hybrid conditions is poorly understood. Evidence suggests that reduced social interaction and weakened connectivity in hybrid contexts may disrupt the development of shared language and common meaning, affecting communication and collaboration (Golden et al., 2008; Wang et al., 2021). Trust, which mitigates isolation and supports team performance in remote settings (Coovert et al., 2017; van Zoonen et al., 2024), may also be affected, as limited opportunities to observe colleagues' behaviour constrain trust formation and normative visibility (Alsharo et al., 2017; Crisp & Jarvenpaa, 2013). Structurally, network diversity and knowledge-based ties facilitate collaboration and knowledge exchange (Burt, 2000; Dobrow et al., 2012). However, little is known about how hybrid work changes the way employees activate their networks. Empirical evidence remains limited; Maurer et al. (2022) exemplify this work, showing that the reactivation of dormant ties supports coordination and performance, suggesting that hybrid work compels employees to actively reconstruct their social capital to support EDI. Relational dynamics within employee networks influence how tacit knowledge is exchanged (Kaše et al., 2009). Yet the micro-level interactions through which employees engage with their networks under different communication conditions remain unexplored in hybrid environments. Addressing this gap contributes directly to the second objective of the research, clarifying how employees mobilise social capital to support EDI. It also corresponds to the third research question, by explaining how hybrid work conditions shape the relational dynamics through which such mobilisation occurs.

Finally, the fourth main gap concerns how knowledge sourcing operates under the variable communicative conditions of hybrid work. Prior research indicates that supportive technologies can foster relational confidence and facilitate knowledge seeking independent of physical co-location (Keppler & Leonardi, 2023), extending earlier insights from distributed work on digital coordination and knowledge transfer (Cramton, 2001; Malhotra & Majchrzak,

2014; Qureshi et al., 2018; Sarker et al., 2009; 2011). Yet most studies attribute communication quality to media characteristics rather than to the relational contexts in which hybrid interactions occur (Marques-Quinteiro et al., 2022; Peltokorpi, 2015). Hao et al. (2022) further show that interpersonal trust enhances psychological safety and, in turn, promotes open knowledge sharing under remote conditions, yet increasing technological mediation can weaken these relational effects. Similar challenges may emerge in hybrid work when interactions occur through digital rather than face-to-face channels. Chen et al. (2020) provide additional evidence that communication quality varies with the level of virtuality, initially constraining but later enhancing knowledge exchange as employees adapt to technology use. These findings suggest that similar dynamics may shape knowledge sourcing in hybrid environments, where variations in face-to-face and digital interaction lead to fluctuating communication quality (Handke et al., 2024; Kniffin et al., 2021). It remains unclear how such fluctuations affect employees' willingness and ability to source knowledge for EDI, or which relational conditions mitigate these effects. Addressing this gap advances the overarching research question by examining how hybrid work conditions shape knowledge sourcing behaviours essential to sustaining EDI.

2.11 Directions for the Current Research

Building on the gaps above, this research addresses each through three interrelated studies aligned with the overarching research question and objectives. The scoping review showed that existing MRT-based approaches capture either the structural mode of communication or the extent of technological dependence but overlook the interpersonal dynamics that shape effective interaction in hybrid work. To evaluate how well existing lenses represent hybrid interaction dynamics, Study 1 compares traditional and extended MRT operationalisations and tests their association with social capital. Although a range of extensions to MRT have been proposed, from structural-modality to technology-mediation and dispersion-separation perspectives, their explanatory power remains uncertain, and existing operationalisations vary widely in focus and underlying assumptions (Gilson et al., 2015; Leonardi, 2021; Orhan et al., 2016; Waizenegger et al., 2020). The study addresses these limitations, by providing an exploratory comparison of traditional and extended MRT operationalisations to evaluate how effectively each captures communication quality and social capital in hybrid environments. The findings will clarify whether a structural, mode-based, or more relationally attuned communication lens best represents the interaction-centred

conditions of hybrid work. The MRT lenses examined include a structure-based measure, a technology-exclusive measure, and task virtuality (Orhan et al., 2016), and a new MRT operationalisation, referred to in this study as the Hybrid Relational Communication Ratio (HRCR). The HRCR is a weighted composite index that integrates the extent of face-to-face interaction with the quality of technology-mediated communication. HRCR is designed to capture interpersonal communication quality in hybrid settings more effectively than structure-based or technology-exclusive MRT measures. By comparing these MRT operationalisations, this research will determine which lenses offer the most appropriate operationalisations for the in-depth analyses in Studies 2 and 3. Accordingly, the central research question guiding Study 1 (RQ1) is: *How effectively do existing operationalisations of media richness theory, compared to the Hybrid Relational Communication Ratio, capture variations in social capital mobilisation within hybrid work environments?*

A second gap concerns how Employee-Driven Innovation (EDI) operates under hybrid work conditions and the interpersonal communication conditions that support it. As the review indicated, EDI depends on informal, interaction-based mechanisms such as social capital mobilisation and knowledge sourcing (Chen et al., 2020; Høyrup, 2010; Qureshi et al., 2018). Although media richness theory and its extension, task virtuality, explain how communicative conditions influence interaction processes, few studies have examined how variations communication quality across hybrid modalities affect employees' ability to coordinate, share knowledge, and generate new ideas (Choudhury et al., 2021; Kniffin et al., 2021; Rico & Cohen, 2005). Consequently, the role of communication quality in enabling or constraining EDI remains poorly defined, limiting understanding of how variable communicative conditions affect employees' capacity to innovate.

Two interrelated gaps therefore emerge. The first concerns how interpersonal communication quality influences EDI in hybrid environments. The second relates to how communicative conditions shape the underlying mechanisms of such innovation, particularly social capital mobilisation and knowledge sourcing. Clarifying these relationships is essential to explain how employees enact EDI under varying communicative conditions. This is the aim of studies 2 and 3, which examine how communication quality dynamics in hybrid environments influence EDI. The studies adopt the proactivity dimension developed by Griffin et al. (2007) as the behavioural representation of EDI, herein termed innovative work performance (IWP). This approach aligns closely with research on EDI that views proactivity, including showing

initiative, taking charge and being change oriented, as a core feature of idea generation and implementation (Frese et al., 1999; Unsworth & Parker, 2003). This view is consistent with research that conceptualises innovation as a multidimensional behavioural construct rather than a single outcome (Rahrovani & Pinsonneault, 2020; Echebiri et al., 2020). This behavioural approach has also been adopted in doctoral research, as demonstrated by Echebiri (2021), who operationalised employee-driven innovation (EDI) through employees' self-reported engagement in identifying, generating and implementing ideas. Study 2, building on the conceptual insights gained from the exploratory comparison in Study 1, extends the theoretical framework to examine how IWP operates in hybrid work environments. It investigates how variations in communication quality enable or constrain employees' ability to mobilise social capital for innovation. In this study, communication quality is operationalised using the previously introduced HRCR, which captures the dynamics of interaction across hybrid modalities. The central research question guiding Study 2 (RQ2) is: *How does employees' personal (ego-centric) networks contribute to innovative work performance in hybrid work environments, and how does interpersonal communication quality in such environments, framed through HRCR, shape this relationship?*

Study 3 examines how IWP operates through the second key mechanism, knowledge sourcing, using the task virtuality MRT extension of communication quality. This measure captures differences in reliance on virtual and face-to-face interaction and allows the study to assess how these communicative conditions influence employees' engagement in knowledge-related behaviours that support innovation. The central research question guiding Study 3 (RQ3) is: *How does employees' knowledge sourcing influence innovative work performance in hybrid work environments, and how does interpersonal communication quality, framed through task virtuality, shape this relationship?*

Collectively, these three studies form a coherent strategy for addressing the theoretical and empirical limitations identified in the review. The research is designed to extend understanding of communication quality in hybrid work and to refine the conceptual grounding of media richness theory by evaluating its explanatory capacity across multiple operationalisations and by introducing a relational extension, the HRCR, tailored to hybrid contexts. It also explores how social capital and knowledge sourcing function as mechanisms linking communication conditions to EDI. Through this integrated approach, the research seeks

to fulfil the thesis objectives by providing insights about how organisations can design hybrid practices to foster the interpersonal conditions essential for innovation.

2.12 Conclusion

Building on the preceding analysis of hybrid work concepts, theoretical perspectives and the mechanisms underpinning EDI, this chapter has consolidated and critically evaluated fragmented research on EDI in hybrid work environments. In doing so, it highlighted the enabling roles of social capital and knowledge sourcing behaviours as foundations for understanding how communication supports innovation in hybrid settings. Through the scoping review, three conceptual dimensions were identified that structure hybrid work: work modality and structural arrangement, communication and technology use, and dispersion and separation. Synthesising insights across these dimensions showed how structural, technological and relational conditions collectively shape the communicative context within which EDI occurs. The analysis indicates that communication quality acts as the cross-cutting mechanism linking these dimensions. It does so by enabling the mobilisation of social capital and the knowledge sourcing behaviours that underpin innovation. This helps explain why, although hybrid work presents communicative challenges, it can also combine the autonomy of remote work with the collaborative benefits of co-located engagement when supported by high-quality communication and positive relational structures.

The review also identified significant theoretical and empirical limitations in how communication quality has been conceptualised within existing perspectives. Although media richness theory and task virtuality emerged as the most relevant, both remain limited in explaining how communication operates as a dynamic and relationship-centred phenomenon across hybrid work settings to support EDI. This highlighted the need for a more integrated conceptualisation of how communication quality functions across modalities and supports innovation through interpersonal mechanisms.

Accordingly, the chapter established the theoretical rationale for the current research programme. Building on these conceptual gaps, the studies that follow evaluate alternative operationalisations of communication quality and examine how variations in communicative conditions influence EDI through social capital mobilisation and knowledge sourcing. Collectively, these insights provide the conceptual foundation for the methodological approach presented in the next chapter, ensuring coherence between theory and research design.

CHAPTER 3: METHODOLOGY

3.1 Introduction

This chapter outlines the methodological framework used to examine how communication conditions in hybrid work environments shape employee-driven innovation (EDI). It begins by justifying the ontology and epistemology that underpin the quantitative, deductive research design. Guided by a pragmatic orientation, the study employs a multi-study, cross-sectional design across three organisations to test the central hypotheses. The chapter details the research design, including the operationalisation of hybrid communication through constructs such as the Hybrid Relational Communication Ratio (HRCR), and explains how the multi-study approach systematically investigates both social capital mobilisation and knowledge sourcing as mechanisms underpinning employee-driven innovation.

The chapter is structured as follows: First, it outlines the philosophical foundations guiding the study, and then presents the research strategy, methodological approach and operationalisation of the key constructs. The design logic linking the three empirical studies is then explained, before detailing the strategies used to mitigate the limitations of cross-sectional designs. Finally, the ethical considerations underpinning the research are discussed.

3.2 Philosophical Foundations Underpinning the Study of Hybrid Communication and Employee-Driven Innovation

This study adopts a post-positivist philosophical stance, combining a realist ontology with an empiricist epistemology. Within this paradigm, organisational reality is regarded as existing independently of perception but only partially knowable through systematic observation and evidence-based analysis (Creswell, 2014). This position aligns with the study's focus on identifying observable patterns of interpersonal communication and innovation within hybrid work environments, while recognising some degree of contextual variability. It therefore combines a high level of objectivity, with the adoption of a post-positivist stance in recognition of this variability.

To clarify this stance, it is helpful to contrast post-positivism with other philosophical paradigms. Ontology, which concerns the nature of reality and what can be known about it, provides the foundation for research assumptions and methodological choices (Crotty, 1998; Guba & Lincoln, 1994). In business and management studies, paradigms typically include

interpretivism, constructivism, critical realism, positivism, and post-positivism (Guba & Lincoln, 2005; Saunders et al., 2019). Interpretivist and constructivist perspectives view knowledge and communication as socially produced through meaning-making (Berger & Luckmann, 1966; Nonaka et al., 2000), while critical realism integrates both objective and socially constructed dimensions of reality (Bhaskar, 1978; Easton, 2010). Although these paradigms offer valuable insights into meaning-making and social processes (Mkansi & Acheampong, 2012), they are less aligned with the aims of this study.

Classical positivism assumes full objectivity and deterministic causality; however such assumptions are overly rigid for cross-sectional organisational research where variability, measurement error and contextual influences make causal inferences inherently uncertain (Johnson & Duberley, 2000; Morgan & Smircich, 1980). Post-positivism occupies an intermediary position, retaining realism while recognising that organisational phenomena are mind-independent yet imperfectly measurable, meaning that inferences are probabilistic rather than absolute (Creswell, 2014; Phillips & Burbules, 2000). offers distinct advantages. It balances objective measurement with some sensitivity to context (Blaikie, 2007; Creswell, 2014), facilitating rigorous, theory-driven testing of relationships among observable constructs, while acknowledging that this reality is influenced and better understood within its social and environmental context. (Cohen et al., 2018; Phillips & Burbules, 2000). Accordingly, the research conceptualises hybrid communication, social capital mobilisation, knowledge sourcing and innovative work performance as measurable constructs that capture empirically observable yet context-bound organisational phenomena (Borgatti & Foster, 2003; Daft & Lengel, 1986; Lee & Choi, 2003; Scott & Bruce, 1994). Consistent with this logic, the design controls for organisational context, rather than allowing for interpretive description or critical realist accounts (Easton, 2010; Morgan & Smircich, 1980). This provides methodological rigour by improving the internal validity of the research, thereby facilitating the identification of general patterns of association in hybrid work environments, while offering empirically grounded insights into communication and innovation processes (Blaikie, 2007; Saunders et al., 2019).

While this philosophical stance offers several methodological advantages, it is not without recognised limitations. Considering only some degree of context may risk reducing complex social processes to quantifiable indicators, potentially overlooking interpretive and relational nuances within hybrid work environments (Guba & Lincoln, 1994; Johnson & Duberley, 2000; Morgan & Smircich, 1980). This challenge arises due to the tendency of

quantitative analysis to simplify multifaceted realities (Easterby-Smith et al., 2018). This is a real concern considering the dynamics of the variables, which may vary across organisations due to factors such as structure, work practices or hybrid configurations (Oppong-Peprah, 2024; Saunders & Ahuja, 2006). However, the study mitigates this risk by grounding its constructs in established theoretical frameworks from organisational communication and innovation research, ensuring conceptual fidelity and contextual sensitivity (Daft & Lengel, 1986; Lee & Choi, 2003; Nonaka et al., 2000). Accordingly, patterns of communication and knowledge exchange can be empirically examined even when their manifestations differ across organisational settings (Berger & Luckmann, 1966; Nonaka et al., 2000).

Within this philosophical position, an empiricist epistemology guides how knowledge is conceived and justified. From an empirical standpoint, knowledge arises from experience and sensory evidence rather than speculation (Saunders et al., 2019). This epistemological stance is particularly appropriate for the present study because research on hybrid communication and EDI is still relatively new and exploratory. Such emerging areas require an approach that acknowledges the provisional and context-bound nature of empirical knowledge. By grounding these developing relationships in systematic empirical evidence, the study contributes to theoretical advancement while maintaining the post-positivist commitment to rigorous, probabilistic explanation rather than claims of absolute truth.

3.3 Research Strategy and Methodological Approach

Informed by its philosophical foundations, the research adopts a pragmatic methodological orientation that prioritises methods capable of addressing meaningful organisational problems. Pragmatism emphasises the usefulness and application of knowledge (Goldkuhl, 2012; Lincoln et al., 2011), making it well suited to research that seeks to balance theoretical rigour with practical relevance (Laudan, 1996). This orientation supports the integration of theory testing with applied insight to generate evidence on hybrid communication, social capital mobilisation and EDI that can inform organisational practice (Aguinis et al., 2019). Guided by this pragmatic stance, the research employs a deductive research strategy. This theory-driven approach enables systematic testing of hypothesised relationships and supports evidence-based organisational decision-making (Colquitt & Zapata-Phelan, 2007; Rousseau, 2006; Rynes et al., 2001; Tranfield et al., 2003). The study draws on media richness theory (Daft & Lengel, 1986), social capital theory (Nahapiet & Ghoshal, 1998) and knowledge

management theory (Grant, 1996; Nonaka & Takeuchi, 1995) to derive and test hypotheses to better understand how EDI emerges in hybrid work. This approach aligns with established practice in quantitative organisational research (e.g., Decius et al., 2019; Huang & Lai, 2020). The quantitative approach adopted is consistent with these assumptions, allowing systematic measurement and statistical testing of key relationships and providing rigorous, practically relevant insights across organisational settings. A self-report method was utilised to capture participants' subjective perceptions and psychological experiences, as these internal states are best reported by individuals themselves (Orhan et al., 2016; Spector, 2006).

Grounded in these philosophical foundations, the research examines how hybrid communication conditions shape employees' social capital mobilisation and knowledge sourcing behaviours, which together underpin EDI (Høyrup, 2010). EDI is operationalised behaviourally through a measure of innovative work performance. Hybrid work conditions are operationalised through four constructs grounded in media richness theory (MRT), each representing a different dimension of communication quality.

- Remote Intensity (RI) reflects the proportion of time employees work away from the organisational site (Virick et al., 2010) and serves as an indirect indicator of communication quality by assuming that off-site work increases reliance on technology-mediated interaction, whereas on-site work provides more opportunities for face-to-face communication (Bloom et al., 2024; Choudhury et al., 2021).
- Digital Information Communication Quality (DICQ) represents communication quality by assessing the rich characteristics of employees' dominant technology-mediated channels. It classifies written, audio, avatar and video communication according to the cues, immediacy and synchronicity they afford, following media richness theory (Daft & Lengel, 1986; Kirkman & Mathieu, 2005).
- Task virtuality (TV) reflects the extent to which work and communication occur without physical co-presence (Orhan, 2014; Orhan et al., 2016). It captures communication conditions indirectly through the structural pattern of interaction, indicated by reliance on technology-mediated rather than face-to-face contact (Kirkman & Mathieu, 2005), and is operationalised as the weighted percentage of non-face-to-face interaction across key stakeholder groups.
- The Hybrid Relational Communication Ratio (HRCR), introduced in this thesis, represents communication quality directly by combining employees' level of face-to-

face interaction with the interpersonal quality of their technology-mediated communication in a weighted composite index. Its primary purpose is to serve as an integrative, relationally attuned measure of communication quality that captures both the mode and the interpersonal effectiveness of hybrid interaction.

Together, these constructs provide a coherent set of MRT-informed operationalisations for examining communication conditions in hybrid environments. The next three chapters offer a more detailed account of these measures. All survey instruments are also provided in Appendix B.

To test the theoretical models in the research, the thesis adopts a multi-study, cross-sectional design comprising three distinct empirical studies. Each study examines hybrid communication conditions and their effects at the individual level, drawing on data collected across three participating organisations. Although all three studies investigate hybrid communication as the central explanatory construct, each adopts a distinct analytical focus; one on social capital mobilisation, another on EDI and its association with social capital mobilisation, and a third on knowledge sourcing behaviours and their relationship to EDI. This approach captures variation in how hybrid work is structured and experienced (Lauring & Jonasson, 2025; Oppong-Peprah, 2024), while the use of consistent instruments enables meaningful comparison across organisational contexts. To accommodate the conceptual fluidity and practical diversity of hybrid work (Sun et al., 2025), the study utilises this design to collect data in several organisational settings that represent different hybrid arrangements. Consistent measurement instruments and procedures ensure that any observed differences reflect contextual variation rather than methodological inconsistency. The design also identifies behavioural and interpersonal patterns at specific points in time, providing meaningful snapshots of how communication conditions influence knowledge sourcing and social capital mobilisation in real world contexts.

In line with the study's theoretical framework, the Hybrid Relational Communication Ratio (HRCR) is specified in the analytical models, where appropriate, as both a predictor and a moderator, enabling the examination of its direct and interaction effects as distinct components. This approach follows established methodological frameworks that distinguish between main effects and interaction effects, where moderators identify the conditions under which relationships vary (Baron & Kenny, 1986; Hayes, 2015). Given the novel nature of HRCR, estimating its direct relationship with outcomes provides initial evidence of nomological

or criterion-related validity (MacKenzie et al., 2011; Hinkin, 1998), while moderation analysis captures the conditional nature of these relationships. This dual-specification approach reflects established empirical precedents where the same construct is modelled as both an independent predictor and a boundary condition (e.g., Oldham & Cummings, 1996). Accordingly, both effects are specified and tested within the relevant models. This approach aligns with the practical aims of the study, namely, to generate actionable insights into hybrid work and their implications for EDI (Rindfleisch et al., 2008).

3.3.1 Design Logic: How the Three Studies Relate

The three studies offer complementary examinations of how communication conditions influence the interpersonal and behavioural mechanisms that underpin EDI. Each study is analytically self-contained, yet all are unified by a shared foundation in media richness theory (MRT). Across the studies, the key operationalisations include Remote Intensity, Digital Information Communication Quality and task virtuality, together with the newly developed Hybrid Relational Communication Ratio, which provides a more relational and integrated measure of communication quality. The multi-study design allows the thesis to examine communication quality from different angles using distinct operationalisations, two of which (task virtuality and HRCR) are used to test how communication conditions contribute to EDI. The following summarises the specific focus and contribution of each study:

- Study 1 evaluates the predictive utility of the established operationalisations by examining how Remote Intensity, Digital Information Communication Quality (DICQ) and task virtuality relate to the cognitive, relational and structural dimensions of employees' social capital. It also introduces and tests the Hybrid Relational Communication Ratio (HRCR) as a potentially stronger indicator of communication quality.
- Study 2 extends on this work by examining how communication conditions influence the translation of social capital into innovative work performance. It tests both the direct effects of social capital on innovative behaviour and whether communication quality, measured through the HRCR, moderates these relationships.
- Study 3 examines knowledge sourcing as a second interaction-dependent mechanism through which communication conditions influence innovative work performance (IWP). Using task virtuality as the focal operationalisation, it tests both the direct effects of knowledge sourcing on IWP and the moderating role of spatially distributed interaction

patterns. A two-wave, temporally separated design is used in this study to reduce the likelihood of common method bias.

Although each study focuses on a different mechanism, with the Hybrid Relational Communication Ratio applied to social capital and the task virtuality construct applied to knowledge sourcing, all remain grounded in media richness theory (MRT) and linked to the same innovation outcome, innovative work performance. Their theoretical coherence and methodological complementarity extend the explanatory power of MRT in hybrid work contexts and provide a layered understanding of how communication dynamics support innovation. By examining communication quality using several operationalisations across varied organisational settings, the research provides a detailed account of how interpersonal dynamics in hybrid work environments influence employees' ability to mobilise resources for innovation.

The methodological procedures, data collection processes and analytical approaches for each study are presented in detail in the methods sections of the relevant empirical chapters.

3.5 Mitigation of Cross-Sectional Study Limitations

To address the limitations typically associated with cross-sectional research, the research employs a set of strategies designed to enhance rigour. First, it incorporates a narrowly defined application of methodological and analytical triangulation, specifically through data triangulation in its measures and analytical triangulation across the three studies. Data triangulation incorporates variation in both person and time. Participants were drawn from three distinct organisations across different industries and structures with representation spanning hierarchical levels from entry to senior management (Denzin, 2017; Flick, 2018; Valencia, 2022). While the use of multiple case studies across diverse sectors enhances contextual richness and external validity, it also introduces challenges in comparability across organisational types; these were mitigated through consistent data collection protocols and analytical frameworks (Yin, 2018).

Analytical triangulation was strengthened by examining the three studies at different stages of the research process. Although each study collected data at different times and in different organisational contexts, the datasets were analysed and then compared across studies to identify convergent and divergent patterns. This variation in organisational setting, participant profile and timing enhances the robustness of the findings by reducing context-specific bias and improving external validity. Triangulation was employed as an overarching analytical process

to integrate and interpret patterns across all three studies, rather than as a procedure replicated within each study. This approach enabled the synthesis of convergent and divergent findings across contexts, thereby strengthening the overall validity of the research conclusions. Analytical triangulation, as used here, also refers to the application of diverse statistical techniques, including network analysis, regression, moderation analysis and confirmatory factor analysis, to examine related constructs across distinct empirical contexts. While not part of Denzin's (2017) original typology, this approach is increasingly recognised as a means of validating findings through multiple analytical perspectives (Fetters & Freshwater, 2015; Valencia, 2022).

Second, the research further mitigates cross-sectional limitations by combining temporal variation with theory-driven assumptions. Each study is grounded in well-established theoretical models that offer conceptual justification for hypothesised directional relationships. For instance, media richness theory posits that richer communication leads to better relational outcomes (Daft & Lengel, 1986), while social capital theory asserts that social network structures influence access to resources rather than the reverse (Lin, 2001; Nahapiet & Ghoshal, 1998). Recent empirical research supports these theoretical assumptions, demonstrating that communication richness can influence improved relational and performance outcomes and that social network structures facilitate access to resources (Choi & Lim, 2021; Men et al., 2020; Park & Lee, 2023). These directional assumptions are widely supported in the literature, enhancing the internal consistency and interpretive clarity of the findings.

3.6 Ethical Considerations

All research procedures for the research were reviewed and approved by Dublin City University's (DCU) Research Ethics Committee, in accordance with institutional and national guidelines. Ethical safeguards were embedded throughout the research design to uphold participants' rights to autonomy, privacy, confidentiality, and psychological well-being. Informed consent was obtained from all participants prior to data collection. Each participant received a Plain Language Statement (PLS) and informed consent form detailing the study's purpose, procedures, potential risks, and their right to withdraw without penalty. Consent was obtained via mandatory checkboxes embedded within the online survey, ensuring compliance with GDPR and DCU standards. To preserve anonymity, unique, non-traceable survey links were distributed either via internal company communications or directly by the researcher.

While organisation-specific links enabled statistical control, individual responses remained unidentifiable to employers. For longitudinal participation, email addresses were collected solely for re-contact purposes and stored separately in a password-protected master index accessible only to the researcher. Survey data were anonymised immediately upon download and stored securely on DCU's encrypted Google Drive, ensuring full compliance with data protection requirements.

As the study employed an ego-centric social network approach (Study 1 and 2), participants were asked to list individuals (alters) within their networks. To minimise identifiability, only the first name and the initial of the surname were requested (e.g., "Janet M."), following the minimal data principle in egocentric network designs (Vacca, 2018). No data were collected from or about the alters themselves, ensuring their identities remained untraceable. Although the study posed minimal risk, potential psychological discomfort arising from reflection on interpersonal dynamics was anticipated and pre-emptively prepared for. As a precaution, participants were provided with contact information for free counselling services (submitted to DCU's Research Ethics Committee), and a clear opt-out mechanism was available at every stage of the survey. These procedures align with recommendations (e.g. Perry et al., 2018; Reins et al., 2021), particularly for higher-burden survey formats such as social network analysis.

All three studies adhered to the same DCU-approved ethical protocol described above. The methodological and ethical framework was intentionally standardised across studies to maintain comparability of findings and ensure that all participants received equal protection and transparency, consistent with institutional and General Data Protection Regulation (GDPR) requirements. A copy of the Plain Language Statements (PLS), informed consent form, privacy notice and the survey instruments (Survey 1 and Survey 2) are provided in Appendix B.

3.7 Conclusion

This chapter established the rationale and structure of the study's methodological approach. It outlined how a post-positivist, empiricist stance informed a pragmatic, quantitative design comprising three cross-sectional studies. The overall design integrates deductive, theory-informed methods with strategies that ensure analytical validity, ethical integrity and contextual sensitivity. Together, the three studies provide complementary insights into how hybrid communication conditions shape the relational and behavioural mechanisms that underpin EDI,

including social capital mobilisation and knowledge sourcing behaviours. Each study maintains a distinct research focus while contributing cumulatively to the overarching inquiry, which is examined further in Chapter 7.

The next chapter, which applies this overarching methodological strategy, details the first empirical investigation examining how hybrid work conditions - operationalised through media richness theory constructs - relate to employees' social capital.

CHAPTER 4: STUDY 1

Operationalising Media Richness for Understanding Social Capital Variation in Hybrid Work

4.1 Introduction

As hybrid work becomes the dominant mode of organising, the quality of interpersonal communication has emerged as a critical factor shaping employees' ability to mobilise social capital. In hybrid environments, the success of mobilising social capital within employees' personal networks depends on the quality of communication. When communication is weak, relationships erode and employees lose access to the knowledge and support embedded in personal networks, reducing the resources available for collaboration and innovation (Griffith et al., 2003; Nahapiet & Ghoshal, 1998). Face-to-face engagement is particularly effective for building strong ties, as it aligns messaging and reduces misinterpretation (Choi, 2019; Cramton, 2001), and conveys informal elements such as emotions and attitudes (Knapp & Hall, 2010; van der Meulen et al., 2019). As employees rely more on less rich, asynchronous media like email and messaging, they experience a decline in communication immediacy and information value (Griffith et al., 2003; Kirkman & Mathieu, 2005). This weakens reciprocal feedback and social connection (Li et al., 2017; Ramirez & Zhang, 2007), undermining the high-quality interactions that sustain social capital (Dang et al., 2020; Messmann et al., 2018). Recent literature suggests that this pattern continues, particularly as hybrid work increasingly relies on digital and asynchronous modes (Lauring & Jonasson, 2025). Hybrid arrangements can therefore reduce the accessibility of social networks (Oppong-Peprah, 2024), making it essential to examine how communication quality shapes employees' social capital mobilisation.

Media richness theory (MRT) explains communication effectiveness through the capacity of media to convey cues critical for interaction (Daft & Lengel, 1986). However, existing MRT operationalisations remain largely structural and therefore fail to capture the interpersonal communication dynamics that shape employees' actual communication experiences in hybrid work (Dennis & Valacich, 1999). Although constructs such as task virtuality (Orhan et al., 2016) address variation in remoteness and reliance on digital channels, they still do not account for the quality of technology-mediated interaction (Kirkman & Mathieu, 2005). Co-location and technological affordances create diverse interaction patterns (Golden et al., 2008; Nguyen Duc et al., 2022; Olson & Olson, 2000) raising questions about whether current operationalisations

reflect employees' actual communication experiences in hybrid settings. To address this gap, the current study develops the Hybrid Relational Communication Ratio (HRCR) as a refinement of task virtuality (Orhan, 2014; Orhan et al., 2016). Functioning as a weighted composite index, HRCR integrates employees' level of face-to-face interaction with the quality of their technology-mediated communication to better capture the interpersonal dynamics that shape social capital mobilisation in hybrid work. The research question is therefore*: How effectively do existing operationalisations of media richness theory, compared to the Hybrid Relational Communication Ratio, capture variations in social capital mobilisation within hybrid work environments?*

This study examines how communication quality dynamics shape social capital mobilisation in hybrid settings, where interactions occur across face-to-face and technology-mediated exchanges. However, the limitations of existing MRT-based approaches make it necessary to use multiple operational lenses of communication quality. This is tested using a cross-sectional online survey of hybrid employees across three organisations to compare different operationalisations of MRT. Three MRT operationalisations, each emphasising structural, technological, or spatial factors, have been selected: Remote Intensity (RI), Digital Information Communication Quality (DICQ), and task virtuality (TV). These three operationalisations are tested against the Hybrid Relational Communication Ratio (HRCR), developed in this thesis to determine which measure is most consistently associated with social capital mobilisation. The four MRT operationalisations are tested to assess their associations with the cognitive (shared language), relational (trust), and structural (network diversity) dimensions of social capital mobilisation. The analysis focuses on employees' personal networks, the active connections individuals establish to access critical social capital resources both within and outside their organisations (Lin, 2001; Marsden & Baum, 2019; Schreurs et al., 2019; van der Rijt et al., 2013).

Though hybrid work has become the organisational norm (Bloom et al., 2024), theoretical understanding of how it reshapes key relational mechanisms such as the mobilisation of social capital (Nahapiet & Ghoshal, 1998) remains critically underdeveloped. This limitation arises from the absence of robust ways to assess the quality of interpersonal communication that underpins these processes. By extending Media Richness Theory (Daft & Lengel, 1986) through the development of the Hybrid Relational Communication Ratio (HRCR), which captures the cumulative quality of employees' interpersonal communication experiences across face-to-face

and technology-mediated contexts, this study exposes the limitations of existing operationalisations. In doing so, it advances theoretical understanding of communication quality in hybrid environments and identifies which measure most reliably reflects the dynamics associated with social capital mobilisation, thereby addressing the empirical and conceptual gaps highlighted by Hao et al. (2022) and Keppler and Leonardi (2023).

The chapter proceeds as follows. First, the theoretical framework and conceptual model are developed, followed by the hypotheses. The next sections describe the data, measures and analytical strategy. Then, the results are presented. Finally, the contributions, implications and limitations are discussed.

4.2 Theoretical Framework

4.2.1 Social Capital Resources in Hybrid Employee Personal Networks

Social capital represents a core mechanism that operationalises the interaction dimension of the DUI innovation process (Høyrup, 2010; Jensen et al., 2007). Social capital, through its cognitive, relational, and structural dimensions, enables employees to access knowledge, interpret ambiguity, and support collaborative learning under conditions of reduced co-presence. The available evidence consistently shows that the effectiveness of social capital is contingent on the quality of interpersonal communication, which sustains the necessary relational and communicative conditions in remote-enabled settings (Heubeck et al., 2024; Van Zoonen et al., 2022). In line with this evidence, this study draws on Nahapiet and Ghoshal's (1998) multidimensional framework to represent the three dimensions identified in the scoping review: cognitive (shared language), relational (trust) and structural (network diversity).

Shared language, defined as the extent to which individuals use similar vocabulary and narratives to communicate ideas (Petter et al., 2020), is regarded as a key cognitive element of social capital in hybrid work. Studies suggest that shared language makes it easier for employees to interpret information and deal with ambiguity (Levin et al., 2006; Tidwell & Walther, 2002; Ye, 2003), and that common vocabulary and narratives support the exchange of tacit knowledge (Levin et al., 2006; Orr, 1990; Ye, 2003). These benefits are especially important in hybrid work environments, where the shift away from rich, face-to-face interaction may weaken shared meaning and relational bonds. According to media richness theory (Daft & Lengel, 1986), richer media such as face-to-face meetings support shared understanding, whereas asynchronous,

lower-cues communication makes interpretation harder and mutual understanding less likely (Tidwell & Walther, 2002). This is particularly important in hybrid work, where low-cues communication increases ambiguity and makes shared meaning harder to maintain, unless communication quality compensates for the loss of contextual cues (Robert & You, 2018; Tidwell & Walther, 2002; Weber & Kim, 2015).

Trust is an important relational resource in hybrid work and represents the relational dimension of social capital (Nahapiet & Ghoshal, 1998). In this study, trust is defined as the willingness to be vulnerable to another person's actions based on expectations of reliability (Mayer et al., 1995, as cited in Gillespie, 2013; Nahapiet & Ghoshal, 1998). Trust supports knowledge sharing and reduces perceived interpersonal risk in hybrid work. This allows employees to interact openly and to mobilise support even when they are not co-present (Hsu et al., 2007; Parra-Requena et al., 2022). Communication quality strengthens trust by signalling reliability (Alsharo et al., 2016; Hao et al., 2022; Sarker et al., 2011). In hybrid interactions, dependence on digital channels means that responsiveness and clarity are particularly important for sustaining such relational bonds (Choi, 2019; Qureshi et al., 2018). However, studies also suggest that when communication is fragmented or low in richness, trust and coordination become difficult to maintain in virtual settings (Chen et al., 2020; Colazo, 2014; Cramton, 2001). From the perspective of media richness theory (MRT), richer and more responsive communication offers relational reassurance by enabling deeper shared understanding and clearer interpretation of cues (Daft & Lengel, 1986).

Structural social capital refers to the overall pattern of connections between individuals (Nahapiet & Ghoshal, 1998). In this study, it is operationalised as network diversity, defined as the range of connections that provide access to varied resources (Burt, 2000; Dobrow et al., 2012). Lin (2001) highlights that diverse networks matter not only for their size but also for the mix of instrumental and expressive resources they provide, thereby making them resource-rich. Diverse contacts often span roles and affiliations, which expands access to information, influence and support (Abbasi et al., 2014; Burt, 1992; Chen, 2015; Higgins & Kram, 2001), and which provide structural benefits that are particularly relevant in hybrid work. Reduced co-presence and fragmented digital communication make coordination and informal access to support more difficult (Chen et al., 2020; Colazo, 2014; Cramton, 2001). Under these conditions, employees with more diverse networks have alternative routes to information, assistance and problem-solving, reflecting the structural dimension of social capital identified

across the reviewed studies (Burt, 2000; Higgins & Kram, 2001; Lin, 2001). Although studies do not examine network diversity through a media richness lens, multiple studies nevertheless suggest that richer and more responsive communication creates conditions that enable it. Research shows that rich communication strengthens trust, coordination, and collaborative engagement in dispersed settings (Chen et al., 2020; Choi, 2019; Cramton, 2001; Qureshi et al., 2018), and these relational conditions are foundational for building and sustaining diverse networks (Burt, 2004; Higgins & Kram, 2001; Lin, 2001). Moreover, some studies show that high-quality interpersonal communication sustains cohesion and identification at a distance, helping employees preserve varied professional ties and thereby maintain diverse, non-redundant networks that provide access to both specialised expertise and general assistance (Robert & You, 2018; Weber & Kim, 2015). From an MRT perspective, this suggests that communication mechanisms with greater richness and personalisation are better able to convey the complex and relational cues needed to nurture the varied and distant relationships that sustain diverse networks under hybrid conditions.

4.2.2 Conceptual Model and Operationalisation

Although social capital enables hybrid employees to access information, support and opportunities, its benefits depend on the quality of interpersonal communication. Existing MRT operationalisations emphasise channel richness rather than interpersonal behaviour, meaning they cannot detect how employees adapt their communication practices to sustain shared meaning and trust when both high- and low-quality exchanges coexist (Heydari et al., 2018; Knapp & Hall, 2010; Morrison-Smith & Ruiz, 2020). These adaptive behaviours maintain communication effectiveness in interdependent relationships and extend ties beyond immediate work dependencies (Hambley et al., 2007; Kankanhalli et al., 2005; Ledbetter & Mazer, 2014; Majchrzak et al., 2012; Woudstra et al., 2012). The gap in understanding therefore lies in the limited ability of current measures to capture interpersonal communication dynamics.

To address this, the study evaluates four extensions of MRT: Remote Intensity (RI), operationalised as the proportion of remote working days, Digital Information Communication Quality (DICQ), task virtuality (TV), and the Hybrid Relational Communication Ratio (HRCR). HRCR reflects the balance of high- and low-quality interpersonal communication experiences across both face-to-face and technology-mediated interactions. These four operationalisations serve as indicators of interpersonal communication quality in hybrid employee personal

networks. This study examines how well each operationalisation captures variation in the cognitive (shared language), relational (trust), and structural (network diversity) dimensions of social capital. Figure 4.1 presents the conceptual model supporting the development of the research hypotheses presented in the next section.

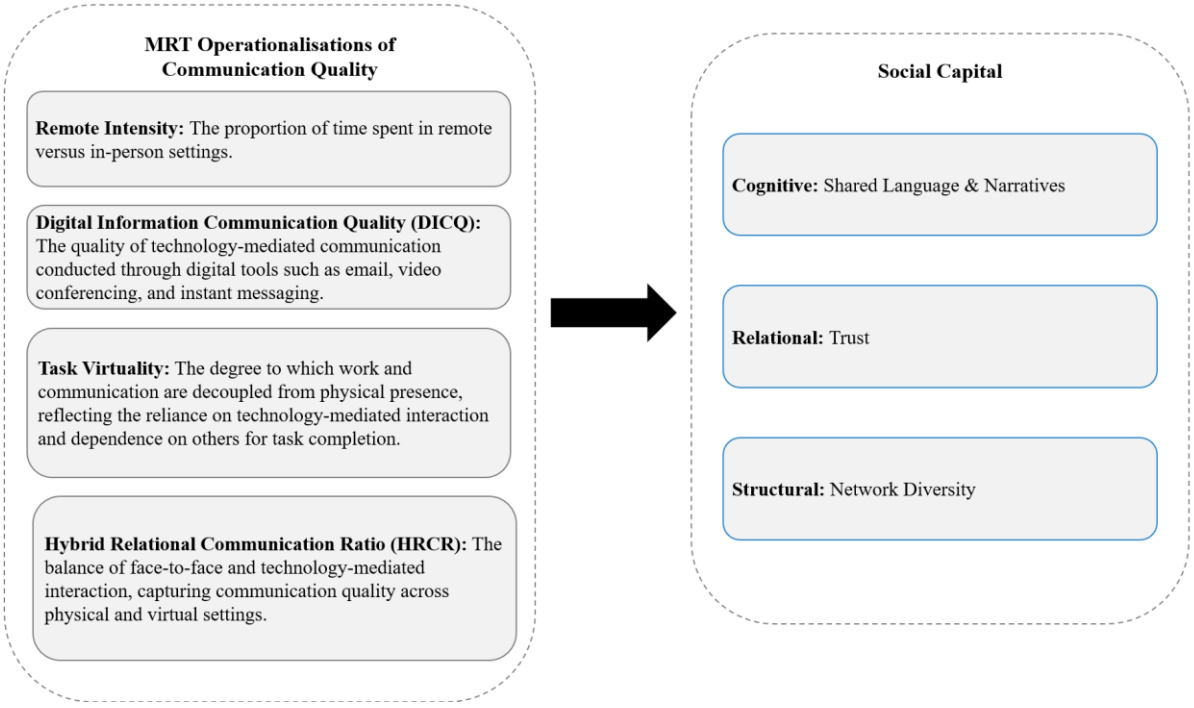


Figure 4.1 *Conceptual Model Detailing The Proposed Relationship Between MRT Operationalisations of Communication Quality and Shared Capital (Study 1)*

4.3 Social Capital in Hybrid Employee Networks: Assessing HRCR Against Existing MRT Operationalisations

This section evaluates the capacity of the Hybrid Relational Communication Ratio (HRCR) relative to three existing Media Richness Theory (MRT) operationalisations, namely Remote Intensity (RI), Digital Information Communication Quality (DICQ) and Task Virtuality (TV), to determine which provides the most accurate representation of communication quality effects on social capital mobilisation. The analysis compares how each operationalisation relates to the cognitive (shared language), relational (trust) and structural (network diversity) dimensions of social capital in order to identify the measure that most effectively captures the communication quality dynamics characterising hybrid work environments.

4.3.1 Mobilising Cognitive Social Capital - Shared Language: An MRT-based Comparison

Co-presence traditionally supports shared language by allowing spontaneous conversation, nonverbal cues, humour, and informal exchange (Boland & Tenkasi, 1995; Chae et al., 2005). When co-presence declines, informal exchange weakens, practices misalign and communication quality falls (Morrison-Smith & Ruiz, 2020). Fewer in-person interactions limit opportunities to align practices and build shared identity, even though these exchanges are critical for mutual understanding and effective collaboration (Allen et al., 2015; Mortensen & Hinds, 2001; Suh et al., 2011). Lower communication quality hampers understanding of message nuances, so shared language may decline (Kock, 2005). Although tools like Zoom allow visual communication, they reduce the frequency and depth of informal exchange (Waizenegger et al., 2020). Heavier reliance on text in remote conditions (Yang et al., 2021) lowers communication quality, potentially weakening shared language as employees struggle to establish a unified perspective (Armstrong & Cole, 2023).

However, shared language is not a passive outcome of the working arrangement; it is actively sustained. Because shared language underpins bonds and facilitates cooperation and task coordination, employees are motivated to sustain it (Abbasi et al., 2014; Moeschler, 2009; Molina et al., 2020; Petter et al., 2020). These deliberate efforts follow stable, personalised 'social signatures' (Heydari et al., 2018) which guide adaptive efforts to mitigate disruptions and preserve bonds (Ogolsky & Monk, 2019), especially in hybrid-work conditions of relational uncertainty (Theiss, 2019). Even when face-to-face interaction declines, employees frequently compensate by mixing communication modes, e.g., video, real-time messaging, voice notes, to preserve some form of informal interaction, repair misunderstandings, and maintain collaborative momentum (Ledbetter & Mazer, 2014). Interdependent work further encourages linguistic alignment to support clarity and cooperation, sustaining shared language across strong and weak ties (Brinberg & Ram, 2021; Hansen, 1999; Morrison-Smith & Ruiz, 2020).

This distinction becomes clearer when considering existing operationalisations of MRT. Structural or channel-focused measures alone do not explain how employees can preserve mutual understanding through relational effort and adaptive communication practices. For example, greater remote intensity may restrict informal exchanges, but long-term job-relevant relationships often maintain linguistic alignment even when contact decreases (Bierstetel et al., 2020; Brinberg & Ram, 2021; Gibson & Gibbs, 2006). Research in interpersonal communication further shows that linguistic alignment is a stable cognitive process that persists

under reduced contact and supports mutual understanding, even outside formal organisational contexts (Karan et al., 2019; Long et al., 2020). Likewise, although reduced media richness limits non-verbal cues, adaptive online communication can preserve shared language, meaning DICQ alone may not capture variation in shared understanding (Bierstetel et al., 2020; Walther, 1992, 1996). A similar pattern emerges with task virtuality. While fewer face-to-face interactions can limit social exchange, interdependent relationships still tend to engage in ongoing discussion and clarification, helping preserve shared understanding and shared language (Brinberg & Ram, 2021; Hinds & McGrath, 2006).

HRCR captures interpersonal communication quality dynamics across modalities, reflecting how employees adjust their behaviour when shifting between forms of communication. Low HRCR reflects more synchronous, cue-rich interaction that should enhance partner predictability, facilitate social information exchange, and encourage self-disclosure (Baym, 2002; Walther & Parks, 2002), conditions known to support shared language (Mohammed & Kamalanabhan, 2019a; Nahapiet & Ghoshal, 1998). At moderate HRCR levels, indicating an increasing reliance on technology for communication, the measure is expected to capture employees' adaptive practices that sustain informal discussion, support quick issue resolution, and enable collaboration (Junaidi et al., 2020; Ledbetter & Mazer, 2014; Walther, 1996). Employees often offset reduced face-to-face contact by combining communication modes such as video calling and real-time messaging, increasing the likelihood that shared language is maintained (Cox et al., 2021; Ledbetter & Mazer, 2014). However, high HRCR is expected to indicate a breakdown of these adaptations and diminished use of rich media (Long et al., 2020; Yang et al., 2021). Under such conditions, maintaining 'social signatures' would be less likely, especially in close networks where declining quality alters norms (Heydari et al., 2018; Theiss, 2019). This decline is likely to undermine interdependent work, which requires communication that fosters mutual understanding and collaboration (Allen et al., 2015; Mortensen & Hinds, 2001; Suh et al., 2011).

High HRCR is expected to limit the development of shared language in new relationships and accelerate erosion within established ones. Communication serves as signals of intent to build and maintain relationships and supports attraction and relational development (Littlejohn & Foss, 2012). However, under high HRCR, limited access to connection spaces would reduce opportunities for new bonds. Moreover, high HRCR would likely reflect more transactional communication, arising from fewer physical interactions and greater dependence

on low-quality technologies that reduce interpersonal cues. High quality interpersonal communication would become harder as individuals would struggle to interpret events without a clear framework (Knobloch & Satterlee, 2009; Solomon et al., 2016). These conditions would obscure communication, increase misinterpretation, and foster tensions that hinder shared understanding, leaving new and existing relationships vulnerable to breakdown (Berger & Gudykunst, 1991; Theiss, 2019). These dynamics are expected to impede the development of shared language in new relationships and accelerate its decline in existing ones. By capturing declines in both face-to-face and technology-mediated communication quality, HRCR is expected to detect shared language erosion that traditional measures miss and should therefore be strongly associated with shared language.

High HRCR is also arguably a stronger indicator of conditions that weaken shared language than existing MRT extensions, because it reflects interpersonal dynamics that signal deterioration in the organisational relational climate. High-quality interaction during planning, decision making, and innovation builds connectedness and alignment, which supports shared language (Baltes et al., 2002; Cox et al., 2021; Gibson & Gibbs, 2006). Poor interpersonal communication, especially when accompanied by scrutiny and alienation, has been shown to weaken relational ties (Berger & Bradac, 1982; Knobloch & Solomon, 1999) and to leave employees feeling they lack access to critical information (Gajendran & Joshi, 2012; Orhan et al., 2016). This creates a strained environment that heightens disharmony (Lau & Murnighan, 1998) and weakens perceptions of mutual obligation (Blau, 1964), further compromising ties and shared language. Routine interpersonal behaviours maintain relationships (Dainton & Stafford, 1993; Duck, 1994; Stafford et al., 2000). A significant shift toward asynchronous communication (Yang et al., 2021) under high HRCR levels therefore signals reduced interpersonal effort (Blaskovich, 2008; Ledbetter & Mazer, 2014). This pattern indicates a weakening relational fabric driven by psychological distance and diminishing social bonds (Perry et al., 2016; Tajfel, 1982). Such conditions would make employees question relational depth (Berger & Bradac, 1982; Knobloch & Satterlee, 2009), creating an environment under which shared language is likely to weaken.

Overall, high HRCR should weaken existing ties, hinder new ties, and degrade the broader relational climate of the work environment (Berger & Gudykunst, 1991; Gibson & Gibbs, 2006; Theiss, 2019). This would reflect the erosion of cue-rich, reciprocal communication and the breakdown of adaptive practices that would normally preserve social

signatures and mutual understanding when face-to-face contact is reduced and technology use becomes heavier (Ledbetter & Mazer, 2014; Walther & Parks, 2002; Yang et al., 2021). These dynamics span both face-to-face and technology-mediated exchange and are often overlooked by frameworks that emphasise mode or channel features rather than interpersonal quality (Majchrzak et al., 2012; Woudstra et al., 2012). Because HRCR is designed to capture interpersonal communication quality across both face-to-face and technology-mediated exchange, it should better capture the forces that shape shared language compared to single-mode or channel-based measures. Lower HRCR should therefore coincide with higher shared language by signalling richer communication and enabling the mutual understanding and alignment necessary to sustain close and cross-boundary ties (Cox et al., 2021; Mohammed & Kamalanabhan, 2019a; Yang et al., 2021). Thus, compared to mode- or channel-focused MRT extensions, the HRCR is expected to provide a more accurate indication of the interpersonal conditions that shape variation in shared language.

Hypothesis 1 (H1): HRCR will show a stronger association with shared language than the other operationalisations of media richness. Specifically, employees with lower HRCR levels (i.e., the low-HRCR group) will demonstrate higher levels of shared language than employees with higher HRCR levels (i.e., the high-HRCR group).

4.3.2 Mobilising Relational Social Capital - Trust: An MRT-based Comparison

Trust, as a component of relational social capital, develops through repeated interpersonal interactions and assessments of competence and reliability (Lewicki & Bunker, 1995; McAllister, 1995; Moran, 2005; Nahapiet & Ghoshal, 1998). Open and transparent communication helps build trust because it allows individuals to demonstrate credibility, share expertise, and reduce uncertainty (Maynard et al., 2012; Schiller & Cui, 2010). Consequently, physically collocated settings that allow immediate feedback, real-time response gauging and spontaneous informal conversations, and observation of behaviour are recognised as ideal for deepening connections and fostering trust (Crisp & Jarvenpaa, 2013; van der Werff & Buckley, 2017; Zhang et al., 2017). However, sustaining trust relies on active participation, effective communication and social interaction (Covey et al., 2008; Hsiao & Chiou, 2012). Due to the inherent strains on interpersonal communication in hybrid environments, employee trust levels are likely to decline as these conditions become increasingly strained (Jones & George, 1998).

MRT can account for some of the erosion of trust in hybrid environments because, when interaction shifts toward lean, asynchronous channels, many social cues are removed (Daft & Lengel, 1986; Kossen & van der Berg, 2022). This suggests that MRT-based extensions such as remote-work intensity and task virtuality may help explain trust variation. However, these measures capture only reductions in face-to-face collocated communication and overlook the resilience of ego-centric networks, which are intimate, long-standing relationships built through repeated interaction (Higgins & Thomas, 2001; Jones & George, 1998; Luz et al., 2021). In such ties, trust that has reached a stable phase through past reliability is likely to be sustained despite reduced face-to-face contact and even under turbulent conditions (Cherry, 2015; Rousseau et al., 1998; Theiss, 2019). While remote intensity and task virtuality extensions can capture erosion in general workplace ties (Crisp & Jarvenpaa, 2013; Jarvenpaa et al., 1988), they fail to detect trust in ego-centric relationships, where stability makes communication quality less critical and multiple communication channels are leveraged to maintain connection (Dorairaj et al., 2012; Hambley et al., 2007; Haythornthwaite, 2005; Jones & George, 1998). Similarly, the DICQ, a technology-focused MRT extension, overlooks relational history, as trust can persist in strong ties even when lean media are used (Berger & Bradac, 1982; Chen et al., 2020; Jones & George, 1998; Rousseau et al., 1998). Moreover, in hybrid settings where individuals shift between rich and lean channels, a technology-centred lens like DICQ provides an incomplete account of trust, especially given that lean media use can signal strong normative bonds (Driskell et al., 2003). Taken together, these limitations demonstrate that current MRT extensions fail to adequately capture how trust operates in hybrid workplaces.

The Hybrid Relational Communication Ratio (HRCR), as a new operationalisation of MRT, is likely to serve as an effective determinant of trust variation in hybrid work environments. HRCR accounts for communication patterns across both face-to-face and technology-mediated exchanges in a dynamic way that captures interpersonal dynamics relevant to all types of relationships, including those in personal networks where trust is harder to disrupt and meaningful variations are correspondingly harder to detect. By providing a granular view of communication quality across modalities, HRCR is well suited to capture these subtle fluctuations in trust. Low HRCR reflects synchronous, cue-rich interaction. These conditions support immediate feedback, real-time response gauging, and spontaneous informal conversations, all of which foster trust (Zhang et al., 2017). It is therefore plausible that HRCR would detect corresponding trust levels under low values. At medium HRCR, employees are

likely to adapt their communication practices to compensate for reduced face-to-face interaction, which can help maintain trust within close or personal networks. However, medium-strength ties are more vulnerable to disruption than strong ties (Sitkin & Roth, 1993; Sutcliffe et al., 2012), so the granularity of HRCR may still capture subtle declines in communication quality and corresponding reductions in trust. High HRCR reflects a greater reliance on lean, asynchronous, and transactional technology-mediated exchanges. These forms of communication limit responsiveness, transparency, and expertise-sharing. As a result, open communication climate is likely to weaken because colleagues lose awareness of expertise, timely clarification, and mutual reliability, causing trust to deteriorate (Kramer & Tyler, 1996; Wegner et al., 1991). Trust maintenance becomes especially challenging when interpersonal connectivity is reduced (Berger & Bradac, 1982; Knobloch & Solomon, 1999), such as when employees are excluded from informal conversations or feel isolated from colleagues (Ceci et al., 2021; Cooper & Kurland, 2002; Jarvenpaa et al., 1998). This perceived distance undermines relational bonds and makes trust more difficult to sustain (Alsharo et al., 2017; Jones & George, 1998, 2007). Trust also deteriorates when interpersonal signals such as responsiveness, contextual awareness, and informal interaction decline (Cramton, 2001; Kraut et al., 2002; Zhang et al., 2024). Since high HRCR reflects a decline in such interpersonal dynamics, corresponding reductions in trust are likely to be detected, making HRCR sensitive enough to capture these resulting trust fluctuations.

Hybrid arrangements can mask underlying interpersonal issues making subtle trust problems harder to detect (Rupcic, 2024). Structural or mode-centred extensions such as remote intensity and task virtuality are inadequate in hybrid conditions because they capture only reductions in face-to-face communication and treat stability as evidence of sustained trust. As a result, they may overlook the gradual erosion of interaction quality and tie-level trust that occurs when communication shifts toward leaner channels. Technology-centred MRT extensions such as DICQ also struggle in this context because hybrid environments involve switching between rich and lean modes of communication. In addition, DICQ can misinterpret lean media use as evidence of stable normative bonds (Driskell et al., 2003), which can lead to trust deterioration to remain invisible. HRCR aggregates communication quality across in-person and technology-mediated contexts and detects subtle trust variation that mode or channel measures miss (Vîrgă et al., 2014; Zhang et al., 2024). In doing so, HRCR addresses the core diagnostic limitations of current MRT extensions and provides a more complete explanation of how trust varies within

hybrid environments. As a stronger MRT operationalisation of communication quality, HRCR should be the most consistent correlate of trust.

Hypothesis 2 (H2): HRCR will show a stronger association with trust than the other operationalisations of media richness. Specifically, employees with lower HRCR levels (i.e., the low-HRCR group) will demonstrate higher levels of trust than employees with higher HRCR levels (i.e., the high-HRCR group).

4.3.3 Mobilising Structural Social Capital - Network Diversity: An MRT-based Comparison

Network diversity exposes employees to novel ideas and support (Burt, 1992, 2004). Personal networks that provide diverse knowledge and developmental resources are crucial for employee growth (Berraies et al., 2020; Bunger et al., 2018; Kirchmeyer, 2005). Employees learn not only from colleagues and peers but also from experts across organisational, educational and online environments (Boud & Middleton, 2003; Cross & Sproull, 2004; De Laat, 2012). These learning opportunities rely on interpersonal exchange, through which employees seek advice, feedback and mentoring (Kirchmeyer, 2005; Murphy & Kram, 2010). Communication also enables employees to build and sustain cross-domain relationships inside and outside the organisation, ultimately mobilising the developmental benefits of network diversity by enabling employees to access a diverse set of social resources, knowledge, advice and support (Podolny & Baron, 1997; Tasselli & Kilduff, 2021; Walther & Parks, 2002; Wolff & Spurk, 2020).

Research shows that employees working remotely engage more actively in interpersonal communication to develop their personal networks. Greater autonomy over schedules and work location increases motivation for social interaction and knowledge exchange (Naghavi et al., 2019; Wang et al., 2021; van Zoonen et al., 2021). Greater autonomy over schedules and work location increases motivation for social interaction and knowledge exchange (Naghavi et al., 2019; Wang et al., 2021; van Zoonen et al., 2021). This motivation aligns with self-determination and optimal distinctiveness theories, which suggest that employees naturally seek networks that provide both belonging and uniqueness (Brewer, 1991; Deci & Ryan, 1985). By cultivating ties that offer inclusion and diverse perspectives, employees satisfy identity needs while broadening access to resources (Leonardelli & Loyd, 2016; Tasselli & Kilduff, 2021). Employees also generally tend to expand their networks and mobilise social capital resources for both professional development and personal growth (Moser & Ashforth, 2022; Tasselli & Kilduff, 2021). They deliberately form developmental ties that provide career guidance, role

modelling and problem-solving support, which builds confidence and behavioural competence (Dobrow et al., 2012; Higgins, 2001). When skill or decision-making demands increase, employees further extend advice ties to strengthen expertise and maintain control over their work goals (Brass et al., 2004; Vacca, 2020). Drawing on Social Exchange Theory (Blau, 1964), these networks are sustained through reciprocal giving and seeking of support, which creates ongoing opportunities for learning and the continued mobilisation of social resources (Marin & Hampton, 2007; Wenger et al., 2011). Ultimately, interpersonal communication enables this entire process by connecting employees to colleagues across organisational boundaries and to wider sources of influence (Chiaburu et al., 2007).

Interpersonal communication quality is critical for relationship development and the mobilisation of resources from personal networks. Low-quality exchanges characterised by ambiguity, limited interaction or miscommunication can weaken ties and restrict access to developmental resources (Kock, 2005; Theiss, 2019; Zhang, 2010). In contrast, high-quality, frequent and responsive communication fosters interpersonal clarity and strengthens relational bonds (Stafford, 2011; Walther & Parks, 2002; Wellman, 1979). Diverse networks are built through communication experiences that support emotional guidance and constructive feedback, allowing insights to be turned into actionable ideas (Beretta & Søndergaard, 2021; Malhotra et al., 2007) and are further enhanced by high-quality communication (Abbasi et al., 2014; Chen, 2015). Hybrid environments, despite incorporating in-office days, do not guarantee that the communication conditions needed for effective network diversity mobilisation will be maintained (Doherty, 2023) as evidenced by research showing that enforcing face-to-face communication can reduce relational benefits (Bouncken & Reuschl, 2018; Ramirez & Zhang, 2007).

Existing MRT operationalisations are insufficient for detecting variations in network diversity because a structural or medium-focused lens overlooks communicative agency and underestimates the effectiveness of modern tools for varied interpersonal exchanges (Kankanhalli et al., 2005; Majchrzak et al., 2012; Woudstra et al., 2012). Technology-mediated communication enables employees to connect and sustain relationships across distances, broadening the range of contacts and resources available to them (Cuypers et al., 2020; Kane & Alavi, 2007). Different digital platforms support relational development in distinct ways: video conferencing and collaboration tools enable resource exchange and, when used strategically, help employees expand their networks and strengthen weak ties that provide access to novel

information and support (Constant et al., 1996; Malhotra et al., 2007). Enterprise platforms such as wikis and blogs facilitate resource pooling and knowledge sharing, while social media fosters dialogue, visibility and professional growth that further enhance access to social capital (Chang & Hsu, 2016; Kuegler et al., 2015). Together, this evidence demonstrates that employees have multiple technological pathways through which they mobilise social resources. Consequently, the development of network diversity and the effective mobilisation of its resources depend less on medium richness and more on how interpersonal dynamics are enacted.

Sustaining and diversifying personal networks relies on employees' agency to strategically select tools, align expectations, and occasionally supplement these with in-person contact (Chen et al., 2020; Jarvenpaa & Leidner, 1999; Ramirez & Zhang, 2007). This communicative competence is further shaped by proactive dispositions (Chiaburu et al., 2007; Crant, 1995) and deliberate networking behaviours (Fang et al., 2011). Evidence from virtual teams in Taiwan, for instance, shows that knowledge exchange via platforms like Facebook and Line is driven by both relational ties and technological affordances (Chumg et al., 2022). Because these relational and behavioural factors are overlooked by existing MRT extensions, the HRCR, which focuses on the cumulative interpersonal conditions shaping employees' relational opportunities, should be more effective at capturing variations in network diversity mobilisation. Grounded in immediacy and message accuracy, HRCR offers a broader lens on technological affordances and communicative agency, indicating capacity to engage competently and proactively. HRCR should capture cumulative communication quality across contexts. This makes it a more comprehensive lens for understanding how communicative experiences mobilise network diversity.

This study proposes that high HRCR is more strongly associated with lower network diversity than existing MRT extensions because high HRCR reflects a cumulative reduction in interpersonal richness, constraining employees' ability to form diverse relational ties and leverage the resources they provide. There are three specific reasons why HRCR should be especially consequential. First, high HRCR undermines relational connectivity. Rich communication enables cognitive empathy and nonverbal cue exchange, fostering rapport and an open relational climate that allows diverse connections and access to their resources to grow (Littlejohn & Foss, 2009; Sybing, 2019; Tasselli & Kilduff, 2021; Veerareddy et al., 2024; Zhou, 2021). Emotional connectivity and strong relational bonds also increase access to broader social capital, an essential driver of diverse and innovative networks (Burt, 2004; Haslam et al.,

2021). When communication richness declines under high HRCR, these elements are likely weakened. Interactions show limited physical and psychological connectivity, so employees engage less openly beyond their groups and adopt more reserved and risk-averse communication (Carmody et al., 2022; Makarius & Larson, 2017). This tendency to remain within familiar circles should reduce opportunities for new and diverse ties, producing more homogeneous and isolated networks (Hinds & McGrath, 2006) that restrict the range of resources and perspectives available for problem-solving and innovation. A further consequence for network diversity that should arise from high HRCR is the hampering of collaboration, which normally increases opportunities to engage with diverse perspectives, expertise and social resources (Reich & Reich, 2006). Collaboration is strongest when relational connectivity aligns ties through shared goals and interdependence (Podolny & Baron, 1997) and drives cross-boundary work that builds person-centred ties, improving tie quality and network breadth (Tasselli & Kilduff, 2021). Communication signals identity and belonging (Cox et al., 2021), so reliance on low-quality technology can indicate growing disconnection among interdependent colleagues. High HRCR levels should result in communication dynamics that shift from relationally enriching to task-oriented and transactional, deteriorating tie quality and reducing network diversity (Xu & Liao, 2021). Because effective communication underpins collaboration (Gittell, 2002; Johnson et al., 2007; Thompson, 1967), these shifts should decrease opportunities to build and sustain the person-centred ties needed for collaborative, cross-boundary network expansion and the resource exchange such diversity affords.

The second reason is that high HRCR should reduce visibility. Heavy reliance on technology is linked to lower communication quality and misinterpretations, and mismatched technology perceptions further exacerbate barriers and weaken ties (Gibson & Gibbs, 2006; Liang et al., 2008; Wu et al., 2023). High HRCR should capture reliance on low-quality technologies that strip nonverbal cues essential for perceived presence and meaningful connection (Littlejohn & Foss, 2009). By reflecting cumulative declines in communication quality, HRCR should also account for relational barriers created by misaligned perceptions, offering a broader view of how low-quality communication erodes network diversity.

The final reason why increasing HRCR should constrain network expansion is restricted access to others, especially in cross-boundary and external networking where diverse resources normally originate. Co-location naturally enhances opportunities to interact and initiate communication with new people, providing important social affordances for network

diversification (Martins et al., 2004; Waizenegger et al., 2020). Such opportunities arise in conferences and on professional platforms such as WebMD (Lin et al., 2016; Wasko & Faraj, 2005). Non-work virtual communities such as forums, blogs, and social media can extend access and support relational development (Sanz-Blas et al., 2021). However, their role in professional networking is limited because they usually supplement formal channels and involve existing contacts rather than fostering new ties (Bodhi et al., 2023; Nah & Saxton, 2012). When high HRCR reflects reliance on low-quality interactions, opportunities to establish new relationships are expected to shrink, particularly for external networking that provides unique resources. Similarly, internal tie-building should also be curbed, leaving networks less diverse (Cuypers et al., 2020; Ertug et al., 2018; Moser & Ashforth, 2022). Even where digital platforms offer access (Dittes & Smolnik, 2019), poor communication quality in high-HRCR contexts should magnify these struggles and reduce relationship building (Cross et al., 2018).

Overall, the evidence highlights that it is the dynamics of interpersonal communication - rather than the mere presence of media or channels - that shape quality network diversity (Burt, 1992, 2004; Malhotra et al., 2007; Stafford, 2011; Wellman, 1979). When cue exchange and psychological connectivity diminish, rapport and openness weaken and the range of ties narrows (Littlejohn & Foss, 2009; Tasselli & Kilduff, 2021; Veerareddy et al., 2024; Zhou, 2021). Reduced visibility and misaligned technology perceptions increase psychological distance and invite misinterpretations, eroding relational connectivity (Gibson & Gibbs, 2006; Liang et al., 2008; Wu et al., 2023). Limited access to new contacts constrains network expansion, since co-location and targeted venues supply social affordances that low-quality digital exchanges only partly replicate (Cuypers et al., 2020; Martins et al., 2004; Waizenegger et al., 2020; Wasko & Faraj, 2005). Constrained collaboration further reduces exposure to diverse perspectives and weakens cross-boundary ties that typically broaden networks (Gittell, 2002; Podolny & Baron, 1997; Xu & Liao, 2024). These mechanisms suggest that HRCR better captures the communication dynamics shaping network diversity mobilisation than existing MRT extensions, since mode- or channel-based measures cannot account for cumulative dynamics across face-to-face and digital contexts. HRCR reflects cumulative interpersonal communication quality and communicative agency (Kankanhalli et al., 2005; Majchrzak et al., 2012; Woudstra et al., 2012). Higher HRCR should reduce the collaborative, cross-boundary tie-building that normally expands personal network diversity, consistent with narrower, more homogenous networks (Burt, 2004; Tasselli & Kilduff, 2021). Accordingly, lower HRCR

should reflect richer communication and foster greater network diversity by supporting broader, cross-boundary ties and enhanced access to social resources.

Hypothesis 3 (H3): HRCR will show a stronger association with network diversity than the other operationalisations of media richness. Specifically, employees with lower HRCR levels (i.e., the low-HRCR group) will demonstrate higher levels of network diversity than employees with higher HRCR levels (i.e., the high-HRCR group).

4.4 Methodology

4.4.1 Sample and Procedure

This study employed a cross-sectional design. Participants were recruited from three organisations operating in different industries: Company A, a UK-headquartered multinational in the medical technology sector; Company B, a semi-state national research, advisory and teaching organisation; and Company C, an Irish telecommunications service provider. Data collection was conducted between October and November 2022, with each organisation determining its own launch date (Company A in October 2022; Companies B and C in November 2022). Each organisation controlled the duration for which the surveys remained open, typically allowing approximately two weeks for participation.

Based on estimates provided by organisational contacts, approximately 1,020 employees were invited to participate (Company A ≈ 30; Company B ≈ 850; Company C ≈ 140). A total of 295 employees responded, yielding an overall response rate of approximately 29% which compares favourably with the 8.2-10.3% rates reported in prior empirical work on social capital research (Carey et al., 2011; Valenzuela et al., 2009). Company A had 18 participants (response rate of 60%), representing various roles. Company B had 235 participants (response rate of 28%) across divisions and locations in Ireland. Company C had 42 participants (response rate of 30%). After data cleaning, including the removal of empty networks, the final usable sample comprised 141 employees (N = 141).

Participants held diverse roles and occupied various hierarchical levels across the three organisations. In Company A, the sample included executive leaders, mid-level managers in sales, marketing and R&D, and operational engineers and specialists within its European division. In the two Ireland-based firms, participants were drawn from multiple divisions, departments and geographic locations across Ireland. The descriptive statistics for the study variables are presented in Table 4.1.

All participants took part voluntarily and were fully informed of the study requirements prior to participation. They received a Plain Language Statement and Privacy Notice outlining the study's aims, procedures and data protection measures. They then provided informed consent, confirming their understanding of their rights and their voluntary participation.

Data were collected using an online self-report survey administered in English via Qualtrics. Responses were anonymised and stored securely in line with Dublin City University's ethical protocols and Irish data protection regulations.

Full documentation, including the Plain Language Statement, Privacy Notice and Consent Form, is provided in Appendix B1.

Table 4.1 Descriptive Statistics for Study 1 (N = 141)

Variable	Mean	Median	Median Category	% in Category
Gender	1.61	2.00	Female	61.11%
Age Category	5.57	6.00	45-49 years	16.96%
Organisational Tenure	3.89	4.00	5-10 years	18.42%
Position Level	2.15	2.00	First-Line	23.76
Education Level	4.64	5.00	Master's Degree	37.38%
Remote Working Days	1.84	2.00	2 days/week	-

Notes: The sample included entry-level (47%), first-line supervisors/managers (29%), middle management (18%), and senior management (7%).

4.4.*2 Measures*

Personal Networks: These were collected using a single name generator (NG), following best practices in social network analysis and grounded in the exchange perspective (McAllister & Fischer, 1978; Milardo, 1988) and social capital theory (Lin, 2001). The NG identified core network members who support participants' work, focusing on a subset of relationships that exchange emotional, instrumental, and informational resources. In this approach, the participant is known as the ego, and the individuals they name are the alters. This approach reflects established principles in social network research emphasising the importance of resource-based relationships and associated interactions within egocentric networks (Marin & Hampton, 2007; Marsden & Baum, 2019).

The *Name Generator* question was framed as follows: *"Please list the individuals in your social network who provide you with one or more types of support in your daily job activities. These individuals can include anyone, such as a work colleague, mentor, role model, friend, acquaintance, or family member. Examples of support include emotional support, such as affection and acceptance; tangible assistance with work tasks; advice and guidance based on professional experience; technical knowledge related to your work tasks; sponsorship, exposure, and protection at work; or role modelling and examples of appropriate workplace*

behaviour." This broad definition encouraged respondents to include diverse relationships, reducing interpretive ambiguity (Marin & Hampton, 2007). Clear definitions of support categories, grounded in social capital and social support theory (Lin, 2001; Lloyd-Jones, 2021), further ensured consistent interpretation and guided inclusion of relevant ties.

This study followed established guidelines for limiting sociometric choices to balance data quality with respondent burden (Merluzzi & Burt, 2013; Morrison, 2002). Respondents were required to list at least one and up to six individuals, consistent with prior research showing that most people identify between two and six significant network members (Fischer, 1982; Morrison, 2002). This cap balanced comprehensiveness with efficiency, minimising redundancy since names beyond this threshold typically yield diminishing returns (Marin & Hampton, 2007; Merluzzi & Burt, 2013). Only first names and initials were recorded (e.g., "Janet M.") to preserve confidentiality, consistent with ethical guidelines (Marsden, 1987; Reins et al., 2021).

Name interpreters followed the generator to capture characteristics and attributes (e.g., role, type of support) of each alter (Marin & Hampton, 2007). The data collected through the single name generator and interpreter questions enabled the construction of ego-alter profiles, which were then aggregated to form individual personal-network social capital measures (Marin & Hampton, 2007; Vacca, 2018). For each named alter, respondents reported their perceptions of that alter across the key dimensions of social capital. These perceptions served as the foundation for the dependent variables, operationalised in line with Nahapiet and Ghoshal's (1998) three dimensions of social capital: cognitive (shared language), relational (trust), and structural (network diversity/resource range) (Burt, 1992, 2000; Lin, 2001).

Shared Language (Cognitive Social Capital): This construct measured the extent to which ego and alters shared a common language or jargon, following Levin et al. (2006). It reflects Argyres' (1999) concept of a "technical grammar" for communication (p. 162). Items were rated on a 7-point Likert scale (1 = strongly disagree, 7 = strongly agree). A sample item was: *"We are able to communicate effectively."* The measure demonstrated excellent reliability (ICC = 0.976, $p < 0.001$; $\alpha = 0.99$).

Trust (Relational Social Capital): This construct measured an individual's willingness to trust, rather than perceptions of trustworthiness, using Gillespie's (2013) 10-item scale. The scale comprises two factors, reliance and disclosure. Items were rated on a 7-point Likert scale (1 = completely unwilling, 7 = completely willing). Sample items include *"How willing are you*

to rely on their work-related judgments?" (reliance) and *"How willing are you to share your personal feelings with these individuals?"* (disclosure). The scale demonstrated high reliability (ICC = 0.97, $p < 0.001$; $\alpha = 0.98$). This single composite measure is consistent with the conceptualisation of trust as an overarching "willingness to be vulnerable" presented by Schoorman et al. (2007) and supported empirically by studies that similarly adopt a unified trust construct for analysis (e.g., Masood & Afsar, 2017; Mayer & Gavin, 2005).

Network Diversity - Range of Resources (Structural Social Capital): This construct measured the spread of instrumental, knowledge, and expressive resources drawn from a predefined list of options: emotional support, tangible help, role modelling, career support, tacit knowledge, and explicit knowledge. For each respondent, diversity of access to resources was first calculated as the proportion of these six resource types available in their network (ranging from 0 = no access to any resource type, to 1 = access to all six types). This proportion was then adjusted for network size by multiplying it by the ratio of the respondent's network size to six. The resulting continuous index captures both the range of distinct resource types and the structural capacity of the network to provide them. This approach follows established treatments of resource heterogeneity in social-capital theory (Burt, 2000; Lin, 2001) and methodological guidance on heterogeneity measures in ego-network analysis (Perry et al., 2018, p. 171). This approach is also supported empirically by research demonstrating that variation in access to distinct resource categories can be validly captured using a continuous diversity index, as in Rodan and Galunic's (2004) measure of knowledge heterogeneity.

Four communication-related variables were examined: Remote Intensity (RI), Digital Information Communication Quality (DICQ), task virtuality (TV), and the Hybrid Relational Communication Ratio (HRCR). Remote Intensity represents the proportion of workdays spent away from the organisational site. The DICQ captures the richness characteristics of employees' dominant technology-mediated channels. Task virtuality reflects the degree to which task-related interaction occurs without physical co-presence. The HRCR combines the extent of face-to-face contact with the quality of technology-mediated interaction in a single index of interpersonal communication quality across hybrid settings. These four variables provide a basis for comparing alternative operationalisations of media richness theory (MRT) in relation to social capital mobilisation.

Remote Intensity: Participants reported how many days they typically worked remotely each week, following the approach of Virick et al. (2010). The survey item asked, *"How often*

do you work remotely each week?" Responses ranged from *"less than once a week"* to *"five days a week."* These categories were converted to numeric values ranging from 0.5 to 5 days per week, with 0.5 days assigned to represent "less than once a week." Fractional values were used to capture low-frequency remote-work schedules and to allow remote-work intensity to be treated as a continuous variable in analyses.

Task virtuality: This was assessed using the framework developed by Orhan et al. (2016). This measure captures the extent to which interdependent work is conducted without face-to-face interaction. Participants reported the percentage of interaction with key groups (team members, coworkers, customers, suppliers, etc.) that occurred face-to-face, along with self-rated weights for the importance of each group to their role. These values ranged from 0% (fully virtual) to 100% (fully face-to-face) and were treated independently across groups. Participants also assigned interdependence weights (ω) to the same groups, indicating the extent to which their work depended on each group's input. These weights represented the full distribution of task dependency and were required to sum to 100% (converted to proportions summing to 1.00 for analysis). A weighted average was calculated to produce a composite task virtuality score. Task virtuality comprises heterogeneous indicators associated with different stakeholder groups and is therefore treated as a formative rather than a reflective construct (Orhan et al., 2016). For this reason internal consistency measures such as Cronbach's alpha are not appropriate (Hair et al., 2017).

Digital Information Communication Quality (DICQ): DICQ evaluates the quality of technology-mediated interpersonal communication. Following Kirkman and Mathieu (2005), four communication modes were assessed: written, audio/verbal, avatar-based, and video. Each reflects a different level of media richness, ranging from low to high in cue availability, synchronicity and informational value. Participants indicated the percentage of their communication occurring through each mode. Responses were classified into "low," "balanced," or "high" digital communication quality (coded 0-2). Reliability tests indicated acceptable consistency (ICC = 0.358, $p < 0.001$; Cronbach's alpha = 0.63).

Hybrid Relational Communication Ratio (HRCR): HRCR integrates face-to-face and technology-mediated communication. It treats face-to-face interaction as the richest medium within media richness theory. HRCR is derived from task virtuality scores (Orhan, 2014), which estimate the share of work coordinated without face-to-face contact. This value is then adjusted using an indicator of the quality of employees' technology-mediated exchanges using the DICQ.

DICQ reflects the synchronicity and informational richness of the digital channels employees use, following the framework of Kirkman and Mathieu (2005). In this study, task virtuality was categorised into four levels (TV* = 1-4), corresponding to low (0-49%), moderate (50-64%), high (65-79%) and very high (80-100%) virtuality. DICQ values ranged from 0 to 2, representing low-, medium- and high-quality digital communication. HRCR values range from 5 to 100, reflecting all possible combinations of TV* and DICQ categories.

Controls: This study incorporated age as a control variable due to its established influence on remote working experiences and work-life perceptions (Bailey & Kurland, 2002; Belanger, 1999), and its effect on communication preferences (Shi & Weber, 2020). Age homophily further supports its inclusion, as individuals tend to form connections with peers of similar ages (Ertug et al., 2018; Han et al., 2020). For analysis, participants' ages were grouped into categorical ranges. Organisational tenure was also included, given its associations with professional relationships and integration within workplace networks (Soltis et al., 2018). Tenure is widely recognised in cognitive social capital research as shaping familiarity, trust, and access to knowledge resources (Balkundi & Kilduff, 2006; Lang, 2004; Petter et al., 2020). Tenure was categorised into intervals (e.g., "Less than one year," "1-2 years," "2-5 years," etc.) to allow comparative analysis across unique experience levels.

Mathematical formulations for Network diversity - Range of resources, Task virtuality, DICQ, HRCR, and are described in Appendix C (C1-C4 respectively). The full set of Name Interpreter questions is provided in Appendix B1

4.5 Data Analysis **Strategy**

Efforts to minimise Common Method Variance (CMV) were integrated throughout the research process. In line with the procedural stages outlined by Hair et al. (2017), pre-survey preparation, survey development, administration, and post-survey distribution were designed to reduce method bias. An email template was provided to HR contacts to distribute to employees, outlining the study's purpose, including clear instructions for accessing the anonymous questionnaire, and emphasis ing the importance of honest feedback and engagement. Survey development followed the methodological considerations outlined by Jordan and Troth (2020) and Dillman and Christian (2009), focusing on minimising repetition, providing clear instructions, and avoiding common scale properties.

Procedural remedies recommended by Podsakoff et al. (2003) and Podsakoff et al. (2012) were also incorporated. The survey used proximal separation, randomisation of item order, and varied response anchors, following Podsakoff et al. (2012) and Johnson et al. (2011). Items were unnumbered and presented in a random sequence, and the use of previously validated scales helped mitigate measurement bias. During administration, participants received a plain language statement to enhance comprehension and were offered a summary of the study results, as recommended by Podsakoff et al. (2003, 2012). Post-survey, HR contacts sent two reminders: one approximately one week after the initial distribution and a final reminder one week before the survey closed.

4.5.1 Data Reliability:

Data reliability was examined using three checks. First, Likert-based constructs demonstrated acceptable internal consistency for exploratory research (Nunnally & Bernstein, 1994; van Griethuijsen et al., 2015). Second, RI and network diversity were directly observed, proportion-based single items, so internal-consistency metrics were inapplicable; however, their reliability is supported by theory and prior evidence indicating that the proportion of remote days is a reliable antecedent of job satisfaction and performance and that ego-network resource diversity indices indicate access to nonredundant resources. Proportion measures also tend to be stable because aggregation reduces random error (Allen et al., 2015; Burt, 1992; Cross et al., 2002; Gajendran & Harrison, 2007; Hayes & Krippendorff, 2007). Third, TV and HRCR were multi-component formative indices rather than reflective traits, so internal consistency was not the relevant criterion. TV was built upon the Job Characteristics Model's "dealing-with-others" dimension, and HRCR extended it by integrating DICQ within MRT, producing a unified indicator suited to hybrid contexts. Reliability followed the theoretical grounding of these components and their fit to hybrid work, where interaction shifts from face-to-face to mediated collaboration (Fiol & O'Connor, 2005; Gilson et al., 2015; Kirkman & Mathieu, 2005; Orhan et al., 2016).

4.5.2 Validity and Integrity:

Prior research indicates that surveys typically yield stable results (Patterson et al., 2005). The ego-network survey's item-by-item format improves accuracy and consistency in measuring network characteristics (Coromina & Coenders, 2006). The independent variables RI, TV, DICQ, and HRCR follow established formulations (Kirkman & Mathieu, 2005; Orhan,

2014; Virick et al., 2010). TV has been validated in prior studies (Orhan & Altili, 2017; Orhan et al., 2016), and DICQ is empirically supported (Chen et al., 2020; Chan, 2015; den Hooff & de Leeuw van Weenen, 2004).

HRCR draws validity from its components: TV captures substitution of face-to-face contact with technology-mediated interaction, and DICQ captures the quality of digital exchanges as conceptualised in media richness theory (Kirkman & Mathieu, 2005). Together they provide a comprehensive indicator for hybrid contexts. Additional theoretical grounding comes from social capital theory, which links communication quality to trust and collaboration (Nahapiet & Ghoshal, 1998), and from interdependence and social network theories, which emphasise task coordination and information flow. Because TV and DICQ are empirically validated and theoretically grounded, HRCR derives its validity from these components as a composite measure (Hair et al., 2010).

Name-interpreter items provided a single-item, directly observed measure of network diversity (the structural dimension of social capital). As a directly observed variable, CFA was unnecessary, and effects were estimated with linear regression. Multi-item Likert scales underwent CFA to validate latent constructs. Variables with zero variance and cases with missing data were removed to ensure data integrity.

Discriminant validity met the Fornell-Larcker criterion across six CFA models, with values of approximately 0.67 for shared language and 0.74 for trust, and results were consistent across RI, TV, DICQ, and HRCR, indicating distinct constructs and supporting model integrity. Convergent validity was supported for shared language and trust: AVE was 0.93 and 0.86, respectively, exceeding the 0.50 benchmark (Hair et al., 2017).

4.5.3 Power Analysis:

Post hoc power analyses used the Hybrid Relational Communication Ratio as the determinant of shared language, trust, and network diversity. GPower estimates at $\alpha = 0.05$ ranged from 0.70 to 0.89. Power for Network Diversity was 0.83, and power for Trust was 0.84 without controls (see Table 4.2). Adding controls for age and tenure slightly increased power, particularly for shared language, rising from 0.70 to 0.79. With $\alpha = 0.05$, samples of at least 112 generally achieved power above the 0.80 benchmark for detecting meaningful effects (Cohen, 1988; Hoenig & Heisey, 2001). Power for shared language fell below 0.70 but increased to 0.79 with controls, which may still be practically significant. In exploratory contexts, slightly lower

power can be acceptable since requirements are context dependent (Cohen, 1988) and practical constraints may justify relaxed thresholds (Maxwell, 2004). The power estimates are presented in Table 4.2.

Table 4.2 Power estimates (Study 1)

Social Capital Resource	**Controls Age & Tenure**	**Effect**	**Sample size (N)**	**Power Level**
Network Diversity	No	0.0765	114	0.8337
Network Diversity	Yes	0.0902	112	0.8829
Trust	No	0.0773	114	0.8373
Trust	Yes	0.0911	112	0.8858
Shared Language	No	0.0557	114	0.7049
Shared Language	Yes	0.0679	112	0.7872

4.5.4 Data Management: Pre-Processing and Statistical Methods Employed

Preprocessing removed empty or irrelevant entries and retained required fields, yielding an analysis-ready dataset. For missing data and derived indices, cases flagged as empty egocentric networks were excluded and models used complete-case analysis using the R default na.omit function. For HRCR, a pre-specified sensitivity rule set task virtuality to the midpoint 50 when TV was missing but digital communication quality was present. This was necessary to preserve the integrity of the HRCR calculation. Assigning TV a value of zero would force TV* into the lowest category and, in combination with higher DICQ values, produce negative HRCR scores, which fall outside the theoretical 5-100 range and violate the scale's interpretive structure. Using the midpoint provides a neutral, non-extreme estimate that maintains the validity of the TV* categorisation, preserves comparability across cases, and ensures that HRCR values remain within their definitional bounds. In the main specification HRCR was set to missing if any input was missing and those rows were omitted from estimation. Analytic Ns for regressions are in the report of each model. Group-wise comparisons across high and low ranges were estimated with linear regressions using 'lm' function. Coefficients were reported in original units to preserve substantive interpretability and the link to measurement scales. Linear regression was chosen over structural equation modelling for parsimony and interpretability, consistent with applied research guidance (Hayes, 2018; Kline 2016). This reflects Occam's Razor, favouring simpler models with fewer assumptions (Field, 2013), and reduces overfitting risks in modest samples (Bargagli Stoffi et al., 2022; Wolf et al., 2013). These advantages made linear regression a reliable approach for testing how hybrid work influences the effects of social capital variables.

4.6 Results

4.6.1 Correlation table

A summary of the means, standard deviations, correlations, and reliabilities of the study's variables are presented in Table 4.3.

Table 4.3 Correlation Table (Study 1)

	M	SD	1.	2.	3.	4.	5.	6.	7.	8.	9.
1. Remote Intensity	1.89	1.48									
2. DICQ	0.65	0.59	0.05	**(0.63)**							
3. Task Virtuality	57.49	22.51	0.523****	-0.11							
4. HRCR	48.37	26.47	0.442****	-0.314***	0.897****						
5. Shared language	0.65	0.24	-0.12	0.04	-0.11	-0.10	**(0.99)**				
6. Trust	0.61	0.22	-0.06	0.09	-0.09	-0.09	0.905****	**(0.98)**			
7. Network diversity	0.73	0.28	-0.09	0.06	-0.16	-0.16	0.885****	0.903****			
8. Age	5.57	1.95	0.08	0.13	0.12	0.05	-0.03	0.02	-0.06		
9. Tenure (low to high)	3.89	1.93	-0.314***	0.03	-0.13	-0.17	0.13	0.198*	0.08	0.45****	

Notes: N = 141. Correlations were computed using pairwise deletion. Cronbach's alpha reliabilities are reported in parentheses. Mean (M); Standard Deviation (SD); Digital Information Communication Quality (DICQ); Hybrid Relational Communication Ratio (HRCR): Numeric range from 5 to 100.
Statistical Significance Indicators: ****p<.0001; ***p < .001, **p < .01, * p<.05 (two-tailed tests)

4.6.2 Groupwise Hypothesis Testing Using Threshold-Based Comparisons

To test the hypotheses, groupwise comparisons were conducted for each media richness operationalisation, with low and high groups created based on threshold values derived from the distribution of each variable. These thresholds were set using summary statistics to ensure that groups with higher remoteness were above average but not so high as to include only fully remote workers. For the HRCR measure, a threshold of 66 was selected, exceeding the 3rd quartile value of 65. This ensured that the high group captured HRCR levels above the 75th percentile, representing the lowest levels of interpersonal communication among hybrid employees, while scores of 65 or below were assigned to the low group. For Remote Intensity, a threshold of 3.3 was set, guided by a median of two remote days, to place individuals working more days remotely in the high group. For task virtuality, where the median was 62.5, a threshold of 75 was chosen in line with previous 3rd-quartile cut-offs. For DICQ, the median was 1. To categorise values above the 66th percentile, a threshold of 1.32 was calculated using

interpolation, a method for estimating values between known points (Burden & Faires, 2011, Chapter 3).

For each social capital dimension, a Welch Two-Sample t-test was first employed to compare the means of low and high groups based on the predetermined thresholds. Groupwise linear regression analyses were subsequently conducted to validate these findings, with age and organisational tenure controlled due to their potential influence. For the regression models, HRCR was dummy-coded with the high-HRCR group serving as the reference category; therefore, positive β coefficients indicate higher outcome values for employees in the low-HRCR group. By examining the t-test and regression results alongside one another, the relationships between each media richness operationalisation and the social capital variables could be evaluated.

The detailed calculation for the DICQ threshold using interpolation is provided in Appendix C Section C5.

4.6.3 Hypothesis Tests

To examine how hybrid work influences the cognitive, relational, and structural components of social capital (Nahapiet & Ghoshal, 1998), a comparative analysis was conducted using R Studio (version 2021.09.01, Build 372). The objective was to determine which of four operationalisations of the media richness framework - Remote Intensity (RI), Digital Information Communication Quality (DICQ), task virtuality (TV), and the Hybrid Relational Communication Ratio (HRCR) - serves as the strongest indicator of variation in shared language, trust, and network diversity-range of resources. For thresholding, a reverse-coded form of DICQ (DICQ-R) was used, where higher values indicate poorer digital communication quality. Regression analyses used the original scale.

Hypothesis 1 proposed that, among the four operationalisations of the media richness framework, the HRCR would be more strongly associated with shared language, with lower HRCR levels associated with higher shared language. Results supported this prediction. Welch's t-tests showed that RI ($t = -0.38$, $df = 19.89$, $p = 0.71$), DICQ ($t = -0.52$, $df = 7.56$, $p = 0.62$), and TV ($t = 0.90$, $df = 58.48$, $p = 0.38$) were all non-significant. Regression analyses confirmed this pattern (RI: $\beta = -0.09$, $p = 0.36$; DICQ: $\beta = 0.05$, $p = 0.68$; TV: $\beta = 0.05$, $p = 0.49$). HRCR however, showed significant effects in both tests: Welch's t-test revealed a difference between high- and low-HRCR groups ($t = 2.11$, $df = 37.76$, $p = 0.04$, CI = [0.005, 0.23]), and the

regression analysis confirmed a positive association (β = 0.24, p = 0.003, R^2adj = 0.08). These findings indicate that lower HRCR scores, reflecting richer interpersonal communication experiences, were associated with significantly stronger shared language, thereby supporting H1.

Hypothesis 2 proposed that, among the four operationalisations of the media richness framework, the HRCR would be more strongly associated with trust, with lower HRCR levels associated with higher trust. Results supported this prediction. Welch's *t*-tests showed no significant effects for RI ($t = -0.18$, df = 18.97, $p = 0.86$), DICQ ($t = -0.43$, df = 7.52, $p = 0.67$), or TV ($t = 1.15$, df = 56.47, $p = 0.25$). Regression analyses confirmed these null results (RI: β = −0.05, $p = 0.58$; DICQ: β = 0.07, $p = 0.50$; TV: β = 0.07, $p = 0.30$). HRCR however, demonstrated significant effects in both tests: Welch's *t*-test revealed a difference between high- and low-HRCR groups ($t = 2.50$, df = 37.45, $p = 0.02$, CI = [0.02, 0.23]), and regression analysis confirmed a positive association (β = 0.26, $p < 0.001$, R^2adj = 0.13).These findings indicate that employees with lower HRCR scores, reflecting richer interpersonal communication experiences, reported significantly higher trust levels, thereby supporting H2.

Hypothesis 3 proposed that, among the four operationalisations of the media richness framework, the HRCR would be more strongly associated with network diversity - range of resources, with lower HRCR levels associated with greater network diversity. Results supported this prediction. Welch's *t*-tests showed no significant effects for RI ($t = -0.17$, df = 18.50, $p = 0.86$), DICQ ($t = -0.53$, df = 7.64, $p = 0.61$), or TV ($t = 1.96$, df = 56.13, $p = 0.06$). Regression analyses confirmed these null results (RI: β = −0.03, $p = 0.80$; DICQ: β = 0.07, $p = 0.62$; TV: β = 0.14, $p = 0.09$). HRCR however, demonstrated significant effects in both tests: Welch's *t*-test indicated a difference between high- and low-HRCR groups ($t = 2.66$, df = 32.92, $p = 0.01$, CI = [0.044, 0.33]), and regression analysis confirmed a positive association (β = 0.32, $p < 0.001$, R^2adj = 0.09). These findings indicate that employees with lower HRCR scores, reflecting richer interpersonal communication experiences, reported significantly greater network diversity, thereby supporting H3.

A summary of the results is presented in Table 4.4.

Table 4.4 Welch's t-Tests and Linear Regression Analyses of Social Capital Resources across Media Richness Operationalisations (Study 1)

H	**G_{MRT}**	**SCR**	**Welch's t-test**				**Linear Regression -Group wise**					
			t	**df**	***p***	**CI**	**F**	**R^2_{adj}**	**DF**	**beta**	***t***	***p***
H1	RI	SL	-0.38	19.89	0.71	[-0.16, 0.11]	0.64	-0.01	105	-0.09	-0.92	0.36
	DICQ	SL	-0.52	7.56	0.62	[-0.33, 0.21]	1.01	0.0003	107	0.05	0.42	0.68
	TV	SL	0.90	58.48	0.38	[-0.06, 0.15]	1.01	0.0003	107	0.05	0.69	0.49
	HRCR	SL	2.11	37.76	0.04	[0.005,0.23]	3.33	0.08	107	0.24	3.08	0.003
H2	RI	TR	-0.18	18.97	0.86	[-0.14, 0.12]	1.09	0.003	105	-0.05	-0.55	0.58
	DICQ	TR	-0.43	7.523	0.67	[-0.30, 0.21]	1.83	0.03	107	0.07	0.677	0.50
	TV	TR	1.15	56.47	0.25	[-0.04, 0.15]	1.81	0.03	107	0.07	1.05	0.30
	HRCR	TR	2.50	37.45	0.02	[0.02, 0.23]	5.01	0.13	107	0.26	3.65	0.0004
H3	RI	Div	-0.17	18.50	0.86	[-0.19, 0.16]	0.25	-0.028	105	-0.029	-0.25	0.803
	DICQ	Div	-0.53	7.64	0.61	[-0.36, 0.23]	0.85	-0.006	107	0.07	0.503	0.62
	TV	Div	1.956	56.13	0.06	[-0.003, 0.24]	1.46	0.0162	107	0.143	1.74	0.085
	HRCR	Div	2.66	32.92	0.01	[0.044, 0.33]	3.82	0.0923	107	0.32	3.46	0.0008

Notes: Hypothesis (H); Grouping Variable - media richness operationalisation (G_{MRT}); Social Capital Resource (SCR). Remote Intensity(RI); Task virtuality(TV); Digital Information Communication Quality (DICQ), Hybrid Relational Communication Ratio (HRCR); Shared Language (SL); Trust (TR); Network Diversity (Div); Test statistic (t value); Beta coefficient (beta); Significance (p Value); Confidence Interval (CI); Adjusted R-squared Goodness-of-fit (R^2_{adj}); F-statistic (F), Degrees of Freedom (DF)

4.7 Discussion

4.7.1 Summary of the main findings

The findings of this study offer insights into the contextual conditions of hybrid work and their impact on social capital. This is accomplished by examining four operationalisations of the media richness framework - namely Remote Intensity (RI), Digital Information Communication Quality (DICQ), task virtuality (TV), and the Hybrid Relational Communication Ratio (HRCR) - as indicators of variation in shared language, trust and network diversity within employees' networks.

HRCR, defined as the balance between face-to-face and technology-mediated communication and used here as an index of interpersonal communication quality, was the most consistent indicator of social capital mobilisation differences. Regression analyses showed that lower HRCR scores were associated with significantly higher shared language, trust and network diversity. Conventional proxies such as RI, DICQ and TV explained little variance overall. TV's effect on network diversity was close to significant, which suggests that structural-based reductions in face-to-face contact still capture a loss of communication opportunities. However, these structural proxies are insufficient to capture the complex variations in social capital observed in hybrid environments, which require a broader view of interpersonal communication behaviours. By extending task virtuality to incorporate the interpersonal dynamics of both technology-mediated and in-person exchanges, HRCR yielded stronger and more reliable effects across all three dimensions of social capital. These findings show that the critical factor is not location or mode of work, but the interpersonal quality of employees' communication across their daily interactions.

These findings align with prior research highlighting that accessibility, usability, and perceived proximity are critical for interpersonal connections (Begemann et al., 2024). They also build on work that links media richness to structural, relational, and cognitive capital (Chang & Hsu, 2016). This study extends these insights by demonstrating that an operationalisation that integrates technology-mediated and face-to-face communication quality is a more effective indicator for explaining social capital variations in hybrid work.

4.7.2 Contribution

A key theoretical contribution of the study is the development of a new conceptual reframing of Media Richness Theory (MRT) through the Hybrid Relational Communication Ratio (HRCR). HRCR shifts emphasis from channel or mode richness to the cumulative quality of interpersonal communication across face-to-face and technology-mediated contexts. HRCR extends task virtuality (TV) (Orhan et al., 2016) by combining the extent of non-face-to-face coordination with the quality of technology-mediated and in-person exchanges and is a stronger indicator than structural or medium-only operationalisations (RI, DICQ, TV). Prior research has assumed that communication effectiveness derives from channel richness, yet in hybrid settings structural or medium-based proxies such as remote frequency or tool choice overlook how communication unfolds in socially embedded practices (Leonardi, 2021). For example, employees often use a mix of digital and in-person channels to maintain their networks (Waizenegger et al., 2020). The quality of these interactions depends more on deliberate, socially embedded communication practices (Leonardi, 2021; Orhan et al., 2016), and research has shown that such relationally driven dynamics can influence social capital mobilisation even when rich media are available (Breuer et al., 2016; Choi, 2019). As such, the findings suggest that the cumulative quality of interpersonal communication dynamics, rather than structural or medium features, is more closely associated with social capital variations in hybrid environments.

The study provides a critical empirical contribution by extending and empirically testing MRT in hybrid settings, addressing a documented gap (Yang et al., 2021). Building on classic MRT (Daft & Lengel, 1986) and its predominant use in remote-work research (Gilson et al., 2015), the findings show that HRCR performed more consistently than the alternative operationalisations, with clear associations for shared language, trust, and network diversity - range of resources. Higher HRCR scores, indicating lower cumulative communication quality, are associated with lower social capital, clarifying why mode or channel-focused measures under-detect variation in hybrid relationships. This demonstrates the limitations of conventional proxies such as remote intensity, technology-mediated communication quality indices and TV, which explain little variation in social capital. In contrast, HRCR, which integrates MRT across face-to-face and technology-mediated interactions as a cumulative quality index, captures these variations more effectively. This aligns with and extends prior research showing that poor-quality technology-mediated communication erodes social capital (Breuer et al., 2016; van

Zoonen et al., 2024). Building on research that observed shifts in social resources during remote and in-office transitions (Mazzei et al., 2023), the study advances the field with a granular analysis. By moving beyond binary physical versus virtual classifications and centring on employees' cumulative communication experiences, it specifies which variations in communication quality are associated with gains or losses in social capital.

The methodological contribution of this study lies in the development and empirical validation of the HRCR, a new MRT operationalisation for assessing communication quality dynamics in hybrid work. Grounded in MRT, HRCR extends the TV measure by integrating technology-mediated communication alongside in-person exchanges (Orhan, 2014; Orhan et al., 2016). By capturing cumulative communication quality across contexts, it provides a more granular approach than channel- or mode-based MRT operationalisations. This granularity exposes variations in social capital that traditional operationalisations fail to capture, illustrating the limits of structural or medium-only proxies in hybrid settings. HRCR therefore offers a practical and replicable method for analysing communication dynamics in hybrid environments and constitutes a novel methodological contribution to research on hybrid work.

4.8 Implications for Practice

The findings have practical implications for organisations seeking to maintain social capital in hybrid environments. Three implications are especially important: (1) using granular measures of communication quality rather than structural proxies, (2) monitoring and addressing communication-related declines in social capital, and (3) managing the implementation of HRCR responsibly.

First, the findings suggest that interpersonal communication dynamics across both face-to-face and technologically-mediated settings matter more than location or mode of work alone. In practice, organisations should therefore avoid relying on coarse indicators such as "days in office," email volume, or channel usage as proxies for relational strength. Instead, leaders should prioritise granular assessment of interpersonal communication quality captured cumulatively across face-to-face and technology-mediated exchanges, rather than relying on coarse volume measures. The HRCR offers a practical tool for this purpose because it integrates face-to-face and digital communication into a single relational index. By applying HRCR, organisations can assess whether hybrid policies are supporting high-quality interpersonal interaction or unintentionally reducing it, and refine their strategies that promote social capital mobilisation.

Second, the findings show that elevated HRCR levels can function as indicators of weakened social capital mobilisation. Leaders can use HRCR monitoring to identify teams or units at risk of relational decline. Where HRCR levels are high, organisations can intervene by promoting richer communication formats. Examples of interventions include open discussions regarding needed changes, the provision of specific feedback, and encouragement of more effective interactions (Baker, 2019; Edmondson, 1999). Organisations can also implement targeted training and development to build communication skills (Cabrera & Cabrera, 2005; Taskin & Bridoux, 2010). Leaders can also establish clear communication guidelines to strengthen relational connectivity and foster higher-quality interpersonal interactions. Rather than policing specific behaviours, organisations can set audience-appropriate and task-appropriate guidelines and shared norms for written communication to improve both effectiveness and professionalism (Allen et al., 2015; Golden et al., 2008). Importantly, these interventions do not require eliminating remote work; rather, the focus is on helping employees maintain strong relational ties.

4.9 Limitations and Future Directions

A key limitation is the HRCR's status as a 'proof-of-concept' measure. Future work should validate and refine the tool to strengthen reliability, validity, and applicability across diverse organisational contexts and participant groups. A structured path is to use Creswell and Plano Clark's (2011) mixed methods instrument development framework to guide design, pilot testing, and validation. Iterative pilots can surface and resolve instrument issues, with feedback used to improve relevance and utility (Hathcoat et al., 2016). These steps would provide a strong foundation for broader application of HRCR. HRCR focuses on interpersonal communication and does not capture technology perceptions such as ease of use and perceived functionality. Because these perceptions shape communication quality and relationships, future work should test how they interact with communication richness in hybrid settings (Hertzum, 2014; Wu et al., 2023). Although TV showed limited explanatory power relative to HRCR, it remains useful. As a well-established construct (Orhan, 2014), TV has reliably captured variation in face-to-face versus mediated coordination, even though it omits technology-mediated quality (Orhan et al., 2016). TV therefore remains a structural benchmark for evaluating HRCR's dynamic operationalisation.

Another limitation is that the study did not test whether HRCR moderates the link between social capital and individual outcomes. Prior research has linked social capital to outcomes such as well-being and innovation at the individual level (Jarvenpaa & Leidner, 1999; Kirkman & Mathieu, 2005), but without modelling the interaction with HRCR, the direction of the effect for employees remains unclear. The observed group differences in social capital across HRCR conditions suggest that HRCR changes how social capital is used. This pattern may reflect adaptive communication that dampens negative effects, further supporting a potential moderation and possibly nonlinear or threshold effect for HRCR. Examining HRCR as a moderator would clarify when social capital has stronger or weaker effects and why (Putnam, 2000; Zheng, 2010). Future work could do this using well-being and innovative performance (Adler & Kwon, 2002; Gibson & Gibbs, 2006; Nahapiet & Ghoshal, 1998).

This study has several methodological limitations. First, the cross-sectional design limits temporal ordering and causal inference but is suitable for identifying associations and group differences that motivate further inquiry (Levin et al., 2006; Rindfleisch et al., 2008; Wang & Cheng, 2020). Future research should use longitudinal or quasi-experimental designs to test HRCR as a moderator and to probe causal mechanisms (Abdelmoteleb, 2018; Gannon & Roberts, 2020; Xu et al., 2021). Second, reliance on self-reports introduces potential recall and social desirability bias, which may distort reports about alters, although anonymity and the use of validated instruments help to reduce these risks (Althubaiti, 2016; Kreitchmann et al., 2019; Podsakoff et al., 2003). While a single-informant design captures employees' perceptions rather than dyadic alignment and helps to reduce complexity and respondent burden (Cross & Parker, 2004; McCarty & Killworth, 2007), self-report measures of employees' experiences are often considered the most valid approach (Spector, 1994). Future researchers are nevertheless encouraged to include objective measures of these constructs where possible. Third, the sample size in the study is relatively small. Future research with larger samples should further test elements of the conceptual model and, the HRCR measure in particular.

A final limitation concerns organisational heterogeneity and sample representativeness. Although invitations were distributed across three companies of differing sizes and industries, the final sample represented only a small proportion of total employees and was unevenly distributed across organisations, with a moderate overall response rate. Working environments are likely to differ in culture, communication norms, and hybrid work policies, which may introduce non-independence in responses (Bliese & Ployhart, 2002; Bliese et al., 2020). Because

the analysis did not control for organisational membership, some observed effects may reflect context-specific organisational characteristics, rather than purely individual or relational processes. Future research should aim for more balanced sampling across organisations and use multilevel modelling or include organisation as a covariate to distinguish contextual influences from communication dynamics.

4.10 Conclusion

This study advances understanding of communication in hybrid work by demonstrating the clear limitations of structural and mode-based operationalisations of media richness theory. While existing MRT operationalisations overlook the interpersonal dynamics through which hybrid communication unfolds, the HRCR demonstrated consistent associations with all dimensions of social capital. This suggests that effective hybrid work hinges on the quality of interpersonal communication across modalities, rather than employees' physical location or the specific medium used. These findings caution organisations against the assumption that increasing office attendance or adopting new platforms will automatically strengthen interpersonal dynamics. Instead, a relationally focused and communication-quality-oriented approach is required, with a more holistic view of communication-quality dynamics to ensure that high-quality, relationally driven exchanges occur. Future research should validate the HRCR across different industries and professional groups and examine interventions that enhance interpersonal communication in hybrid settings. Accordingly, the following chapter extends this work by examining the HRCR in relation to employee-driven innovation and the role of social capital mobilisation in shaping this relationship.

CHAPTER 5: STUDY 2

Employee-Driven Innovation through Social Capital in Hybrid Work: Extending the Media Richness Framework

5.1 Introduction

As organizations increasingly adopt hybrid work as a permanent model, they face a growing challenge in sustaining the interpersonal connections that drive Employee-Driven Innovation (EDI). Hybrid work environments inherently risk fragmenting these connections, as these arrangements can weaken workplace relationships (Keppler & Leonardi, 2023) and reduce the benefits of physical presence for collaboration and idea sharing (Olson & Olson, 2000). This fragmentation directly threatens organizations' capacity for innovation and adaptive performance, as the everyday exchanges through which employees generate and share new ideas become harder to sustain.

EDI refers to employees' voluntary generation and implementation of new ideas beyond formal job requirements, typically emerging through the exchange of tacit insights, ideas and expertise in everyday interactions (Høyrup, 2010; Jensen et al., 2007). In this study, EDI is represented by innovative work performance (IWP), defined as proactive, change-oriented behaviours that involve anticipating, developing and implementing new approaches (Griffin et al., 2007). Within the Doing, Using and Interacting (DUI) innovation framework, IWP emerges through interaction-based learning, where employees exchange tacit knowledge in day-to-day problem solving (Jensen et al., 2007). This interaction relies on social capital from personal networks as they provide the shared language, trust and access to knowledge resources (Lin, 2001; Nahapiet & Ghoshal, 1998). Since the quality of interpersonal communication is central to the mobilisation of social capital, it can be examined through Media Richness Theory (MRT), which explains how different media convey social cues and enable feedback for collaborative learning (Daft & Lengel, 1986; Dennis et al., 2008).

There is, however, a poor understanding about how interpersonal dynamics and employees' communication experiences shape networks and mobilise resources for EDI in hybrid environments. Communication breakdowns can disrupt the informal exchanges through which employees mobilise social capital (Sarker et al., 2011; Waizenegger et al., 2020; Wheatley et al., 2023). Yet, most research centres on fully remote settings (e.g., Alshoro et al.,

2017; Orhan et al., 2016), leaving open the question of whether similar dynamics hold in hybrid contexts. Additionally, social capital research has predominantly focused on team-level dynamics in settings such as co-located, virtual, and globally distributed teams, examining how interpersonal relationships support collaboration and innovation (e.g., Breuer et al., 2016; Hao et al., 2022; Mohammed & Kamalanabhan, 2019a). Much less attention has been given to employees' personal or ego-centric networks, which operate beyond formal team structures and are critical for accessing diverse knowledge and informal support (Maurer et al., 2022; Pataraia et al., 2014), particularly under hybrid working conditions. Much less attention has been given to employees' personal or ego-centric networks, which operate beyond formal team structures and are critical for accessing diverse knowledge and informal support (Maurer et al., 2022; Pataraia et al., 2014), particularly under hybrid working conditions. This pattern was evident across the studies included in the scoping review.

MRT-based operationalisations are appropriate for hybrid contexts (Chen et al., 2020; Orhan et al., 2016) but offer limited insight into hybrid communication dynamics (Haythornthwaite, 2002; Leonardi, 2009). Task virtuality, which reflects the degree of electronic rather than face-to-face coordination (Orhan et al., 2016), only partially reflects the nature and quality of communication in hybrid settings. Consequently, interpersonal communication dynamics such as trust, responsiveness and shared understanding can be overlooked. This stands in contrast to findings that these relational conditions are critical for sustaining knowledge exchange and collaboration in remote-enabled contexts (Chen et al., 2020; Hao et al., 2022). Technology may enable communication yet weaken relational connection (Cummings et al., 2007; Waizenegger et al., 2020), risking misrepresentation of the interpersonal foundations underpinning social capital and EDI. To address this conceptual and empirical gap, this study applies the Hybrid Relational Communication Ratio (HRCR) as a relationally attuned operationalisation of communication quality in hybrid work. Informed by MRT, HRCR extends Orhan's (2014) task virtuality measure by incorporating employees' reliance on virtual communication alongside the richness and immediacy of technology-mediated exchanges (Daft & Lengel, 1986; Kirkman & Mathieu, 2005).

This study investigates how innovative work performance (IWP) occurs in hybrid environments, focusing on how employees mobilise social capital through their personal networks. The HRCR is used to examine how communication quality impacts the mobilisation of social capital and ultimately influences IWP. The study adopts Nahapiet and Ghoshal's

(1998) multidimensional social capital framework, linking HRCR with the cognitive (shared language), relational (trust), and structural (knowledge ties) dimensions of social capital. The research question asks: *How does employees' personal (ego-centric) networks contribute to innovative work performance in hybrid work environments, and how does interpersonal communication quality in such environments, framed through HRCR, shape this relationship?* To address this question, the study sets out three objectives: (1) To examine how social capital relates to IWP in hybrid environments; (2) To explore how interpersonal communication quality, captured through HRCR, is associated with social capital mobilisation; and (3) To examine whether digital and face-to-face interaction contexts correspond with different uses of social capital.

The study makes two key contributions. First, it demonstrates that the value of employees' personal networks for innovation is contingent on the quality of interpersonal communication in hybrid work, challenging the assumption that social connections are uniformly beneficial. Second, it extends the contributions of Study 1 by applying the HRCR as a structured way of capturing hybrid communication quality, offering both a methodological contribution and practical insight into how organisations can create communication conditions that support bottom-up innovation.

The chapter proceeds as follows. The early sections develop the theoretical framework, introduce the HRCR, present the conceptual model and set out the hypotheses. Then, the methodology, including the sample, measures and analytical strategy, are described. The findings section follows and the final section discusses the study's findings, contributions, implications and limitations.

5.2 Theoretical Framework: Social Capital in Personal Networks as a Catalyst for Innovative Work Performance

Employee-driven innovation (EDI) refers to innovation initiated and implemented by employees through their everyday work. Although EDI encompasses the full process from idea generation to implementation, existing frameworks often emphasise idea generation, while overlooking implementation (Anderson et al., 2014; Janssen, 2000). Capturing EDI therefore requires a conceptualisation that represents this full spectrum through observable employee behaviour. Such a conceptualisation should reflect EDI's defining characteristics of self-initiated, improvement-oriented behaviour (Høyrup, 2010), which in this study are represented by Griffin et al.'s (2007) *proactivity framework*, hereafter referred to as *innovative work performance* (IWP). This framework is adopted for its consistency with EDI, as it spans individual, team and organisational levels and aligns with contemporary theories of distributed innovation that view sustainable workplace change as a collective endeavour (Hülsheger et al., 2009).

IWP can be understood as emerging through the social and learning processes that enable employees to transform ideas into innovative action. Within the Doing, Using and Interacting (DUI) framework, IWP, as the behavioural expression of EDI, emerges through informal learning and social interaction (Høyrup, 2010; Jensen et al., 2007). Tacit, experience-based knowledge is often transferred through informal conversations, feedback and day-to-day social exchanges, making personal networks essential for turning practical insights into innovative solutions (Polanyi, 1966; Jensen et al., 2007). In hybrid settings, where employees rely on technology to access colleagues and expertise across locations, personal networks become central sources of knowledge, advice, and problem-solving support (Harmaakorpi & Melkas, 2012; Inkpen & Tsang, 2005). These social interactions create the conditions for fresh insights, collaborative problem-solving, and knowledge exchange that drive IWP (Jensen et al., 2007). Social capital represents the mechanism through which these social network interactions drive IWP in hybrid settings, where reduced co-presence increases reliance on personal networks for knowledge exchange (Cummings et al., 2007; Hill & Bartol, 2016). Its cognitive (shared language), relational (trust) and structural (knowledge) dimensions enable employees to exchange insights and learn from one another (Renkema et al., 2021). These resources are especially important within the interaction dimension of the DUI framework, where tacit knowledge transfer depends on informal communication (Høyrup, 2010). When

these conditions are present in job-relevant networks, they promote open communication and idea sharing (De Jong & Den Hartog, 2007; Jensen et al., 2007), allowing everyday insights to be transformed into the applied innovation that characterises EDI (Ben-Hador, 2016; Cross & Parker, 2004; Perry-Smith & Mannucci, 2017), which is reflected in Innovative Work Performance (IWP) in this study.

The following sections examine each dimension of social capital in turn, demonstrating how shared language, trust, and knowledge resources function as cognitive, relational, and structural mechanisms that enable innovative work performance, the behavioural expression through which employee-driven innovation (EDI) is operationalised in this study.

5.2.1 Shared Language, the Cognitive Mechanism of Innovative Work Performance

In hybrid work, shared language becomes essential for coordination and preventing misunderstandings. Without continuous co-location, employees rely more on clear linguistic frameworks to maintain effective collaboration. Shared language supports innovative behaviour in two ways. Indirectly, it enables knowledge-sharing and tacit knowledge transfer. Directly, it strengthens communication and coordination in personal networks, improving problem-solving (Nahapiet & Ghoshal, 1998; Nonaka, 1994). It also fosters the informal relationships and proactive behaviours (Dragojevic & Giles, 2014; Yow & Lim, 2019) necessary for cultivating an innovative work environment (Segarra-Ciprés et al., 2019; Zhao et al., 2022). Together, these mechanisms position shared language as a core driver of IWP in hybrid settings.

The literature indicates that shared language innovative work performance (IWP). Cognitively, it improves observation, modelling, and social interaction processes, making innovative behaviours easier to internalise and apply (Yow & Lim, 2019). Transactive Memory Systems (TMS) reinforce these benefits by increasing familiarity with colleagues' expertise, improving knowledge retrieval, and supporting innovative problem-solving in personal networks (Argote & Ingram, 2000; Cummings, 2004; Lewis, 2004). Shared language also supports perspective-taking and shared mental models, fostering cohesion and alignment around group efforts (Dragojevic & Giles, 2014; Yow & Lim, 2019).

Relationally, shared language reinforces the social mechanisms that sustain interpersonal connection and collaboration, which are critical for enabling the interaction and learning processes that underpin IWP in hybrid environments. It fosters clarity in communication (Chow & Chan, 2008), which is essential for building trust and psychological

safety, lowering the risks of proposing unconventional solutions (Carmeli et al., 2010; Edmondson, 1999). Empirical studies show that cognitive social capital, including shared language and vision, strengthens collaboration and mutual understanding, which in turn foster the knowledge sharing and coordination processes (Chiu et al., 2006; Chow & Chan, 2008) that characterise interaction-based learning in the DUI framework (Jensen et al., 2007). Moreover, by providing a common foundation, shared language enables constructive feedback and validation, ensuring that novel ideas are refined collaboratively (Hattie & Timperley, 2007; Nold & Michel, 2016). In addition to facilitating collaborative feedback, such language use clarifies goals and reinforces psychological safety, strengthening key antecedents of innovation such as efficacy and self-leadership (Sullivan, 1988; Mayfield & Mayfield, 2021). These factors have been shown to promote process innovation (Baer & Frese, 2003), a practical manifestation of EDI through which employees proactively improve work practices (Høyrup, 2010). Through these mechanisms, shared language operates as a relational and cognitive resource that enables interaction-based learning and collaboration, which should enhance IWP.

Shared language also creates a highly collaborative social environment that maximises the effectiveness of IWP. It fosters collective engagement within personal networks by reinforcing identity and a sense of belonging (Hogg & Reid, 2006; Pérez-Sabater, 2021), which cultivates cohesion and commitment to collaborative innovation through alignment around shared goals. When employees identify with a group, they are more likely to internalise its norms and values, deepening their emotional attachment and commitment to collective goals (Martin & Dowson, 2009). This commitment enhances shared language, collaboration, and knowledge exchange and combination (Collins & Smith, 2006; Nahapiet & Ghoshal, 1998), making innovative solutions more accessible and enabling employees to apply them effectively (Bandura, 1986; Yow & Lim, 2019). These dynamics suggest that shared language plays a direct, indispensable role in positively shaping the conditions necessary for IWP in hybrid settings. This leads to the following hypothesis.

Hypothesis 1 (H1): Shared language in personal networks will be positively related to employee innovative work performance.

5.2.2 Trust, a Relational Mechanism of Innovative Work Performance

In hybrid working environments, where physical distance can weaken informal ties, trust becomes a critical relational mechanism for sustaining collaboration and innovation. Trust acts

as a social mechanism that shapes informal tie formation (Levin & Cross, 2004) by fostering confidence in others through both cognitive trust (belief in competence and reliability) and affective trust (belief in goodwill and care) (McAllister, 1995). When trust is strong, employees tend to feel more comfortable seeking and relying on others' insights (Mohammed & Kamalanabhan, 2019a), suggesting it may serve as a foundational driver of innovative work performance (IWP).

This study proposes that trust in personal networks may support IWP through two distinct pathways. First, empirical work shows that psychological safety improves focus and performance (Ning & Jin, 2009), building employees' confidence in shaping work processes and encouraging proactive, future-oriented behaviour (Griffin et al., 2007; Murphy & Jackson, 1999). Trust based on goodwill and competence also reduces perceptions of interpersonal risk, allowing employees to communicate openly, admit mistakes, and take initiative without fear of negative consequences (McAllister, 1995; Edmondson & Lei, 2014). Because innovation involves experimentation and tolerance for mistakes (Schreurs et al., 2019; Taskin & Bridoux, 2010), this reduction in vulnerability may facilitate knowledge exchange and exploration of new ideas (Alhusen et al., 2021; Le & Lei, 2018) for innovation. At the collective level, psychological safety fosters a learning environment where mistakes are reframed as opportunities for growth, helping employees feel secure in adapting to change (Edmondson, 1999; Gittell, 2002).

Second, trust promotes knowledge sharing and informal learning by creating a safe communication environment where employees feel comfortable exchanging expertise, seeking help, and accessing resources (Chua, 2013; Renkema, 2018). These interactions may stimulate informal learning behaviours and the exchange of practical experience (Boud & Middleton, 2003; Mohammed & Kamalanabhan, 2019b) that are central to the DUI mode of innovation (Høyrup, 2010; Jensen et al., 2007). By transforming tacit knowledge into usable forms, trust-based exchanges may foster creativity and problem-solving, supported by open dialogue and honest discussion (Gibson & Gibbs, 2006; Perry-Smith & Shalley, 2003; Wenger et al., 2011). This openness in personal networks could strengthen employees' willingness to innovate (Felstead et al., 2020) and support a collaborative culture that is essential for mobilising innovation in organisations (Buła et al., 2024; Kmieciak, 2020).

Collectively, this evidence indicates that trust nurtures the relational conditions that enable employees to pursue innovative solutions. This mechanism is particularly relevant for hybrid workers, who rely heavily on personal networks to compensate for reduced physical proximity. In hybrid settings, trust can help employees feel psychologically safe despite spatial and temporal separation, sustaining knowledge sharing, informal learning, and collaborative problem-solving. Thus, trust, as a relational condition within personal networks, is likely to be a key enabler of innovative work performance among hybrid employees. Given these insights, the following hypothesis is proposed:

Hypothesis 2 (H2): Trust in personal networks will be positively related to employee innovative work performance.

5.2.3 Knowledge Resources, a Structural Mechanism of Innovative Work Performance

The third mechanism driving innovative work performance (IWP) is via the mobilisation of personal networks to access knowledge resources. This reflects the structural dimension of social capital, where mobilisation of personal networks determines what knowledge resources employees can draw upon to solve problems and innovate. The DUI perspective stresses that practice-based knowledge is central to EDI and is most effectively transferred through informal interaction (Høyrup, 2012; Kesting & Ulhøi, 2010; Polanyi, 1966). Such informal exchanges help translate tacit insights into practical solutions (Jensen et al., 2007; Noe et al., 2013). As no individual possesses all necessary expertise, personal networks are indispensable for collaborative problem-solving and for strengthening the bottom-up application of knowledge that fuels IWP (Birkinshaw & Duke, 2013; Hunter et al., 2011; Nonaka & Takeuchi, 1995). In hybrid settings, personal networks can help maintain critical knowledge flows and support continuous adaptation (Hung, 2013; Hunter et al., 2011).

The literature consistently suggests that personal networks characterised by a higher variety of expertise and insights are likely to provide fertile ground for IWP. Evidence from communities of practice (CoP) research shows that when employees have access to expert contacts this increases the variety of insights available, thereby strengthening organisational innovation through flexible, informal knowledge exchange (Liao et al., 2007). Moreover, informal interactions often involve individuals who take on roles such as legitimisers, socialisers, or passive observers, thereby acting as knowledge brokers who connect people and ideas and help employees refine solutions (Beretta & Søndergaard, 2021). Because relationships

within personal networks naturally perform these functions, increases in knowledge diversity are likely to expand the scale of knowledge available, enabling richer insights and more effective problem-solving. Generally, knowledge-rich networks improve innovativeness, creative performance, collaboration, and knowledge sharing (Ganguly et al., 2019; Mohammed & Kamalanabhan, 2019a; Parjanen et al., 2020). These benefits enable employees to act proactively and solve problems (Griffin et al., 2007); they can also generate and refine ideas (Høyrup, 2010). Thus, expanding employees' connections is likely to amplify these effects, as diverse channels expand access to expertise and insights (Burt, 1992; Murphy & Kram, 2010), which are known to enhance idea generation, problem-solving and innovation-related behaviours (Jehn et al., 1999; Kickul & Gundry, 2001), particularly in the successful implementation of change initiatives (Mumford et al., 2002; Widmann et al., 2016; Widmann & Mulder, 2018). This logic is reinforced by evidence showing that a balanced mix of internal and external ties strengthens performance (Cuypers et al., 2020), and that boundary-spanning relationships and crowdsourcing across diverse groups help refine ideas (Beretta & Søndergaard, 2021; Cross et al., 2018).

Psychologically, networks with a broader knowledge base are likely to enhance IWP by strengthening efficacy beliefs. Efficacy beliefs, defined as the belief in one's ability to execute tasks effectively, foster a 'can-do' mindset and proactive goal-setting (Bandura & Schunk, 1981; Parker et al., 2010; Rahman et al., 2018). Robust personal networks of knowledge enhance this self-efficacy, as noted by Phelps et al. (2012), with studies on knowledge networks demonstrating how nuanced information builds confidence and supports problem-solving (Centola & Macy, 2007; Reagans & McEvily, 2003). Access to expert peers improves decision quality and execution capabilities (Salomon & Martin, 2008). When they contain diverse informal ties, personal networks resemble knowledge networks, providing resources that foster proactive behaviours and innovative outcomes (Høyrup, 2010; Jensen et al., 2007; Lankau & Scandura, 2002). The collective involvement and encouragement from personal networks make innovative behaviour feel more achievable, as supportive personal ties increase confidence, cooperation, and willingness to innovate (Hu & Randel, 2014; Oh et al., 2004). Consequently, expanding and diversifying knowledge resources in personal networks equips employees with broader insights that strengthen self-efficacy and enable the behaviours underpinning IWP. This leads to the following hypothesis.

Hypothesis 3 (H3): Employees with a higher proportion of knowledge resources in their personal networks will be positively related to innovative work performance.

5.3 Innovative Work Performance in Hybrid Environments: An extended Media Richness Theory Lens via HRCR

The social context of work strongly influences employee behaviour, with relational climate and interpersonal communication quality at its core (Burt, 1992; Coleman, 1988; Maznevski & Chudoba, 2000). In hybrid settings, where employees alternate between in-person and digital interactions, sustaining high-quality communication becomes a persistent challenge (Gajendran & Harrison, 2007). Declines in communication quality, often described as 'perceptual distance' (Arling, 2004), erode social capital (Nahapiet & Ghoshal, 1998), thus undermining key elements like motivation, trust, and knowledge-sharing (Wang & Noe, 2010). This resultant erosion is a constraint on organisational innovation (Leonardi & Treem, 2020). Media Richness Theory (MRT) (Daft & Lengel, 1986) explains how communication effectiveness varies across media. The Hybrid Relational Communication Ratio (HRCR) is proposed as a way to assess how hybrid employees experience interpersonal communication quality and how these experiences may shape social capital use and Innovative Work Performance (IWP). Conceptualising HRCR as both a predictor and a moderator enables examination of its direct and interaction effects as distinct analytical components, an approach that has precedent in prior empirical research where variables function simultaneously as independent predictors and interaction terms (Oldham & Cummings, 1996). This aligns with methodological frameworks that distinguish between predictors as causal antecedents and moderators as variables that partition relationships to establish their 'domains of maximal effectiveness' (Baron & Kenny, 1986, p. 1173). Given the novel nature of the construct, examining its direct relationship with IWP provides initial evidence of nomological or criterion-related validity (MacKenzie et al., 2011; Hinkin, 1998), while moderation assesses the conditions under which this relationship varies. The following sections develop these relationships in detail. The following sections explore these pathways in detail.

5.3.1 Interpersonal Communication Quality Dynamics and Innovative Work Performance in Hybrid Work

Interpersonal communication quality is a critical determinant of IWP in hybrid and remote work environments, particularly when environmental conditions promote proactive

motivation. According to the Parker et al. (2010) proactive motivation model, proactive behaviour such as IWP is driven by Can-Do, Reason-To, and Energised-To motivational states. Remote work frequently provides greater autonomy, supporting self-determination and strengthening intrinsic motivation (Ryan & Deci, 2000; Wheatley et al., 2023). This sense of control lies at the core of Can-Do motivation, as autonomy enhances satisfaction and encourages employees to invest effort and initiative (Parker et al., 2010; Ryan & Deci, 2000). Hybrid work can also trigger emotional and behavioural investment. Felstead and Henseke (2017) found that remote workers demonstrated greater voluntary effort, enthusiasm and job satisfaction. Such affective rewards act as catalysts (Allen et al., 2015), triggering the Energised-To process (Parker et al., 2010). High-arousal positive affect, including enthusiasm and vitality (Spreitzer et al., 2005), is widely recognized for sustaining key behavioural outcomes, such as effort, persistence, and initiative (Kuvaas & Dysvik, 2009; Escribá-Carda et al., 2023). Affective commitment and job satisfaction further reinforce this process as established determinants of proactive behaviour (Tornau & Frese, 2013). By extension, hybrid working arrangements that combine autonomy with flexibility are also likely to energise proactive engagement in innovative work performance. However, Parker et al.'s (2010) model also shows that interpersonal conditions directly shape these motivational states, meaning that fluctuations in communication quality are likely to affect employees' innovative work performance. Therefore, the benefits of hybrid working are likely to translate into IWP only when supported by rich interpersonal communication, highlighting the value of the proposed HRCR as a relationally grounded way of capturing communication quality dynamics in hybrid contexts.

Under high HRCR conditions, poor communication quality is expected to undermine the Can-Do, Reason-To, and Energised-To motivational pathways (Parker et al., 2010), thereby weakening IWP. This poor communication quality should foster isolation and disconnection, which will erode self-efficacy, job control, and perceived security (Bryan et al., 2023; Orhan et al., 2016). As these resources decline, Can-Do motivation weakens, proactive engagement feels more costly, and employees are less willing to invest effort in innovation-related activities. Poor communication also restricts access to knowledge resources, further undermining Can-Do motivation (Hodzic et al., 2024; Rahman et al., 2018). A similar result likely emerges for Reason-To motivation. Employees are more likely to act proactively when their values align with organisational goals, as this gives their effort meaning and reinforces belief in positive outcomes (Grant, 2008), although cognitive flexibility can sometimes buffer these effects

(Allahverdi & Bayer, 2024). As social interaction weakens, employees struggle to internalise organisational values, undermining belonging, identification, and shared value internalisation (Yang & Lu, 2023). From an Energised-To perspective, proactive engagement relies on high-arousal positive affect, including enthusiasm, vitality, and emotional investment (Parker et al., 2010). When communication becomes impersonal or transactional in hybrid contexts, it diminishes affective commitment and job satisfaction (Allen et al., 2015; Felstead & Henseke, 2017), which depletes the energy and drive needed to sustain proactive behaviour. Deteriorating interpersonal communication also fosters job insecurity (Niesen et al., 2017), making extra-role behaviours appear too risky or unrewarding, further weakening IWP.

At the collective level, the central theoretical explanation for why IWP may decline under high HRCR conditions is the expected deterioration of the interpersonal communication climate, which disrupts motivation, tacit knowledge exchange, collaborative engagement, and shared goal alignment (Ruliana et al., 2018). Social interdependence theory helps explain this mechanism. Individuals' perceptions of goals, outcomes, and success are significantly influenced by their relationships within a group (Johnson & Johnson, 2008). In this context, positive interdependence refers to collaborative relationships in which individual success is closely linked to the success of others. This fosters a collective goal orientation, mutual support, and stronger emotional bonds (Hogg & Terry, 2000; Janssen et al., 1999). Research shows that changes in work processes, particularly at the group and organisational level, are more likely to succeed when multiple colleagues are involved in envisioning and planning the innovation effort (Barker et al., 2024; Sahay & Goldthwaite, 2024). Employees' proactive goals and achievements are closely shaped by their work relationships and are inherently tied to the success of others (Renkema et al., 2021). Effective communication is therefore essential to fostering this interdependence, as it enables employees to coordinate efforts, share responsibilities, and support one another in working toward shared goals (Johnson et al., 2007). Collaborative envisioning with job-relevant colleagues enables employees to co-create solutions, align with organisational direction, and build the cohesion necessary for implementation (Cadeddu et al., 2023; Renkema et al., 2021). This is consistent with findings that cooperative orientations and visionary leadership enhance innovation by strengthening team cohesion (Hansen et al., 2017; Van der Voet & Steijn, 2021). A breakdown in collaborative envisioning and planning, stemming from reduced interpersonal communication quality,

undermines positive interdependence (Johnson & Johnson, 2008; Parker et al., 2010). This disruption, in turn, is expected to lead to a decline in IWP.

Finally, understanding how HRCR may undermine IWP requires examining three specific functions of the interpersonal communication climate. These functions are likely to become compromised under conditions of high HRCR, weakening employees' capacity to engage in change-oriented behaviours such as IWP. First, motivational activation is highly sensitive to the interpersonal climate. While the pressure to achieve work-related goals can sometimes encourage more effective interpersonal communication, even in hybrid or remote settings (Brinberg & Ram, 2021; Long et al., 2020), this effect is often task-specific. In the case of IWP, which is typically considered as an extra-role behaviour (Echebiri et al., 2020), such pressure is unlikely to serve as a sufficient extrinsic motivator. This is because increasing HRCR should deteriorate the relational conditions that typically support intrinsic motivation to engage in IWP. Second, high HRCR should disrupt the exchange of tacit knowledge, an essential input for collaborative goal-setting within the EDI process, and thus impede IWP, the behavioural expression of it. Tacit knowledge exchange depends on strong relational bonds and informal behaviours such as dialogue, active listening, and rapport, which underpin collaboration and shared goal coordination (e.g., Alavi & Leidner, 2001; Chen et al., 2020; Morrison-Smith & Ruiz, 2020). Under high HRCR conditions, weakened communication quality will strain these relational bonds and undermine the interpersonal behaviours that sustain social interaction (Kirkman et al., 2002). As social interaction deteriorates, employees lose access to valuable knowledge and peer support (Kang et al., 2017), which weakens social interdependence and reduces their capacity to pursue innovative goals proactively (Chen et al., 2020; Cramton, 2001). Therefore, the following hypothesis is proposed.

Hypothesis 4 (H4): Higher levels of HRCR will be associated with lower levels of innovative work performance.

5.4 The Moderating Role of HRCR on Social Capital Mobilisation and Innovative Work Performance

Employees' ability to leverage social capital is highly context dependent, particularly in hybrid environments whereby communication shifts between digital and physical modes. Differences in communication quality influence how the core dimensions of social capital, namely shared language, trust, and knowledge resources, are accessed and mobilised. Media Richness Theory (MRT) explains that communication effectiveness is especially vulnerable in complex or ambiguous situations, because leaner channels limit the interpretation of messages (Daft & Lengel, 1986). As hybrid work increases reliance on asynchronous digital communication, opportunities for high-quality interpersonal exchanges decline.

This research proposes that increases in HRCR (greater reliance on leaner digital media) come at the cost of high-quality interpersonal exchanges. HRCR should therefore affect social capital primarily by weakening the richness of interpersonal communication. Shared language, for example, depends on employees' ability to interpret messages clearly across communication channels. High-quality interactions that include verbal and non-verbal cues support accurate meaning making and alignment of perspectives (Solomon et al., 2016). As HRCR increases and synchronous exchanges decline, employees struggle to maintain shared understanding because fewer informal interactions reduce empathy and rapport. This weakens cognitive social capital (Solomon et al., 2016). Similarly, trust, a central component of relational social capital, develops through repeated, high-quality interactions that demonstrate goodwill and cooperation (Kang et al., 2016; Lewicki & Bunker, 1995; Mayer et al., 1995). In hybrid settings, higher HRCR reduces opportunities for such exchanges and weakens relational confidence (Lam et al., 2013; Molm et al., 2000). However, Keppler and Leonardi (2023) highlight how strong interpersonal relationships, when actively cultivated, can still foster trust and knowledge exchange. Their study illustrates how digital tools, such as Chatter, enable ongoing relational interaction and help mitigate barriers to trust formation. Employees' access to valuable knowledge resources often emerges through informal ties outside formal structures (Chua, 2002; Gubbins & Dooley, 2021; Hatmaker, 2011). As communication richness declines, it becomes more difficult to assess the credibility and usability of knowledge shared through digital platforms (Chen et al., 2020; Cramton, 2001; Griffith et al., 2003). Yet Qureshi et al. (2018) found that technology-mediated interactions can, at times, surpass face-to-face exchanges in promoting knowledge sharing,

demonstrating that digital tools can enhance access to knowledge resources when effectively leveraged.

These findings show that the mobilisation of social capital depends on the quality of interpersonal communication, which strongly suggests that IWP may vary at different levels of HRCR. The next section further considers this possibility.

5.4.1 The Moderating Effect of HRCR on the relationship between the Knowledge Resources Dimension of Social Capital and Innovative Work Performance

Prior research suggests that shared language (cognitive capital) and trust (relational capital) may remain relatively resilient under moderate levels of communication strain in hybrid environments, although this resilience may diminish as communication conditions worsen. This resilience stems from established relational bonds that buffer the effects of reduced communication richness. Shared language, for example, tends to persist because personal networks typically share a common lexicon and mutual understanding (Moeschler, 2009; Petter et al., 2020). Although reduced proximity can impede shared understanding (Allen et al., 2015; Mortensen & Hinds, 2001), established communication norms within networks help preserve and apply shared language (Nahapiet & Ghoshal, 1998; Thomas & McDonagh, 2013). Sociolinguistic research further shows that relational stability, such as long-term work relationships, reinforces shared language (Bierstetel et al., 2020; Brinberg & Ram, 2021; Karan et al., 2019), particularly in job interdependent relationships that require ongoing interpersonal connectivity (Berger & Bradac, 1982; Knobloch & Solomon, 1999).

Trust shows a similar pattern of resilience, but for different relational reasons. Trust develops through repeated, cue-rich exchanges that allow individuals to observe behaviour and evaluate reliability (Butler, 1991; Mayer et al., 1995). Co-located communication is particularly effective in sustaining these bonds, as it enables richer observation and interaction (Crisp & Jarvenpaa, 2013; Lam et al., 2013). The need for rich observation is especially important in the early stages of workplace relationships, where individuals, such as new employees, lack an established foundation of trust (van der Werff & Buckley, 2017). As HRCR rises, opportunities to observe trust-building behaviour decline, producing an “out of sight, out of mind” effect in which physical and psychological separation weakens relational confidence (Glanville & Andersson, 2013; Jarvenpaa et al., 1988; Li et al., 2017). This pattern is further documented by van Zoonen et al. (2024), who show that declines in communication quality undermine the

interpersonal connections needed to sustain trust. When reduced communication creates psychological distance, it can also be misinterpreted as a lack of motivation to invest in relational effort (Berger & Bradac, 1982; Gajendran & Joshi, 2012; McCloskey & Igbaria, 2003; Theiss, 2019). This misinterpretation can increase relational turbulence and the risk of relational breakdown (Gajendran et al., 2015; Golden & Veiga, 2005), causing trust to decline.

However, once trust matures and relationships enter the stability phase (Lewicki & Bunker, 1995), it becomes less vulnerable to communication strain. The history of shared experiences, consistent communication, and reliable follow-through fosters strong expectations about a partner's intentions, making relationships more resilient to communication strain (Crossley et al., 2007; Lee, 2009; Rousseau et al., 1998). A quasi-experimental study by Chen et al. (2020), involving 144 undergraduate students in southwest China, supports this point. Their findings show that trust can be sustained in virtual settings when relational bonds are first established through high-quality, in-person communication grounded in mutual respect. This resilience is amplified by personal networks (e.g., friendship, family, and career ties), which form a uniquely stable foundation for trust, grounded in long-term social exchange and normative expectations of support (Higgins & Thomas, 2001; Jones & George, 1998; Luz et al., 2021). Even when digital reliance strains these bonds, occasional high-quality interactions can restore relationship functionality, reflecting the durability of these networks in sustaining the relational infrastructure needed for IWP (Ye et al., 2020). Consequently, trusted relationships are likely to remain a critical enabler of IWP, even under increasing HRCR conditions.

Personal network ties that provide knowledge resources are expected to respond more dynamically to changes in HRCR. In low-HRCR conditions, high-synchronicity, face-to-face communication facilitates informal knowledge sharing (Alavi & Leidner, 2001; Kirkman & Mathieu, 2005), reducing the need for external knowledge seeking. As HRCR increases, however, traditional workplace ties should weaken due to fewer informal encounters and diminished social interaction (Nakash & Bouhnik, 2023). This reduction in face-to-face contact heightens psychological distance, making employees less likely to seek work-related knowledge internally (Orhan & Altili, 2017). Consequently, employees compensate for reduced internal knowledge flow by turning to their personal networks under high HRCR conditions. This occurs because, in knowledge-based roles, employees are already expected to manage their learning and generate value independently, often relying on peer ties for tacit knowledge and problem solving (Boud & Middleton, 2003; Cross & Sproull, 2004). This reliance is reinforced by the

durability of advice-seeking ties, particularly when both parties are comfortable using digital tools (Bunger et al., 2018; Smedley, 2009; Wu et al., 2023). From an IWP perspective, these networks substitute for declining workplace communication and are well established as supporting innovation (Chiu et al., 2006; Levin & Cross, 2004). Employees also self-initiate skill building and problem solving, enabling distinct contributions to innovation (Grant, 1996; Óskarsdóttir et al., 2022). Research on boundary-spanning relationships highlights the critical role of cultivating diverse personal ties to refine ideas and access novel perspectives (Beretta & Søndergaard, 2021; Cross et al., 2018). Digital platforms facilitate continuous knowledge sharing, helping employees sustain and expand relationships that can rival face-to-face ties (Walther, 1992, 1996). With growing technological proficiency, employees proactively invest in these ties to secure ongoing access to critical knowledge resources (Morrison, 2002; Pataraia et al., 2014; Wu et al., 2023). These arguments imply a positive moderating effect of HRCR on the relationship between knowledge resources and IWP. This leads to the following hypothesis:

Hypothesis 5 (H5): The HRCR will positively moderate the relationship between knowledge resources and innovative work performance.

5.4.2 Conditional Moderation: The Role of HRCR Level

While shared language and trust often demonstrate resilience under moderate communication strain, their mobilisation is expected to shift under above-average HRCR conditions. As communication quality deteriorates further, employees may rely more heavily on subgroup identity and personal networks to sustain coordination, belonging, and knowledge flow. This is expected to change how social capital supports IWP.

Optimal Distinctiveness Theory holds that people seek both belonging and uniqueness (Brewer, 1991). Under deteriorated communication in hybrid settings, employees may shift their self-categorisation towards tight-knit subgroups that satisfy inclusion and distinctiveness needs (Hornsey & Jetten, 2004). These subgroups provide identity affirmation, social support and stable patterns of interdependence that aid coordination and information flow (Goldman et al., 2016). Depending on the climate, subgroups function either as survival mechanisms prioritising coping and role maintenance or as strategic platforms for leveraging social capital.

In dysfunctional climates, the survival role is likely to dominate, making IWP less likely. Limited face-to-face contact and isolation common in fully remote settings can heighten relational tension, potentially eroding trust and fuelling frustration, perceived information

withholding, and reduced feedback, which may undermine autonomy and competence and depress discretionary effort (Morrison, 2011; Mortensen, 2005; Mortensen & Hinds, 2001; Orhan et al., 2016). Ethnographic evidence shows that such conditions coincide with tight informal subgroups that provide emotional and practical support (Mahvar et al., 2020). Social identity work explains this behaviour, as under uncertainty people affiliate with smaller trusted units that provide belonging and distinctiveness (Brewer, 1991; Hornsey & Jetten, 2004; Goldman et al., 2016) while also offering psychological safety and satisfying core needs for relatedness, autonomy and competence in line with Self Determination Theory (Deci & Ryan, 1985, 2000; Orhan & Altili, 2017). In these conditions personal networks are likely to restore balance and basic functioning rather than drive IWP.

In hybrid environments with above-average HRCR, personal networks may operate as strategic platforms for collaboration rather than refuges for emotional survival, making IWP more likely. Although limited face-to-face contact can impede spontaneity, it may also reduce relational noise and can foster more structured, intentional exchanges (Banbury & Berry, 2005; Mortensen & Hinds, 2001; Orhan et al., 2016). With trust and suitable technologies, employees can maintain relationships and knowledge flows (Ford et al., 2022; Olson & Olson, 2000; Wang et al., 2021; Wu et al., 2023). These interpersonal conditions may heighten distinctiveness motives and visibility, which may encourage employees to leverage their personal networks, specialise and share knowledge more intentionally (Cross & Sproull, 2004; Levin & Cross, 2004). Employees are also reported to craft their roles (Kahn, 1990; Wrzesniewski & Dutton, 2001), a change-oriented proactive behaviour (Grant & Parker, 2009; Griffin et al., 2007). Under these conditions, distinctiveness motives may be channelled into a strategic activation of social capital, with dense ties and shared norms expected to enhance coordination and information flow (Goldman et al., 2016). Employees may use shared language and trust to help reduce interpersonal risk and to further mobilise distributed knowledge for problem solving and idea refinement (Cross & Sproull, 2004; Levin & Cross, 2004; Nahapiet & Ghoshal, 1998; Wang et al., 2020). When organisational resources are harder to access, employees tend to rely on their personal networks to bridge information gaps (Granovetter, 1973) and may strategically enable IWP. Under above-average HRCR conditions, employees are expected to use their personal networks as a strategic enabler of IWP.

Hypothesis 6 (H6): At above-average levels of HRCR, the positive relationship between social capital (i.e., shared language, trust, and the proportion of knowledge resources) and employee innovative work performance will be strengthened.

5.5 Conceptual Model

Figure 5.1 presents the conceptual model of how social capital dimensions influence innovative work performance and is moderated by HRCR levels.

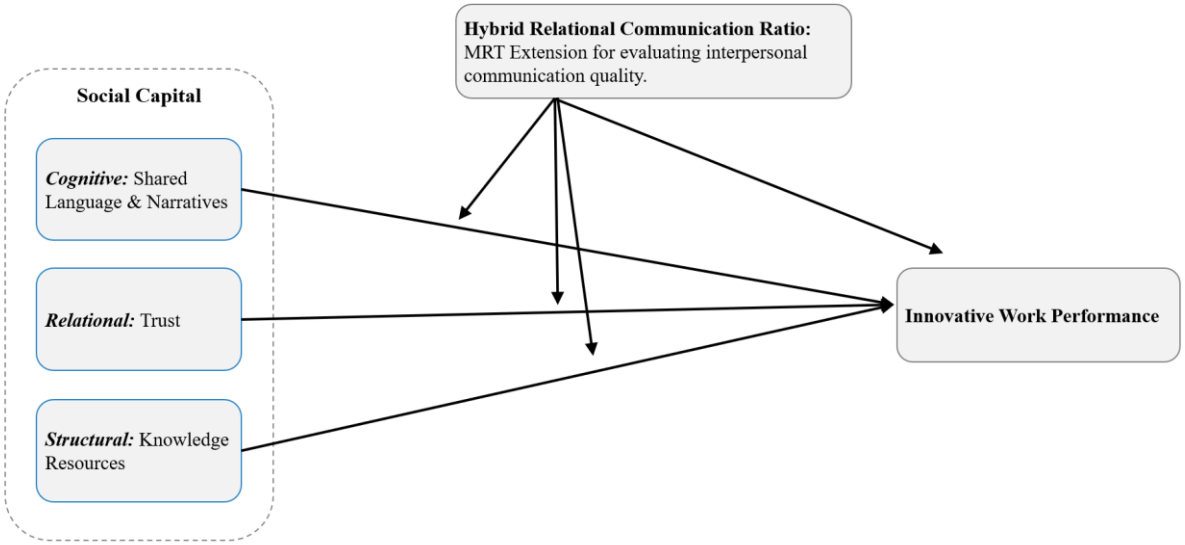


Figure 5.1 *Conceptual Model (Study 2)* - Innovative work performance shaped by HRCR and social capital dimensions

5.6 Methodology

5.6.1 Sample and Procedure

This study employed a cross-sectional design. Participants were recruited from three companies operating in different industries: Company A, a UK-headquartered multinational in the medical technology sector; Company B, a semi-state national research, advisory and teaching organisation; and Company C, an Irish telecommunications service provider. Data collection was conducted between January 2023 and March 2023, with each organisation determining its own launch date (Company A in January 2023, Company C in February 2023, and Company B in March 2023). Each organisation controlled the duration for which the surveys remained open, typically allowing several weeks for participation.

Based on estimates provided by organisational contacts, approximately 1,020 employees were invited to participate (Company A ≈ 30; Company B ≈ 850; Company C ≈ 140). A total of 204 employees responded, yielding an overall response rate of approximately 20%. Company A had 13 participants (response rate of 43%), representing various roles. Company B had 170 participants (response rate of 20%) across divisions and locations in Ireland. Company C had 21 participants (response rate of 15%). The final usable sample was 204 participants (N = 204).

Participants held diverse roles and occupied various hierarchical levels across the three organisations. In Company A, the sample included executive leaders, mid-level managers in sales, marketing and R&D, and operational engineers and specialists within its European division. In the two Ireland-based firms, participants were drawn from multiple divisions, departments and geographic locations across Ireland. The descriptive statistics for the study variables are presented in Table 5.1.

All participants took part voluntarily. Prior to completing the survey, they received a Plain Language Statement and privacy notice outlining the study's aims, procedures and data protection measures. They then provided informed consent, confirming their understanding of their rights and their voluntary involvement. A key criterion for inclusion was that participants worked away from their central office at least one day per week, ensuring relevance to hybrid working conditions.

Data were collected using an online self-report survey administered in English via Qualtrics. Responses were anonymised and stored securely in line with Dublin City University's

ethical protocol and Irish data protection regulations. The survey collected data on employees' social networks, focusing on the support and knowledge resources used for work. It also gathered information on employees' job perceptions, hybrid work arrangements and work behaviours. A self-report method was chosen over observer or supervisor ratings to capture participants' subjective perceptions and psychological experiences, which are best reported by the individuals themselves (Orhan et al., 2016; Spector, 2006).

Full documentation, including the Plain Language Statement, privacy notice, and consent form, is provided in Appendix B3.

Table 5.1 Descriptive Statistics for Study 2 (N = 204)

Variable	**Mean**	**Median**	**Median Category (Interpretation)**	**% in Category**
Gender	1.70	2	Female	70.00%
Age Category	5.63	6	45-49 years	15.87%
Organisational Tenure	4.08	4	5-10 years	3.17%
Position Level	1.93	1.5	First-Line	25.00%
Education Level	4.65	5	Master's Degree	38.71
Remote Working Days	1.77	2	2 days/week (Hybrid)	-
Notes: The sample included entry-level (**50%**), first-line supervisors/managers (**39%**), middle management (**4%**), and senior management (**7%**). 78% held a primary degree or higher, consistent with the study's focus on knowledge centred professionals.				

5.6.2 Measures

Innovative work performance (IWP): IWP was measured using three subdimensions from Griffin et al. (2007) 27-item performance scale, covering task proactivity, team proactivity and organisational proactivity (9 items). Participants rated their responses on a 5-point Likert scale ranging from "not at all" to "to a very great extent." A sample item from the task proactivity subdimension is: *"Initiated better ways of doing your core tasks."* A sample item from the team proactivity subdimension is: *"Suggested ways to make your work unit more effective."* A sample item from the organisational proactivity subdimension is: *"Made suggestions to improve the overall effectiveness of the organisation (e.g., by suggesting changes to administrative procedures)."* IWP demonstrated excellent reliability ($\alpha = 0.94$).

Personal Networks: These were collected using a single name generator (NG), following best practices in social network analysis and grounded in the exchange perspective (McAllister & Fischer, 1978; Milardo, 1988) and social capital theory (Lin, 2001). The NG identified core network members who support participants' work, focusing on a subset of relationships that exchange emotional, instrumental, and informational resources. In this approach, the participant is known as the ego, and the individuals they name are the alters. This approach reflects established principles in social network research emphasising the importance of resource-based relationships and associated interactions within egocentric networks (Marin & Hampton, 2007; Marsden & Baum, 2019).

The *Name Generator* question was framed as follows: *"Please list the individuals in your social network who provide you with one or more types of support in your daily job activities. These individuals can include anyone, such as a work colleague, mentor, role model, friend, acquaintance, or family member. Examples of support include emotional support, such as affection and acceptance; tangible assistance with work tasks; advice and guidance based on professional experience; technical knowledge related to your work tasks; sponsorship, exposure, and protection at work; or role modelling and examples of appropriate workplace behaviour."* This broad definition encouraged respondents to include diverse relationships, reducing interpretive ambiguity (Marin & Hampton, 2007). Clear definitions of support categories, grounded in social capital and social support theory (Lin, 2001; Lloyd-Jones, 2021), further ensured consistent interpretation and guided inclusion of relevant ties.

The study followed established guidelines for limiting sociometric choices to balance data quality with respondent burden (Merluzzi & Burt, 2013; Morrison, 2002). Respondents

were required to list at least one and up to six individuals, consistent with prior research showing that most people identify between two and six significant network members (Fischer, 1982; Morrison, 2002). This cap balanced comprehensiveness with efficiency, minimising redundancy since names beyond this threshold typically yield diminishing returns (Marin & Hampton, 2007; Merluzzi & Burt, 2013). Only first names and initials were recorded (e.g., "Janet M.") to preserve confidentiality, consistent with ethical guidelines (Marsden, 1987; Reins et al., 2021).

Name interpreters followed the generator to capture characteristics and attributes (e.g., role, type of support) of each alter (Marin & Hampton, 2007). The data collected through the single name generator and interpreter questions enabled the construction of ego-alter profiles, which were then aggregated to form individual personal-network social capital measures (Marin & Hampton, 2007; Vacca, 2018). For each named alter, respondents reported their perceptions of that alter across the key dimensions of social capital. These perceptions served as the foundation for the dependent variables, operationalised in line with Nahapiet and Ghoshal's (1998) three dimensions of social capital: cognitive (shared language), relational (trust), and structural (the proportion of knowledge resources), as described by Marin and Hampton (2007) and Eagle and Proeschold-Bell (2015).

Shared Language (Cognitive Social Capital): This construct measured the extent to which ego and alters shared a common language or jargon, following Levin et al. (2006). It reflects Argyres' (1999) concept of a "technical grammar" for communication (p. 162). Items were rated on a 7-point Likert scale (1 = strongly disagree, 7 = strongly agree). A sample item is: *"We are able to communicate effectively."* The measure demonstrated excellent reliability ($\alpha = 0.98$).

Trust (Relational Social Capital): This construct measured an individual's willingness to trust, rather than perceptions of trustworthiness, using Gillespie's (2013) 10-item scale. The scale comprises two factors, reliance and disclosure. Items were rated on a 7-point Likert scale (1 = completely unwilling, 7 = completely willing). Sample items include *"How willing are you to rely on their work-related judgments?"* (reliance) and *"How willing are you to share your personal feelings with these individuals?"* (disclosure). Two approaches were analysed. The first approach assessed Trust Reliance and Trust Disclosure as separate factors. The second, labelled *"TRUST,"* treated trust as a single construct combining both. This composite approach aligns with the conceptualisation of trust as an overarching "willingness to be vulnerable" (Schoorman et al., 2007) and is supported by empirical studies using a unified trust construct

(e.g., Masood & Afsar, 2017; Mayer & Gavin, 2005). Each element demonstrated high reliability, with Trust Reliance showing strong internal consistency ($\alpha = 0.98$), Trust Disclosure also showing high consistency ($\alpha = 0.96$), and the combined TRUST measure demonstrating excellent reliability ($\alpha = 0.99$).

Knowledge Resources (Structural Social Capital): Knowledge resources involve the relationships within an individual's ego network that provide valuable insights. Participants responded to two name interpreter questions that distinguished between tacit and explicit knowledge. Tacit knowledge was defined as intuitive, unarticulated and non-verbalised knowledge (Hau & Evangelista, 2007, p.1154), with further insights from Hansen et al. (2005), Hansen (1999) and Levin and Cross (2004). The question asked*, "Please identify the individual(s), if any, who provide you with tricks of the trade and/or the benefit of their practical know-how and experience."* Explicit knowledge was defined as objective knowledge that can be clearly articulated, outlined by Nonaka et al. (2000) and expanded by Lam (2000), Shi and Weber (2020) and Taskin and Bridoux (2010). The question asked, "*Who (if any) do you turn to for technical information related to your work*? *These individuals provide information akin to what you might find in books, documents, reports, software, manuals, memos, etc."* The resulting construct was recorded as a single composite measure called Knowledge Resources (Weighted), which represents the proportion of the personal network that provides some form of knowledge support, expressed relative to the six-alter reference. This operationalisation aligns with the structural-capital view that prioritises resource heterogeneity but also considers the structural capacity of the network to mobilise and sustain those resources (Lin, 2001; Perry et al., 2018). A value of 1 indicates that all six alters provide knowledge resources, while lower values indicate fewer knowledge-providing ties. The weighting standardises scores across respondents with different network sizes, ensuring that values are directly comparable and represent the normalised proportion of knowledge-providing alters relative to the six-alter reference. Details of the knowledge resources calculations is provided in Appendix C6.

Hybrid Relational Communication Ratio (HRCR): HRCR integrates face-to-face and technology-mediated communication. It is derived from task virtuality scores (Orhan, 2014), which estimate the share of work coordinated without face-to-face contact. This value is then adjusted using an indicator of the quality of employees' technology-mediated exchanges, referred to here as Digital Information Communication Quality (DICQ). DICQ reflects the synchronicity and informational richness of the digital channels employees use, following the

framework of Kirkman and Mathieu (2005). In this study, task virtuality was categorised into four levels (TV* = 1-4), corresponding to low (0-49 per cent), moderate (50-64 per cent), high (65-79 per cent) and very high (80-100 per cent) virtuality. DICQ values ranged from 0 to 2, reflecting low, medium (balanced), or high digital communication quality. Scores were assigned by classifying each participant's overall mix of communication modes (written, audio, avatar-based and video), with higher values indicating greater use of richer digital media. HRCR values range from 5 to 100, reflecting all possible combinations of TV* categories and DICQ classifications. Details of the HRCR and DICQ calculations are provided in Appendix C (C4 & C5).

Company: The organisation was included as a covariate to account for differences in culture, management practices, and policies that may shape employee experiences and perceptions (Pfeffer, 1998). They also differ in size and structure, which can influence social interactions and the formation of networks (Tsai, 2001). Controlling for organisation helped isolate contextual effects on individual outcomes and reduced the risk of findings being confounded by company specific factors. In the regression analyses, company was treated as a categorical variable and dummy coded, with Company 1 serving as the reference category.

All measurement items used in this study are presented in full in Appendix B3. The mathematical formulations for task virtuality, DICQ and HRCR, are in Appendix C.

5.7 Data Analysis Strategy

This study followed the guidelines of Podsakoff et al. (2003) and Podsakoff et al. (2012) during the design phase to address potential issues of common method variance. To reduce non response, measures included pilot testing the survey, providing pre notification, ensuring anonymity and confidentiality, and sending email reminders before closure.

5.7.1 Measurement Model Evaluation: Model Fit, Validity, and Integrity

Confirmatory Factor Analysis (CFA) was used to evaluate each measurement model, focusing on fit, convergent validity and discriminant validity. CFA assessed the adequacy of the proposed models using multiple fit indices. Each model examined the relationships between innovative work performance and a latent construct, shared language and trust, representing the cognitive and relational dimensions of social capital. Both dimensions were measured with

multiple observed indicators, making them suitable for CFA, which assumes latent variables are inferred from two or more indicators.

The CFA therefore focused on validating the latent constructs of Shared Language, Trust and Innovative Work Performance. Each was assessed with multiple Likert-scale items that provided continuous or ordinal data suitable for CFA (Kline, 2016). This approach aligned with CFA assumptions and helped to minimise bias, strengthening the usefulness of the model. Several variables did not meet these criteria and were excluded. Structural social capital, specifically knowledge resources, was measured with a single proportional item, making it unsuitable for CFA. HRCR was omitted because its calculated formula introduces a distinct type of measurement error and because it lacked self-reported or item-based indicators. Advanced CFA techniques for mixed data types were not feasible given the limited sample size (Eid et al., 2003; Kline, 2016). Company affiliation was also excluded as a control variable because it was categorical, unevenly distributed across groups, and not theoretically related to innovative work performance. Including this variable would therefore have risked biased estimates and reduced model validity (Brown, 2015; Hair et al., 2010; Hurley et al., 1997; Kyriazos, 2018).

All CFA models were conducted in R (v. 4.1.2) using the *lavaan* package (v. 0.6.15). After estimation, convergent and discriminant validity were tested using the Average Variance Extracted (AVE) and the Fornell-Larcker criterion. All analyses were implemented in R with libraries for structural equation modelling. The results indicated strong overall model fit. The Comparative Fit Index (CFI) and Tucker-Lewis Index (TLI) consistently showed excellent fit, with values between 0.98 and 0.99 across all models. Chi-square test statistics also reflected acceptable to good fit, with non-significant p-values for most models ranging between 56.0 and 155.1. Most models also demonstrated strong fit based on the Root Mean Square Error of Approximation (RMSEA) and the Standardised Root Mean Square Residual (SRMR), with RMSEA values between 0.026 and 0.043 and SRMR values between 0.052 and 0.063, all within accepted thresholds. Discriminant validity was also supported, as the Fornell Larcker criterion indicated acceptable distinctions between constructs, with values from 0.71 to 0.76, all above the recommended threshold of 0.5. The Average Variance Extracted (AVE) ranged from 0.38 to 0.47, with a mean of approximately 0.40, which falls below the commonly recommended threshold of 0.50 for convergent validity. Fornell and Larcker (1981) suggest that an AVE of 0.50 or higher is preferred to confirm that a latent construct adequately explains the variance in

its observed indicators. However, more recent literature (Hair et al., 2010; Malhotra and Dash, 2011) recognises that lower AVE values may still be acceptable when supported by other indicators of model quality. In this case, the modest shortfall is offset by excellent fit indices (CFI, TLI, RMSEA) and strong discriminant validity. Comprehensive details regarding the model fit statistics are presented in the following table.

Table 5.2 Confirmatory Factor Analysis (CFA) Model Fit Indices and Validity Statistics for Latent Constructs (Study 2)

IV	DV	df, N	X^2	*p*	CFI	TLI	RMSEA	SRMR	F-LC	AVE
Shared Language	IWP	46, 174	56.012	.148	.99	.99	.035	.063	.71	.47
Trust Reliance (TR)	IWP	65, 174	72.539	.243	.99	.99	.026	.052	.76	.41
Trust Disclosure (TD)	IWP	66,174	86.972	.043	.99	.98	.043	.062	.76	.42
TRUST -TR & TD	IWP	131,174	155.108	.07	.99	.99	.033	.058	.74	.38

Notes: Independent Variable (IV); Dependent Variable (DV); Innovative work performance (IWP); Trust Reliance and Disclosure (TRUST TR & TD); Degrees of freedom (df); Number of Observations Used (N); Chi-square Test Statistic (X2); p-value (p); Comparative Fit Index (CFI); Tucker-Lewis Index (TLI); Root Mean Square Error of Approximation (RMSEA); Standardised Root Mean Square Residual (SRMR); Fornell-Larcker Criterion (F-LC); Average Variance Extracted (AVE).

5.7.2 Intraclass Correlation Coefficient

To assess the nested data structure and the need for multilevel modelling, Intra-Class Correlation Coefficients (ICCs) were calculated using the complete-case dataset. ICCs estimate the proportion of variance in a variable attributable to group-level differences, in this case organisation. The analysis tested whether organisational membership contributed meaningfully to variance in the independent variables and in the dependent variable, IWP. All ICC values were below 0.01, indicating minimal between-company variance. The ICC for IWP was 0.00065, showing negligible organisational-level influence on this outcome. This supports the conclusion that most variability in IWP occurs at the individual level, with little contextual effect from organisational membership, consistent with thresholds proposed by Snijders and Bosker (2012) and Goldstein (2011), which regard ICC values below 0.10 as indicating low group-level impact. Similarly low ICCs were observed for the independent variables: Proportion of All Knowledge Resources (0.00076), Shared Language (0.00820), Trust Reliance (0.00993), Trust Disclosure (0.00706) and the combined Trust measure (0.00890). These results indicate that

organisational-level differences account for a negligible share of variance across study variables, supporting the use of individual-level analysis.

5.7.3 Power Analysis

Power analysis was conducted using G*Power, a widely used tool for statistical power analysis and sample size estimation in the social and behavioural sciences (Faul et al., 2009). The aim was to evaluate the study's capacity to detect effects within linear regression models using F tests. Standard effect size benchmarks, small ($f^2 = 0.02$), medium ($f^2 = 0.15$) and large ($f^2 = 0.35$), were applied to assess power for both linear and moderation models based on the final usable sample size (Cohen, 1988).

The analysis showed strong power for detecting medium (0.998) and large (1.00) effects, indicating that the study was well powered to identify significant relationships at these levels. For small effects ($f^2 = 0.02$), power was lower (0.36). Further analysis showed that an effect size of $f^2 = 0.055$ was sufficient to reach the recommended threshold of 0.80 (Cohen, 1988; Hoenig and Heisey, 2001) with the given sample size. The observed significant beta coefficients typically ranged from $\beta \leq -0.1$ to $\beta \geq 0.1$, corresponding to moderate to large effect sizes (Peterson & Brown, 2005). These exceed the $f^2 = 0.055$ benchmark, confirming that the sample size was adequate to detect the effects observed. Overall, these results support the reliability and validity of the study's findings.

5.7.4 Data Management: Pre-Processing and Statistical Methods Employed

Data manipulation and statistical modelling were conducted in R Studio 2021.09.01 Build 372 using the packages lavaan, semTools, dplyr, tidyverse and lmtest. Pre-processing excluded cases with missing data on key variables and filtered out variables with low or zero variance or those unrelated to the study hypotheses. Interaction terms with continuous variables were mean centred to aid interpretation and reduce multicollinearity. Composite scores for latent constructs were computed using scale means, where appropriate. These steps produced a clean and analytically valid dataset. Organisational membership was included as a categorical control variable and entered as a factor in the regression models. Dummy (treatment) coding was applied in R, with Company 1 serving as the reference category.

Each model included one key explanatory variable: either Shared Language (a latent construct measured through multiple observed indicators), Trust (also a latent construct

measured through multiple observed indicators), or Knowledge Resources (a calculated proportion), and one moderator, the HRCR (a calculated composite score used in every model). Linear regression was chosen as the analytic approach for testing interactions between each explanatory variable and HRCR in explaining IWP. While Shared Language and Trust could support a structural equation modelling (SEM) approach, Knowledge Resources and HRCR would have to be treated as observed variables as they were not measured with multiple indicators. This mix of latent and observed variables, combined with the limited sample size (N = 204), made SEM impractical.

This choice is consistent with applied research recommendations, where composite or factor scores are often used in regression to balance parsimony, interpretability and statistical power (Hayes, 2018; Kline, 2017). Linear regression was also preferred for its robustness in small samples, avoiding the overfitting risks of more complex SEM models (Wolf et al., 2013). This reflects the principle of Occam's razor, favouring simpler models that yield clearer and more generalisable insights (Field, 2013). The chosen approach ultimately enhanced the reliability and validity of conclusions regarding how hybrid working conditions influence the effects of each social capital variable.

5.7.5 Moderation Analysis and Interpretation Strategy

A range of statistical methods were employed in line with the study's objectives. Linear regression models tested associations between variables and whether the Hybrid Relational Communication Ratio moderated the relationship between the independent variables, Shared Language, Trust and Knowledge Resources, and the dependent variable IWP. Moderation was tested by including an interaction term between each independent variable and HRCR in the regression model. A statistically significant interaction indicated that the strength or direction of the IV-DV relationship varied with the moderator (Aiken & West, 1991; Hayes, 2018). The summary function in R provided key model statistics, and ggplot2 was used to illustrate the interaction effects. To interpret interactions, the Johnson-Neyman (J N) technique was applied using the johnson_neyman function from the interactions package in R (Long, 2019). This method identifies the values or range of the moderator variable, such as HRCR, where the effect of the independent variable on the dependent variable, such as IWP, becomes statistically significant ($p < .05$). The J N interval represents the range of moderator values where the effect is not significant ($p > .05$); outside this interval the explanatory effect is significant ($p < .05$). In

this study, the technique identified the HRCR values at which the relationship between each independent variable and IWP meaningfully changed.

Unlike traditional approaches that test moderation at fixed points such as ±1 SD, the J N technique provides a continuous interpretation across the full range of the moderator (Johnson & Neyman, 1936; Preacher et al., 2006). Flip points were also calculated to identify the HRCR value at which the direction of the independent variable's effect on IWP changes, where the relationship shifts from negative to positive or vice versa. These were derived from the conditional effect equation (Effect = b1 + b3 × Moderator), where b1 is the regression coefficient for the independent variable and b3 is the coefficient for the interaction term (Hayes, 2018). The flip point occurs when the effect equals zero and is calculated as −(b1 / b3). In R this was implemented by extracting the relevant coefficients from each fitted model using the coef() function and applying the formula.

The Johnson-Neyman (J-N) technique and the flip point calculation provided the framework for interpreting moderation. This technique identified where the independent variable significantly affected the dependent variable across the moderator's range, while the flip point pinpointed the threshold at which the effect changed direction. Used in combination, these methods showed not only whether moderation occurred but also how, where and in what direction relationships varied, strengthening both statistical interpretation and theoretical alignment. This approach was specifically used for testing Hypotheses 5 and 6, exploring how HRCR moderated the effects of social capital on IWP at different levels. The J N analysis revealed regions of significance for the moderation effects, and the flip point identified thresholds where the effects of the independent variables shifted from negative to positive, consistent with the conditional logic of the hypotheses.

5.8 Results

5.8.1 Correlation table

A summary of the means, standard deviations, correlations and reliabilities of the study's variables are presented in Table 5.3.

Table 5.3 Correlation Table (Study 2)

	M	SD	1.	2.	3.	4.	5.	6.	7.	8.
1. Shared Language	0.65	0.22	**(0.98)**							
2. Trust Reliance	0.27	0.35	0.92***	**(0.98)**						
3. Trust Disclosure	0.23	0.31	0.88***	0.98***	**(0.96)**					
4. TRUST	0.61	0.21	0.92***	0.97***	0.97***	**(0.99)**				
5. Knowledge (prop.)	0.54	0.29	0.57*	0.71*	0.64*	0.55*				
6. HRCR	45.82	26.73	0.04	0	-0.02	-0.01	-0.08			
7. Innovative Work Performance	0.53	0.21	-0.02	-0.14	-0.07	-0.11	-0.27*	-0.2	**(0.94)**	
8. Company	2.05	0.41	0.01	-0.15	-0.15	0.03	0.04	-0.07	0.2	

Notes. N = 204. Correlations were computed using pairwise deletion. Cronbach's alpha reliabilities are in parentheses. Mean (M); Standard Deviation (SD). Structural social capital (Knowledge) is expressed as a weighted proportion relative to the overall size of each individual's network. Significance indicators are ***p < .001, **p < .01, *p < .05 (two tailed tests).

5.8.2 Hypothesis Tests

To test the hypotheses, moderated linear regression models were used. The results are presented below. The analysis of social capital and employees' innovative work performance produced unexpected results. Each dimension of social capital showed a significant negative association with IWP, contrary to expectations.

Hypothesis one (H1) proposed that shared language would be positively related to IWP. Regression analysis instead revealed a significant negative association (b = -0.610, p = 0.015). H1 is therefore rejected.

Hypothesis two (H2) proposed that trust would be positively associated with IWP. Across the trust reliance, trust disclosure and the composite trust measure, relationships with IWP were significantly negative: trust reliance (b = -0.755, p = 0.002), trust disclosure (b = -0.582, p = 0.026), and composite trust (b = -0.748, p = 0.005). H2 is therefore rejected.

Hypothesis three (H3) proposed that employees with a higher proportion of knowledge resources would show stronger IWP. Regression analysis instead found a significant negative association ($b = -0.802$, $p < 0.001$). H3 is therefore rejected.

Hypothesis four (H4) proposed a negative relationship between the HRCR and IWP. Across all moderation models, HRCR was significantly negatively related to IWP (b range: -0.008 to -0.012, all $p < .01$), with effect strength varying slightly by independent variable. H4 is therefore supported.

Hypothesis five (H5) proposed that HRCR would positively moderate the relationship between knowledge resources and IWP. The HRCR × knowledge resources interaction was positive and significant ($b = 0.015$, $p < .001$), indicating HRCR weakens the negative relationship between knowledge resources and IWP (See Table 5.6). As HRCR increased, employees were more likely to leverage knowledge resources to enhance innovation, supporting H5.

Hypothesis six (H6) proposed that at higher-than-average HRCR levels, the positive relationship between social capital and IWP would be strengthened. Moderated regression analyses revealed positive and significant interaction effects between HRCR and each social capital dimension (Effect range: 0.011 to 0.015, all $p < .05$). These results reinforced H5, showing that within specific higher ranges of HRCR, employees were able to draw on social capital to enhance IWP.

Further analysis using the Johnson-Neyman technique and flip point calculation ($-b_1/b_3$) identified the thresholds at which HRCR must exceed for the relationship between social capital and IWP to become positive and significant. Flip points ranged from 49.14 to 54.60, indicating that initially negative associations became positive at above average HRCR levels. The Johnson-Neyman analysis showed that the effect of social capital on IWP was significant outside model-specific intervals: shared language [26.12, 78.95], trust reliance [39.26, 86.53], trust disclosure [23.36, 114.73], trust composite [36.59, 87.11], and knowledge resources [41.29, 71.26]. Across models, positive effects were statistically significant at higher levels of HRCR, generally above approximately 70. These findings indicate that moderately high HRCR is required for social capital to positively influence IWP. H6 is therefore supported.

The hierarchical regression results are presented in Tables 5.4–5.6, with controls entered in Model 1, main effects in Model 2, and interaction terms in Model 3. Table 5.4 reports shared

language (H1), Tables 5.5a–5.5c report the trust dimensions (H2), and Table 5.6 reports knowledge resources (H3–H5).

The corresponding moderated regression results and interaction plots are presented in the following section.

Table 5.4 *Hierarchical Regression Results for Shared Language (Study 2)*

Variable	Model 1	Model 2	Model 3
Controls			
Company 2	-0.019 (0.145)	-0.036 (0.143)	0.056 (0.140)
Company 3	0.333 (0.201)	0.350 (0.198)	0.444 (0.193)*
Main Effects			
Shared Language	—	-0.032 (0.111)	-0.610 (0.242)*
HRCR	—	-0.002 (0.001)	-0.010 (0.003)**
Interaction			
Shared Language × HRCR	—	—	0.012 (0.005)*
Model Statistics			
R^2	0.085	0.141	0.230
ΔR^2	—	0.056	0.089

Table 5.5a *Hierarchical Regression Results for Trust Reliance (Study 2)*

Variable	Model 1	Model 2	Model 3
Controls			
Company 2	-0.019 (0.145)	-0.035 (0.141)	0.069 (0.137)
Company 3	0.333 (0.201)	0.356 (0.196)	0.472 (0.189)*
Main Effects			
Trust Reliance	—	-0.140 (0.110)	-0.755 (0.231)**
HRCR	—	-0.002 (0.001)*	-0.011 (0.003)***
Interaction			
Trust Reliance × HRCR	—	—	0.014 (0.005)**
Model Statistics			
R^2	0.085	0.162	0.269
ΔR^2	—	0.077	0.107

Table 5.5b *Hierarchical Regression Results for Trust Disclosure (Study 2)*

Variable	Model 1	Model 2	Model 3
Controls			
Company 2	-0.019 (0.145)	-0.038 (0.143)	0.039 (0.142)
Company 3	0.333 (0.201)	0.344 (0.198)	0.437 (0.196)*
Main Effects			
Trust Disclosure	—	-0.056 (0.116)	-0.582 (0.256)*
HRCR	—	-0.002 (0.001)	-0.008 (0.003)**
Interaction			
Trust Disclosure × HRCR	—	—	0.011 (0.005)*
Model Statistics			
R^2	0.085	0.143	0.211
ΔR^2	—	0.058	0.068

Table 5.5c *Hierarchical Regression Results for Trust Composite (Study 2)*

Variable	Model 1	Model 2	Model 3
Controls			
Company 2	-0.019 (0.145)	-0.038 (0.142)	0.063 (0.139)
Company 3	0.333 (0.201)	0.347 (0.197)	0.465 (0.192)*
Main Effects			
Trust Composite	—	-0.107 (0.117)	-0.748 (0.253)**
HRCR	—	-0.002 (0.001)	-0.011 (0.003)**
Interaction			
Trust Composite × HRCR	—	—	0.014 (0.005)**
Model Statistics			
R^2	0.085	0.152	0.249
ΔR^2	—	0.067	0.097

Table 5.6 *Hierarchical Regression Results for Knowledge Resources (Study 2)*

Variable	Model 1	Model 2	Model 3
Controls			
Company 2	-0.019 (0.145)	0.009 (0.138)	-0.001 (0.124)
Company 3	0.333 (0.201)	0.382 (0.191)	0.384 (0.172)*
Main Effects			
Knowledge Resources	—	-0.202 (0.090)*	-0.802 (0.171)***
HRCR	—	-0.002 (0.001)	-0.012 (0.003)***
Interaction			
Knowledge Resources × HRCR	—	—	0.015 (0.004)***
Model Statistics			

Variable	Model 1	Model 2	Model 3
R^2	0.085	0.205	0.369
ΔR^2	—	0.120	0.164

Note. Entries are unstandardised coefficients (B), with standard errors (SE) in parentheses immediately following each coefficient. Company 1 is the reference category. ΔR^2 reflects the change in R^2 from the previous model. *p < .05, **p < .01, ***p < .001.

5.8.3 Moderated Regression Results and Interaction Plots

Figures 5.2a to 5.6a present the moderated regression models, showing the interaction between HRCR and each social capital dimension on IWP. Figures 5.2b to 5.6b provide the corresponding interaction plots, illustrating how these relationships vary across low, medium and high HRCR levels.

Note. All regression models report unstandardised coefficients. Company is included as a control variable (dummy coded, with Company 1 as the reference category). Significance levels are indicated as follows: *p < .05, **p < .01, ***p < .001.

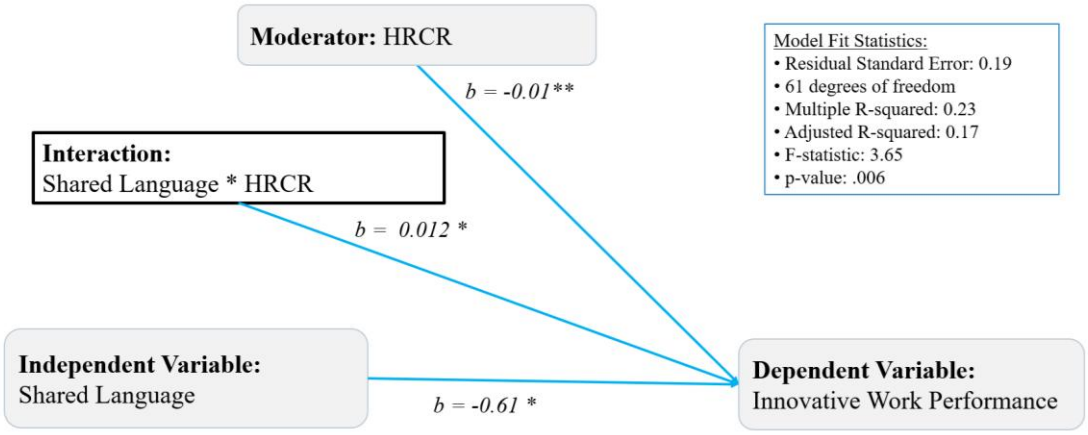


Figure 5.2a Moderation Model of the Interaction between HRCR and Shared Language influence on IWP

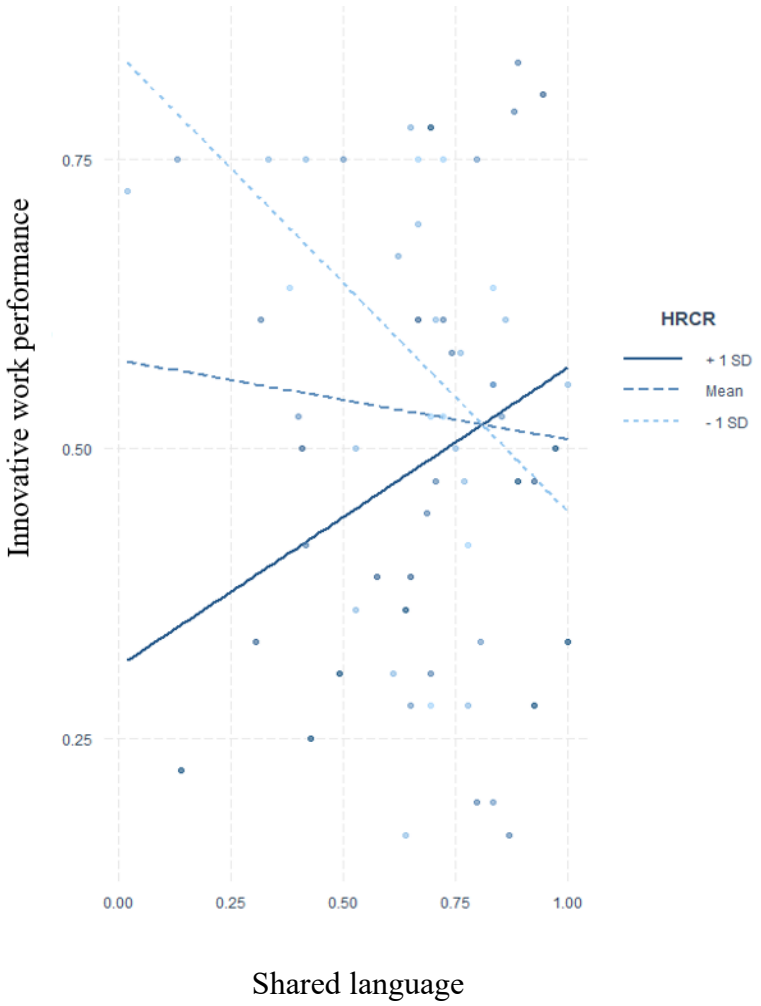


Figure 5.2b Effect of Shared Language and IWP at low, medium and high HRCR levels (plot)

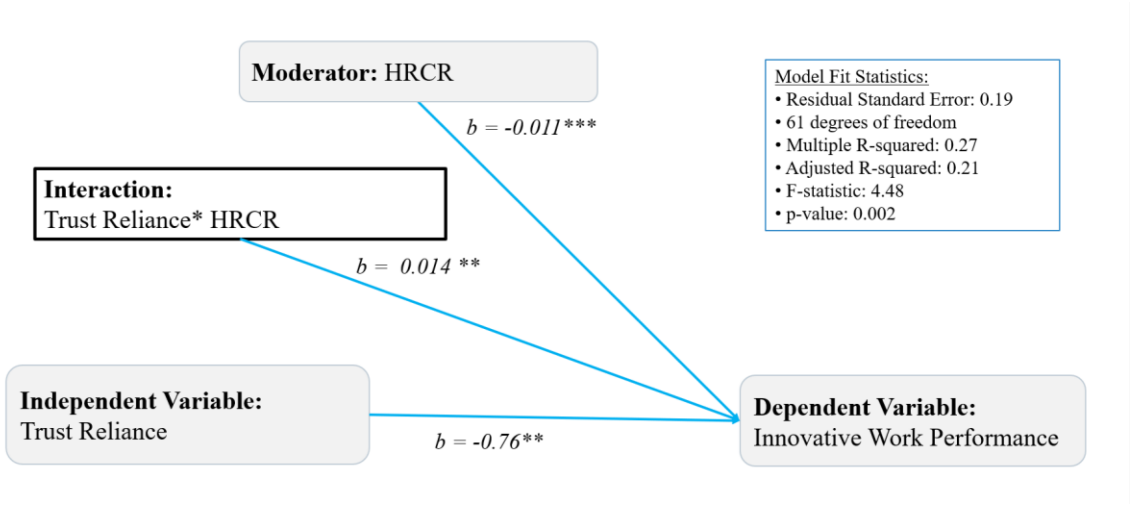


Figure 5.3a Moderation Model of the Interaction between HRCR and Trust reliance influence on IWP

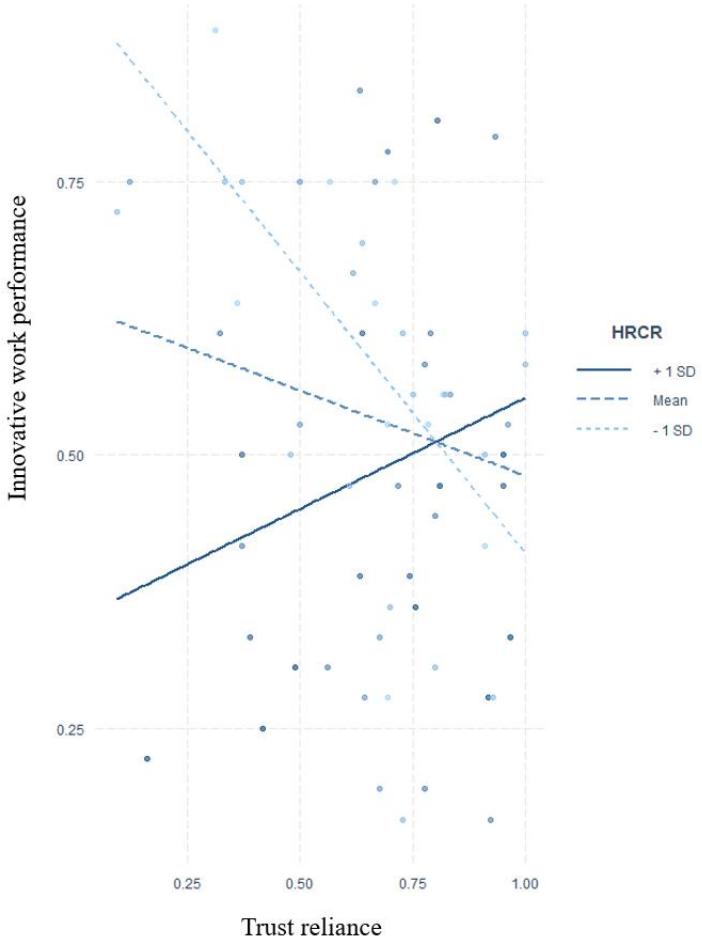


Figure 5.3b Effect of Trust Reliance and IWP at low, medium and high HRCR levels (plot)

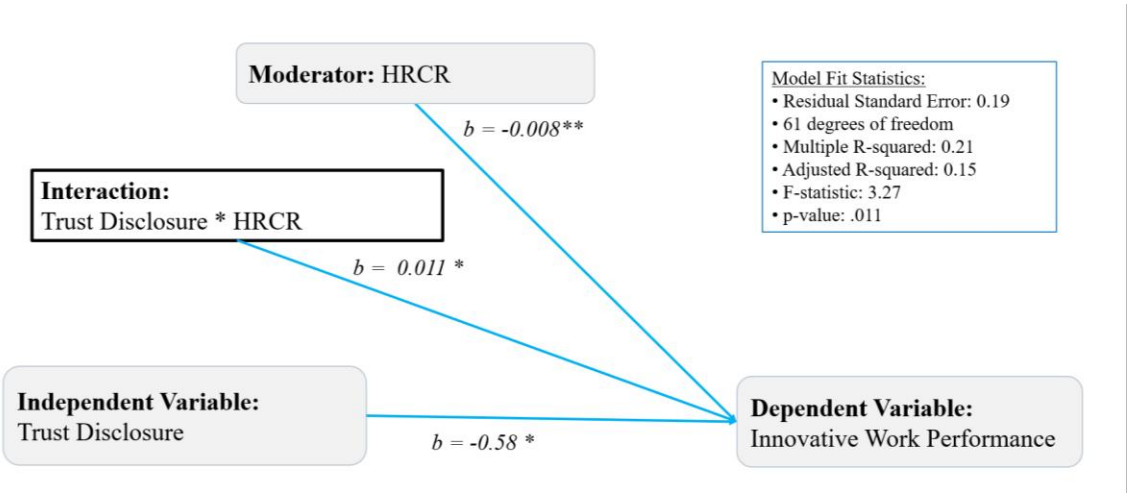


Figure 5.4a Moderation Model of the Interaction between HRCR and Trust disclosure influence on IWP

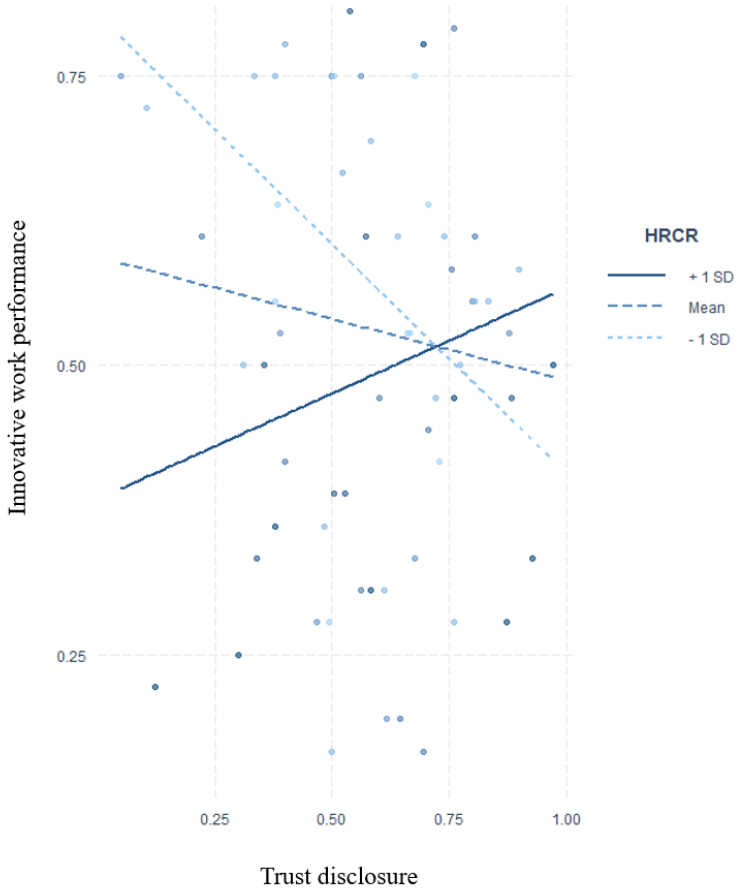


Figure 5.4b Effect of Trust Disclosure and IWP at low, medium and high HRCR levels (plot)

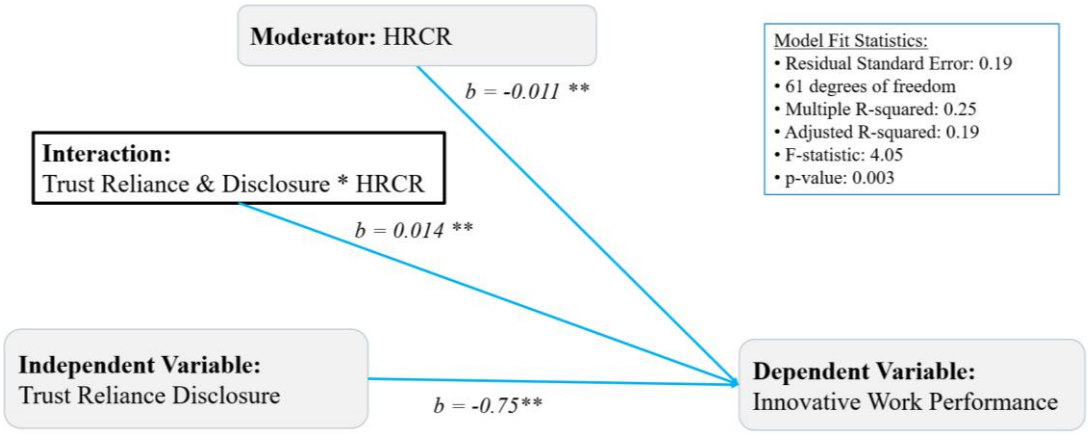


Figure 5.5a Moderation Model of the Interaction between HRCR and Trust (two factor construct) influence on IWP

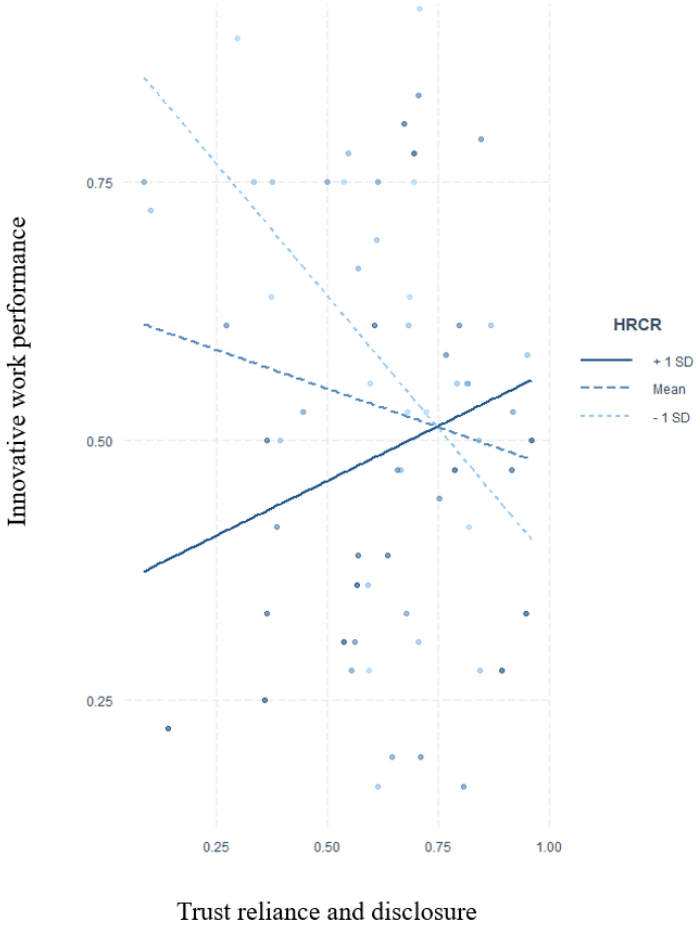


Figure 5.5b Effect of Trust (two factor construct) and IWP at low, medium and high HRCR levels (plot)

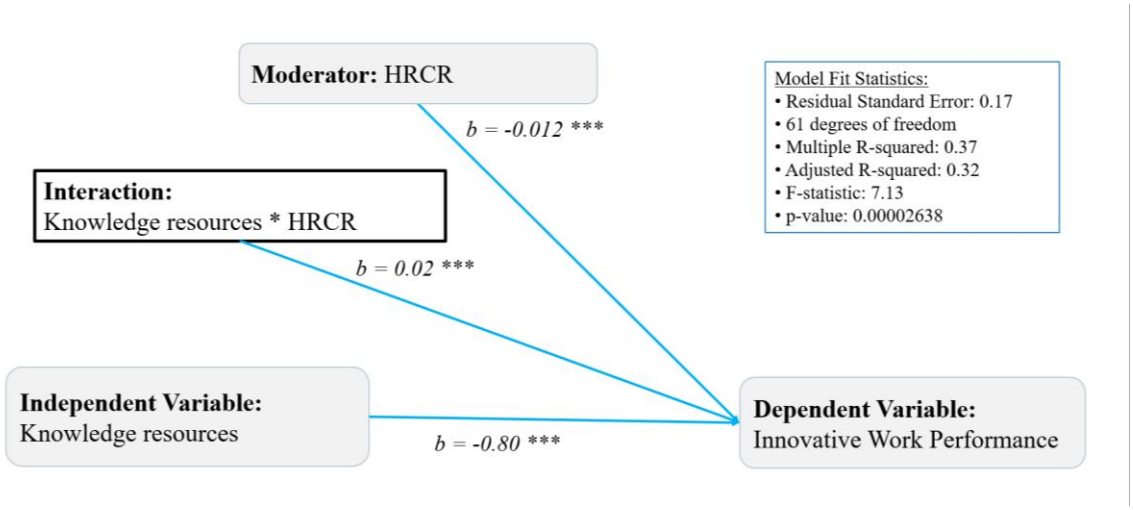


Figure 5.6a Moderation Model of the Interaction between HRCR and Knowledge resources influence on IWP

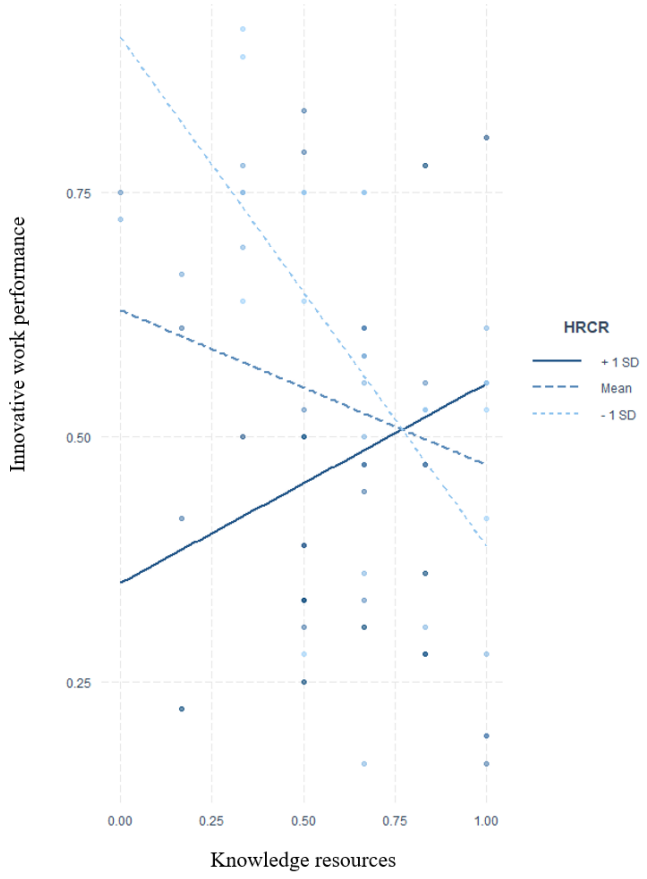


Figure 5.6b Effect of Knowledge Resources and IWP at low, medium and high HRCR levels (plot)

5.9 Discussion

5.9.1 Summary of the main findings

This study investigates how innovative work performance (IWP) occurs in hybrid environments, focusing on how employees mobilise social capital through their personal networks. Contrary to hypotheses, shared language, trust, and knowledge resources in personal networks were each negatively associated with IWP. These negative effects emerged only in the full model including HRCR and interaction terms, indicating that the relationship between social capital and IWP is conditional on relational communication dynamics within the hybrid work environment. Concurrently, the Hybrid Relational Communication Ratio (HRCR) emerged as a critical contextual factor in understanding these findings. HRCR had a small negative direct effect on IWP but consistently demonstrated a positive moderating effect across all dimensions of social capital, reducing their negative impact. At above average HRCR levels, it was possible to see where the effects of social capital became positive and significant. While poor communication directly constrains innovation, the findings show that under certain moderately high HRCR levels, employees are able to use their networks and mobilise social capital resources to enhance IWP. Overall, the findings suggest that the value of social capital for employee-driven innovation (EDI) in hybrid work environments depends on the quality of interpersonal communication. The findings highlight the need to consider both the resources embedded in personal networks and communication conditions when theorising about IWP and EDI more generally.

5.9.2 Contribution

The study makes several contributions: theoretical, empirical, methodological and practical. The first theoretical contribution extends Media Richness Theory (MRT) by showing that richness is not a fixed property of a medium (Daft & Lengel, 1986) but a contextually dynamic quality shaped by how communication tools are enacted in practice. In hybrid settings, where employees alternate between physical and virtual modes (Bloom et al., 2024), communication quality depends not only on technical features but also on how employees use and adapt them in everyday work (Wu et al., 2023). By capturing the quality of interpersonal communication across modes, the HRCR provides a dynamic interaction-based measure, reflecting perspectives that view richness as emerging from synchronicity, interactivity and shared communication norms (Dennis et al., 2008; Leonardi, 2011). This perspective offers a

more realistic account of hybrid conditions than earlier theories of remote or co-located work, which treated media attributes as stable and uniform (Orhan et al., 2016). This advances MRT by demonstrating empirically that communication richness emerges from interpersonal exchange practices rather than from the channels alone.

The second theoretical contribution of this study lies in integrating the extended lens of Media Richness Theory (MRT) with social capital theory. In the remote, virtual, and hybrid literature, these frameworks are typically applied separately. An exception is Choi (2019), who links media richness and social presence to bridging and bonding social capital, while Maurer et al. (2022) examine hybrid networks without MRT, which illustrates the prevailing separation. This study addresses this gap by linking communication quality to the use of personal networks. While MRT focuses on the transmission of information (Daft & Lengel, 1986), social capital emphasises the value embedded in relationships (Nahapiet & Ghoshal, 1998). Since social capital is mobilised through informal, interpersonal communication (Adler & Kwon, 2002), communication quality is not only relevant but fundamental to how it functions. The interdependence between communication quality and the mobilisation of social capital suggests that theoretically, extending MRT to include the relational consequences of communication (Dennis et al., 2008; Kock, 2005) and integrating it with the dimensions of social capital is necessary. The HRCR construct clarifies how the value of social capital for EDI depends on communication conditions, specifying when personal networks shift from being preserved for other purposes to becoming assets that can be leveraged to support IWP. This extends social capital theory by demonstrating that the contribution of personal networks to IWP is contingent on communication quality, thereby advancing understanding of when and how interpersonal connections facilitate rather than constrain EDI in hybrid contexts.

Empirically, the findings deepen our understanding of how hybrid environments reshape innovation. They reveal a contingent interplay between communication quality and social capital in driving IWP. Three specific empirical contributions arise. First, the study reframes the role of social capital in hybrid work. In contrast to prior studies reporting positive relationships between social networks and employee-driven innovation (e.g. Mohammed & Kamalanabhan, 2019a; Wang et al., 2021), this study finds that all dimensions of social capital in hybrid personal networks are negatively associated with IWP, challenging the assumption that social capital is inherently beneficial for innovation. One explanation is theoretical in nature. Prior research demonstrating positive effects has largely examined formal, task-oriented, or organisationally

embedded networks, such as teams, Communities of Practice, and online knowledge-sharing groups. In these settings, ties are explicitly geared toward collaboration, expertise exchange, and idea development (Liao et al., 2007; Wenger, 1998; Mohammed & Kamalanabhan, 2019a; Ortiz et al., 2018). By contrast, this study focuses on employees' informal personal networks, which may serve different functions. The resource generator employed in this study was designed to capture broader interpersonal work-resource ties associated with employees' daily work activities (Perry et al., 2016), reflecting the view that innovation is embedded within wider relational work systems rather than isolated innovation-specific exchanges (Jensen et al., 2007; Nahapiet & Ghoshal, 1998). Such networks are often characterised by intimacy, emotional support, and validation, alongside forms of exchange not exclusively oriented towards innovation (Granovetter, 1973; Wellman & Wortley, 1990). A second explanation relates to the study's methodology. Ego-centric network measures may capture a broader and more subjective set of relationships than those typically examined in organisational network research, potentially including ties serving a broader range of interpersonal and work-related functions beyond innovation alone. Moreover, mobilising personal networks for innovation requires not only access to contacts but also the recognition of their usefulness for innovation-related purposes (Perry-Smith & Mannucci, 2017). Employees may therefore mobilise personal ties for multiple relational and work-related purposes, not all of which are directly oriented towards innovative work performance.

Second, the findings establish the role of interpersonal communication quality in shaping IWP (De Clercq & Pereira, 2020; Renkema et al., 2021). Drawing on MRT (Daft & Lengel, 1986), the HRCR framework redefines communication quality for hybrid contexts by emphasising interpersonal dimensions often overlooked in virtual communication. The findings show that declining communication quality reduces IWP, providing empirical evidence of the direct impact of interpersonal communication on individual outcomes (Gibson & Gibbs, 2006). This extends prior research in remote and virtual settings that linked poor communication to reduced innovation (Allen et al., 2015; Orhan & Altili, 2017; Orhan et al., 2016) and reinforces the critical role of communication quality in shaping innovation within organisational contexts (Bjorklund et al., 2013; Lojeski et al., 2006), thereby strengthening the literature on employee-driven innovation.

Third, the study provides empirical evidence that interpersonal communication quality moderates the relationship between social capital and IWP. It shows that communication

conditions shape how employees draw on their personal networks, indicating that under hybrid arrangements, the effectiveness of social capital depends on the quality of interpersonal exchange. This finding contributes empirically by revealing that the benefits of social capital for innovation are contingent rather than universal, extending prior research that assumed a uniformly positive relationship (Nahapiet & Ghoshal, 1998; Zhou & George, 2001). These insights deepen understanding of how personal networks operate as dynamic resources for employee-driven innovation in hybrid working environments.

The methodological contribution of the study is the development, application and extension of the HRCR framework. The HRCR was developed to address limitations in existing Media Richness Theory (MRT) operationalisations, which largely capture the structural or technological dimensions of communication but overlook its interpersonal dynamics in hybrid work. Building on Orhan's (2014) task virtuality measure, the HRCR was designed as a relationally attuned extension that integrates employees' reliance on virtual communication with the richness and immediacy of those exchanges, producing a weighted composite ratio that reflects overall communication quality. Study 1 of this thesis established and validated the HRCR, and extends this insight into a new domain. It applies the HRCR as a context-sensitive framework to examine the contingent relationship between communication quality, social capital and IWP, advancing understanding of communication dynamics in hybrid work. The HRCR advances MRT by capturing the complexity of interpersonal communication in hybrid work environments, a context that remains underexplored (DeKay, 2012; Handke et al., 2024). This operationalisation revealed key empirical patterns, including initial negative associations with IWP and threshold effects at higher HRCR levels, showing how communication dynamics evolve in hybrid contexts and underscoring the need to move beyond MRT's traditional binary framing (e.g., face-to-face versus remote, or richness assessed only through digital channels) (Daft & Lengel, 1986). The study demonstrates the analytical utility of this extended MRT lens and positions the HRCR as a promising framework for examining social capital dynamics (Daft & Lengel, 1986; Heubeck et al., 2024). The empirical evidence shows that interpersonal communication patterns are closely tied to social capital mobilisation, with different HRCR levels influencing how employees use social resources (Zhao et al., 2022). By applying a novel MRT extension, the study illustrates the HRCR's potential as a rigorous tool for analysing communication quality in hybrid work. Existing MRT applications often overlook the unique interactional dynamics of hybrid contexts (Wu et al., 2023), a gap that the HRCR directly

addresses. With its strong theoretical grounding and empirical support, the HRCR offers a solid foundation for future methodological refinement and practical application.

5.10 Implications for Practice

The study has several implications for practice. First, it demonstrates that employees do not tend to utilise their personal network resources for IWP, redirecting them instead toward non-innovative purposes. Increased reliance on personal networks may therefore signal underlying performance challenges, prompting employees to seek psychologically safer sources of support. Organisations should therefore monitor how employees draw on personal networks, as this can reveal motivational drivers and performance issues, enabling targeted interventions that enhance outcomes.

Second, the findings suggest that lower interpersonal communication quality can increase reliance on personal networks, enhancing their value under certain hybrid conditions. As HRCR levels rise, employees may experience diminished social presence with internal colleagues, particularly those with interdependent roles, making it harder to exchange knowledge resources. HRCR 'flip points' indicate that once communication quality declines to a certain threshold, employees activate personal networks to meet knowledge resource demands. Organisations can harness this adaptive behaviour by offering training and support programmes that help employees identify and engage their personal networks effectively. This insight is particularly relevant in organisations that rely heavily on EDI, where individuals are expected to proactively identify and act on opportunities for improvement. In such environments, employees' ability to socially mobilise resources and navigate communication breakdowns can directly influence innovation capacity and competitive advantage. Supporting this process through HRCR-informed practices can therefore serve as a strategic enabler of agility and resilience.

Finally, using an extended MRT lens is also relevant in co-located settings, where employees choose between face-to-face and digital channels. Understanding such choices (e.g., face-to-face vs email) can help organisations align media use with communication needs and enable more effective mobilisation of social capital. To support this, organisations should consider regular audits of communication patterns and provide guidance on employees' media selection strategies. Robust networks may remain underutilised if mechanisms such as communication quality or relational strain are not well understood. Applying the HRCR can

help organisations monitor different forms of communication and support more strategic use of social capital across work settings.

5.11 Limitations and Future Directions

While the study provides several interesting insights, it also has a number of limitations. First, the reliance on self-report data to measure all variables raises the possibility of common method bias. In a study of this nature, there is the added risk of recall bias such as telescoping and omission, which may affect accuracy (Bell et al., 2019; Brewer, 2000). See also Bell, McAlpine and Hill (2023), who highlight the predominance of perceptual, single-source measures and call for multi-source designs in virtual and hybrid research. Future research could mitigate this by using real-time methods such as diaries or in-situ observation to capture how employees actually use networks (Clardy, 2018). In addition, the range of respondents could be extended to capture others' perceptions of individuals' innovative work performance, including immediate line managers and colleagues. Notwithstanding this limitation, efforts were made to follow established recommendations to limit the possibility of common method bias (Podsakoff, 2003; Podsakoff et al., 2012), including pilot testing the survey, providing pre-notification, assuring anonymity and confidentiality, and sending email reminders. In addition, it may be argued that self-report measures are more valid measures for most, if not all, of the study's variables, since it is the individual employee who is best placed to report on them. Indeed, there are arguments that employees' perceptions of their environment drive their behaviour more than the objective environment itself (Chan, 2009). Nevertheless, future research should include objective measures of these constructs where possible and continue to collect data from multiple sources to validate and extend the present findings.

A second limitation relates to the cross-sectional design of the study, which limits the conclusions that can be drawn regarding causal inference. While appropriate as a first step in a relatively unexplored domain, future longitudinal designs could clarify the direction of influence between communication quality, social capital and IWP (Adler & Kwon, 2002; Nahapiet & Ghoshal, 1998; Ployhart & Vandenberg, 2010). Tracking adaptation over time would capture how employees adjust their network use as hybrid conditions evolve, offering valuable insights into the dynamics of innovation (Ployhart & Vandenberg, 2010).

Third, the study was conducted with a limited sample of three companies and a relatively small sample size, which restricts the generalisation of findings across hybrid settings more

widely. This limitation is compounded by a response rate of approximately 2%, which increases the risk of non-response bias (Ployhart & Vandenberg, 2010). Nevertheless, the achieved rate can be considered comparatively robust, exceeding those typically reported in prior empirical work on social capital research which range from 8.2% to 10.2% (Carey et al., 2011; Valenzuela et al., 2009). Future research should take a broader perspective, using larger and more diverse datasets to enable cross-industry comparison and to test whether personal support and knowledge networks function consistently under similar hybrid conditions (Bliese & Ployhart, 2002; Castellani et al., 2021).

Finally, the unexpected negative associations between personal networks and innovative performance suggest that not all social resources are equally valuable. Qualitative research, such as interviews or ethnography, could uncover why favourable communication conditions sometimes fail to trigger network use, and why deteriorating conditions sometimes encourage it (Snape & Spencer, 2003). These insights could reveal hidden psychological or contextual barriers to network activation that could help organisations design more responsive strategies to support employee-driven innovation.

5.12 Conclusion

This study re-calibrates our understanding of how social resources support innovation in hybrid work by introducing the HRCR. The findings highlight that innovation in hybrid environments depends not only on who employees know but also on how and when relationships are activated. Variations in communication quality shape both access to and use of social capital, making employees' interpersonal communication experiences critical for sustaining bottom-up innovation even in low-connectivity environments. By introducing the HRCR as a new lens, the study offers organisations practical guidance for recognising when communication conditions are sufficient to unlock the value of social capital. Importantly, the findings show that once HRCR reaches moderately high levels, the negative effects of social capital shift into positive contributions to EDI, clarifying the conditions under which networks are not only accessible but also beneficial. Together, these insights provide a more nuanced framework for understanding hybrid innovation and open new pathways for research on when and how social capital becomes most valuable.

Building on these findings, the next chapter adopts a different MRT operational lens to examine how communicative conditions in hybrid environments shape employees' innovative work performance.

CHAPTER 6: STUDY 3

Employee-Driven Innovation through Knowledge Sourcing Behaviour in Hybrid Work: An Extended MRT Perspective Using Task Virtuality

6.1 Introduction

Hybrid work has weakened everyday knowledge flows and reshaped communication, creating a significant hurdle for organisations seeking to foster employee-driven innovation (EDI). This organisational model reduces opportunities for socially embedded idea exchange, intensifying the challenges organisations already face in sustaining collaboration, creativity, and knowledge sharing in today's rapidly evolving business landscape (Qureshi et al., 2018; Waizenegger et al., 2020). As a result, organisations risk disrupting the informal knowledge flows through which employees access, share, and combine expertise critical for EDI (Høyrup, 2010).

EDI refers to employees' voluntary development and implementation of new ideas beyond formal job requirements, typically emerging through the exchange of tacit insights, ideas and expertise in everyday interactions (Høyrup, 2010; Jensen et al., 2007). In this study, EDI is represented by innovative work performance (IWP), defined as proactive, change-oriented behaviours that involve anticipating, developing and implementing new approaches (Griffin et al., 2007). Within the Doing, Using and Interacting (DUI) innovation framework, IWP emerges through interaction-based learning, where employees exchange tacit knowledge in day-to-day problem solving (Jensen et al., 2007). This interaction-based learning relies fundamentally on knowledge sourcing, a key mechanism rooted in knowledge management theory that captures employees' self-initiated efforts to access advice, experience, and expertise from colleagues (Gray & Meister, 2004). These exchanges support tacit knowledge transfer and combination, which underpins creativity and problem solving (Nonaka & Takeuchi, 1995). However, in hybrid work, reduced co-presence limits access to tacit knowledge held by colleagues (Nonaka & Takeuchi, 2021; Sarker et al., 2011), making knowledge sourcing more difficult (Allen et al., 2015) and creating uncertainty about whether it can be effectively mobilised (Keppler & Leonardi, 2023). Because communication quality is central to these exchanges, media richness theory (MRT) (Daft & Lengel, 1986) provides a useful lens for understanding how the dynamics of communication shape knowledge sourcing and IWP. Task virtuality (TV), defined as the degree to which work tasks are performed through non-face-to-face interaction (Orhan, 2014),

extends this perspective by capturing variation in employees' communication modes, offering a focused basis for examining how hybrid communication conditions influence innovation.

The literature highlights a persistent gap in understanding how EDI unfolds under hybrid conditions. This gap persists despite research by Almasradi et al. (2023) and Darban (2024) that highlight the critical impact of interpersonal connections and social resources on innovation and creativity. Most previous research has focused on knowledge management in traditional, co-located settings (e.g. Jensen et al., 2007; Nonaka & Takeuchi, 1995). While it identifies knowledge sourcing as a well-established driver of innovativeness and creativity (Escribá-Carda et al., 2023; Tsai & Zheng, 2021), its contribution to EDI under hybrid conditions remains unclear. While studies have demonstrated that hybrid work can provide benefits when relational conditions such as social support are strong (Mishra & Bharti, 2023), it can also foster isolation, weaken support and reduce job satisfaction (Bartel et al., 2012; Orhan et al., 2016). These outcomes are well-established determinants of innovative behaviour (Orhan et al., 2016; Strauss et al., 2015), raising questions about the hybrid conditions that enable or constrain behaviours critical to EDI. Knowledge behaviours are shaped by communication dynamics that restrict social interaction and knowledge flow (Chen et al., 2020; Cramton, 2001), which are largely determined by the quality of interpersonal communication (Daft & Lengel, 1986; Qureshi et al., 2018). Although knowledge sourcing can occur remotely (Bissani et al., 2024), disruptions in communication richness limit access to tacit knowledge, reducing creativity and problem solving (Darban et al., 2024; Qureshi et al., 2018). Studies capturing variations in communication quality unique to hybrid settings are rare. Consequently, it remains unclear whether higher levels of TV facilitate or hinder IWP, or how they shape the effectiveness of knowledge sourcing. This ambiguity highlights the need to examine both the direct effect of TV on IWP and its potential role in shaping the relationship between knowledge sourcing and innovative outcomes.

The purpose of this study is to examine how knowledge sourcing influences employees' innovative work performance in hybrid work environments, and how task virtuality shapes this relationship. Drawing on Orhan's (2014) MRT-grounded measure of task virtuality, the investigation captures employees' reliance on virtual communication to assess how variation in communication quality affects IWP and the conditions under which knowledge sourcing is mobilised. In doing so, it addresses the following overarching research question: *How does employees' knowledge sourcing influence innovative work performance in hybrid work*

environments, and how does interpersonal communication quality, framed through task virtuality, shape this relationship? To answer this question, the study sets out to address the following three objectives: (1) To examine the direct relationship between knowledge sourcing and IWP in hybrid work environments; (2) To investigate the direct effect of task virtuality at varying levels on IWP; and (3) To evaluate the moderating role of task virtuality in the relationship between knowledge sourcing and innovative work performance.

Theoretically, the study advances research on EDI by integrating knowledge management theory with MRT to show how communication quality impacts knowledge sourcing. Empirically, the study clarifies the conditions under which knowledge sourcing enhances or constrains innovation and answers calls to investigate how individual behaviour interacts with the contextual factors of hybrid work (Zia et al., 2021). Practically, the findings provide managers with a clearer basis for designing hybrid work arrangements, allocating collaboration resources, and sustaining innovation without relying on physical co-location.

This chapter proceeds as follows. The first section defines employee-driven innovation, outlines the knowledge management framework, presents the conceptual model, and states the hypotheses. Then, the methodology, including the sample, measures and analytical approach is described, followed by an overview of the results. Finally, the study's implications, contributions and limitations are discussed.

6.2 Theoretical Framework

EDI encompasses the full innovation process, from idea initiation to implementation, and therefore the employee behaviours used to represent it must capture the full range of innovative activity. In this study, EDI is represented by the term innovative work performance (IWP), operationalised through Griffin et al.'s (2007) proactivity framework, which conceptualises proactive, action-oriented behaviour across individual, team, and organisational levels. IWP reflects the behavioural manifestation of EDI, illustrating how employees translate innovative intent into observable, self-initiated and change-oriented actions.

This study proposes that knowledge sourcing, understood as the proactive micro-behaviour of seeking advice and expertise from colleagues to generate and implement new ideas, is the central mechanism linking learning to IWP (Gray & Meister, 2004, 2006). Such innovation is socially embedded and depends on how employees acquire and apply knowledge

in everyday work (Høyrup, 2010; Jensen et al., 2007). This perspective is grounded in the Doing, Using and Interacting (DUI) framework, which views innovation as emerging from social, interaction-based learning (Jensen et al., 2007). From a Knowledge Management (KM) perspective, this mechanism is critical because EDI depends on the creation, exchange, and recombination of tacit knowledge (Alavi & Leidner, 2001; Nonaka & Takeuchi, 1995). Knowledge sourcing therefore functions as a key behavioural antecedent that enables employees to access tacit resources and enhance IWP.

The challenge of fostering IWP in hybrid environments arises from shifting communication conditions between face-to-face and virtual interaction, which directly affect the effectiveness of knowledge sourcing. To account for the realities of hybrid work, the study draws on media richness theory (MRT), which posits that the transfer of tacit, experiential knowledge requires rich communication that provides social cues, informal interaction and rapid feedback (Daft & Lengel, 1986). This communicative context is operationalised through task virtuality (TV), which reflects an employee's reliance on non-face-to-face communication. Consistent with MRT, higher levels of TV limit access to cue-rich interaction and may weaken the innovative benefits associated with knowledge sourcing (Gilson et al., 2015; Orhan & Altili, 2017; Orhan et al., 2016). This highlights communication richness as a critical condition influencing how knowledge sourcing contributes to innovation in hybrid work environments.

This integrated theoretical lens establishes that knowledge sourcing enables interaction-based learning for IWP, while communication conditions in hybrid settings, represented through TV, shape its effectiveness. The following sections argue that knowledge sourcing is a central catalyst for IWP and examine how the dynamics of communication quality in hybrid work settings shapes this relationship.

6.2.1 Knowledge Sourcing as a Catalyst for Innovative Work Performance

From a knowledge management perspective, knowledge sourcing reflects employees' proactive efforts to obtain ideas, feedback, and expertise from colleagues through informal exchange (Gray & Meister, 2004). In hybrid work environments, this behaviour is increasingly vital because communication is decentralised and information is less visible. This decentralisation requires employees to self-initiate information seeking rather than rely on co-located knowledge flows (Choudhury et al., 2021; Cramton, 2001). Consequently, organisations depend on informal, peer-based knowledge exchange across distributed contexts to sustain

learning and innovation (Borgatti & Cross, 2003; Gubbins & Dooley, 2021; van der Heijden et al., 2013).

Within the DUI model of learning, knowledge sourcing is a core interaction mechanism through which tacit knowledge is shared, co-constructed, and applied to everyday problem-solving (Høyrup, 2010). There are three pathways through which knowledge sourcing is theorised to enhance innovative work performance. The first concerns the enhancement of cognitive resources. Knowledge sourcing expands employees' resource bases by providing access to diverse tacit expertise, experiential solutions, and alternative perspectives. Because tacit insights are acquired through interpersonal interaction rather than formal training (Choi et al., 2020; Nonaka & Takeuchi, 1995), knowledge sourcing enables employees to draw on collective experience (Grant, 1996b; Gray & Meister, 2004). This provides the practical understanding essential for innovation (McInerney, 2002; Polanyi, 1966) and fosters the recombination of knowledge, supporting creativity and novel idea generation (Escribá-Carda et al., 2023; Tsai & Zheng, 2021).

The second pathway highlights how knowledge sourcing interactions strengthen employees' motivational resources by enhancing self-efficacy and supporting a mastery-approach goal orientation. Successful knowledge acquisition generates mastery experiences that reinforce feelings of competence (Bandura & Schunk, 1981), creating a strong "can-do" belief that promotes proactive goal generation and change-oriented behaviour (Crant, 2000; König et al., 2010). Empirical evidence supports this association, showing that informal learning behaviours strengthen proactive motivational states (Huang & Lai, 2020) and that sourcing relevant and credible knowledge increases self-efficacy and fosters innovative performance (Che et al., 2019). Simultaneously, knowledge sourcing supports a mastery orientation by enabling employees to deliberately acquire insights for developing competence (Janssen et al., 2004). Thus, the targeted nature of knowledge sourcing mobilises goal-driven innovative behaviour (Tornau & Frese, 2013; Wang et al., 2022), and the immediate utility of sourced knowledge is expected to enhance envisioning and planning behaviours central to innovation (Montani et al., 2014).

Finally, knowledge sourcing interactions help generate positive interpersonal climates. Consistent with the proactive motivation model (Parker et al., 2010), seeking insights builds perceptions of interpersonal proximity and belonging, meeting relatedness needs even when

physically distributed (Ryan & Deci, 2000). These relational bonds facilitate mutual support, developmental relatedness, and collaborative problem-solving (Doornbos et al., 2008), which strengthen intrinsic motivation and creativity (Amabile et al., 1996). Since knowledge sharing has been shown to support the creation, promotion, and implementation of innovations (Radaelli et al., 2014), knowledge sourcing, as a closely related behaviour, is likely to stimulate proactive engagement and thus enhance IWP. Moreover, because hybrid work can heighten isolation (Orhan et al., 2016), the interactive nature of knowledge sourcing becomes even more critical for maintaining relational connectivity that supports innovative performance. Therefore, the following hypothesis is proposed:

Hypothesis 1 (H1): Knowledge sourcing will be positively related to innovative work performance.

6.3 Innovative Work Performance in Hybrid Environments: An extended media richness theory Lens via task virtuality

This study examines the communication conditions of hybrid work using task virtuality (TV), as it effectively captures variation in employees' reliance on virtual communication (Orhan, 2014). Grounded in media richness theory (Daft & Lengel, 1986), TV reflects variation in access to cue-rich communication that underpins knowledge exchange. As MRT predicts, reduced access to non-verbal cues and spontaneous interaction limits the transfer of tacit knowledge, which is central to innovative work performance (IWP). TV is a focused measure, concentrating specifically on interaction conditions at the task level, unlike broader notions of virtuality that include structural distance or technology adoption (e.g., Costa et al., 2021; Gilson et al., 2015; Schweitzer & Duxbury, 2010). Crucially, high TV, where most work occurs through digital rather than face-to-face communication, limits spontaneous, in-person exchanges, reducing access to non-verbal cues and thus making interaction mechanisms for knowledge exchange, such as knowledge sourcing behaviours, more difficult (Kirkman & Mathieu, 2005).

Effective interpersonal communication is crucial for maintaining strong relationships, ensuring seamless coordination (Maynard et al., 2012), and enabling knowledge sourcing. Because interdependent tasks require timely, accurate exchange, variation in TV likely alters the communicative conditions under which work is performed (Handke et al., 2019; Ramirez & Zhang, 2007; Thompson, 1967). Communication quality significantly affects the ability to

access and share tacit knowledge (Polanyi, 1966; Tsoukas & Vladimirou, 2001), making it central to knowledge sourcing in hybrid settings. On this basis, the next sections examine how task virtuality (a) directly influences IWP and (b) moderates the effect of knowledge sourcing on IWP.

6.3.1 Interpersonal Communication Quality Dynamics and Innovative Work Performance in Hybrid Work

Task virtuality is proposed to exert a dual influence on innovative work performance enhancing it at moderate levels but constraining it when virtuality becomes excessive (Gajendran & Harrison, 2007; Golden & Veiga, 2005; Orhan, 2014). At moderate TV, employees retain opportunities for direct interaction while benefiting from the flexibility of mediated communication, creating distinct conditions for work and collaboration. However, when virtuality becomes high, reliance on technology and the loss of regular face-to-face contact can disrupt social connection and motivation, thereby undermining IWP.

Reductions in face-to-face interaction at moderate levels of TV are likely to enhance IWP because employees have increased autonomy, enabling them to exercise greater discretion, self-regulation, and initiative in their work. When direct supervision and constant interpersonal contact are reduced, they should also experience more freedom in how they organise and perform their tasks, a condition that tends to foster self-regulation, job satisfaction, and proactive engagement (Felstead & Henseke, 2017; Hackman & Oldham, 1980; Theurer et al., 2018; Tornau & Frese, 2013). Evidence also indicates that autonomy strengthens self-efficacy and proactive goal setting (Gajendran & Harrison, 2007; Parker et al., 2010), capacities that underpin employees' creative and innovative actions (Sia & Appu, 2015). Those with greater autonomy also tend to demonstrate enhanced discretion and self-management, creating the psychological and structural space for self-directed experimentation and idea generation (Janssen, 2000; Parker et al., 2010). This suggests that IWP is likely to be enhanced by the physical or communicative distance that hybrid working conditions afford at moderate levels of TV.

Interaction processes under moderate levels of TV are also likely to enhance IWP by supporting high-quality communication that fosters the relational conditions needed for effective collaboration. In dispersed settings, transparent, responsive, and frequent communication enables employees to maintain the relational structures that build trust, cohesion, and shared identification, thereby strengthening coordination and collaboration

(Alsharo et al., 2017; Dang et al., 2020; Hao et al., 2022; Hill & Bartol, 2016). A moderate level of TV also allows employees to leverage flexibility, while retaining crucial opportunities for face-to-face interaction. These exchanges preserve the rich, synchronous communication and informal interactions necessary for tacit knowledge sharing, creativity, and relational bonding (Almasradi et al., 2023; Bloom et al., 2024; Flocco et al., 2021; Høyrup, 2010). Employees also make deliberate efforts to sustain their relationships by periodically reconnecting with key colleagues and reactivating dormant ties to maintain strong interpersonal connections and to offset the drawbacks of technology-mediated communication (Chen et al., 2020; Darban, 2024; Robert & You, 2018; Weber & Kim, 2015). Since communication technologies enhance coordination and accessibility in hybrid contexts (Waizenegger et al., 2020; Walden & Zeng, 2024), this balance of communication modes enables employees to maintain strong relational connectivity and effective knowledge exchange. Such interaction processes at moderate levels of task virtuality are therefore likely to create an environment conducive to enhanced IWP.

Finally, moderate levels of task virtuality, through partial co-location and opportunities for high-quality, intimate communication, help feedback, coordination and guidance systems to remain intact (Almasradi et al., 2023; Bloom et al., 2024; Chen et al., 2020: Maurer et al., 2022). These conditions also sustain organisational support and role clarity, which are known to promote adaptation, engagement and performance (Baruch & Nicholson, 1997; Carillo et al., 2020; Costantini et al., 2022; Mihalca et al., 2024). These are elements that are all central to fostering proactive, change-oriented behaviour in employees (Griffin et al., 2007). Taken, together, these mechanisms suggest that IWP will be enhanced under moderate levels of task virtuality. Therefore, the following hypothesis is proposed:

Hypothesis 2 (H2): Task virtuality at low to moderate levels will be positively associated with innovative work performance.

While evidence suggests that moderate TV enhances IWP, these enabling mechanisms begin to erode as virtuality increases, due to heavier reliance on technology and reduced face-to-face interaction. This overreliance on mediated communication has been shown to harm employees' psychological, motivational and relational states (Bartel et al., 2012; Orhan et al., 2016; Robak, 2022). In such settings, employees' needs for affiliation and visibility may go unmet (Allen & Griffeth, 2001; Orhan et al., 2016; Wiesenfeld et al., 2001). Evidence from

remote work shows that this social isolation undermines job satisfaction and perceived performance (Golden & Veiga, 2008; Orhan & Altili, 2017; Wiesenfeld et al., 2001). As these effects accumulate, discretionary effort and proactive engagement decline (Bloom et al., 2015; Gomez-Baya et al., 2018; Niesen et al., 2017), reducing employees' involvement in the self-initiated behaviours that underpin innovation (Echebiri et al., 2020). These deteriorating psychological and relational conditions weaken the interaction processes of coordination, communication and knowledge sharing through which innovation typically occurs, meaning that IWP is likely to decline.

At above-average TV, the relational and communicative foundations of IWP likely become undermined. Employees primarily coordinate through technology and asynchronous communication tools such as email and instant messaging (Brinberg & Ram, 2021; van den Hooff et al., 2010; Zhang, 2010), causing interpersonal connections to diminish. As employees become increasingly dependent on digital channels and less engaged in nuanced, real-time interactions, social cohesion and trust tend to weaken, which are essential for collaboration and innovation (Kirkman & Mathieu, 2005; Orhan & Altili, 2017). While platforms like Zoom can facilitate richer exchanges (Darban, 2022), employees often default to asynchronous tools, such as email and instant messaging (Mesmer-Magnus et al., 2011), which reduces informal dialogue and makes their communication patterns resemble those of fully remote workers, weakening interpersonal connectivity (Yang et al., 2021). Moreover, when employees rely on virtual communication, shared contexts and networking opportunities diminish (Ardichvili et al., 2003). This can lead to conflict among colleagues (Morrison-Smith & Ruiz, 2020) and trigger negative emotions that hinder work performance (Dubreuil et al., 2021) - a recognised precursor to proactivity (Griffin et al., 2007; Nicholson, 1984) - which suggests that IWP should decline. According to relational turbulence theory, deficiencies in non-face-to-face communication impair employees' perceptions of their relationships (Theiss, 2019). This lack of high-quality interaction can lead to a diminished sense of organisational fit and reduced innovative behaviour (Allen et al., 2015; Gajendran & Harrison, 2007; Pudjiarti & Hutomo, 2020). Nicholson's (1984) framework of adjustment highlights that individuals will become hyper-focused on core job requirements when their work environment lacks interpersonal connectivity, implying that IWP is likely to decline. Therefore, the following hypothesis is proposed:

Hypothesis 3 (H3): Task virtuality at average to high levels will be negatively associated with innovative work performance.

The following section examines whether task virtuality moderates the relationship between knowledge sourcing and innovative work performance.

6.4 The Moderating Role of Task Virtuality in the Knowledge Sourcing and Innovative Performance Relationship

Knowledge sourcing is a central driver of innovative work performance (IWP) because it enables employees to access, integrate, and apply the knowledge of others in creative ways (Gray & Meister, 2004; Høyrup, 2010; Nonaka & Takeuchi, 1995). From a KM perspective, knowledge sourcing is the behavioural mechanism through which tacit knowledge is acquired and combined for innovation. However, its effectiveness depends on the quality of interpersonal communication and the strength of relational bonds that support knowledge exchange (Chiu et al., 2006; Ibarra, 1993; Kang et al., 2016). These conditions are reshaped in hybrid environments as interactions shift across physical and digital boundaries (Golden et al., 2008; Orhan et al., 2016; Waizenegger et al., 2020). Task virtuality captures variation between face-to-face and technology-mediated communication (Mayer et al., 2023; Orhan et al., 2014) and can arguably help identify how knowledge sourcing behaviours are affected. This section considers whether different levels of task virtuality (TV) frame the relational and communicative conditions on which knowledge sourcing depends.

6.4.1 The Moderating Effect of Task Virtuality on the relationship between Knowledge Sourcing and Innovative Work Performance

Communication quality is central to knowledge sourcing effectiveness because it is the mechanism through which relationships are formed and sustained, enabling the exchanges that fuel innovative work performance. Interpersonal communication fosters trust and relational attraction (Littlejohn & Foss, 2012), nurtures strong bonds through consistent, supportive interactions (Arroyo et al., 2014; Wasko & Faraj, 2005) and facilitates the sharing of important resources such as feedback and emotional support (Kram & Isabella, 1985; Methot et al., 2016). Because knowledge sourcing is often self-directed, the quality of these relationships can either support or hinder the flow of knowledge (Ibarra, 1993; Kang et al., 2016). Strong relational bonds encourage collaboration and insight sharing, which are vital for fostering innovative behaviours (Flocco et al., 2021; Suseno et al., 2020). Since professionals primarily rely on their relationships with colleagues and experts to learn (Schreurs et al., 2019), the quality of these ties directly determines the effectiveness of knowledge sourcing, ensuring that exchanges are

both efficient and impactful (Chiu et al., 2006; Mohammed & Kamalanabhan, 2019b). These dynamics show why conditions shaping communication quality, including different levels of task virtuality, may be critical for understanding when knowledge sourcing enhances innovative work performance (IWP). However, when task virtuality increases, the relational and communicative foundations of knowledge sourcing may become impeded. Studies on remote work show that interpersonal communication is often hindered in these settings (Golden et al., 2008). Although technology platforms such as Zoom and Skype can simulate face-to-face interactions (Lal et al., 2023), they fall short of reproducing the spontaneity and serendipitous exchanges typical of in-person interactions. Essential non-verbal cues such as handshakes, gestures, eye contact and facial expressions are also restricted in technology-mediated communication (Littlejohn & Foss, 2009; Mehrabian, 1971).

Relational turbulence theory proposes that communication difficulties can heighten relational uncertainty and undermine relationship functioning (Theiss, 2019). Without these informal exchanges that build rapport and reduce uncertainty, hybrid environments are more likely to experience relational turbulence. This turbulence can inhibit communication and hinder relationship maintenance behaviours, both of which are essential for collaboration and innovation. As evidence shows, reductions in communication richness weaken workplace dynamics, including innovation capability (Orhan & Altili, 2017) and knowledge dissemination (Luz et al., 2021). Empirical studies further highlight the decline in social interaction behaviours when interpersonal communication occurs primarily through technology. For instance, research by Yang et al. (2021) reveals that remote work settings significantly alter interpersonal communication dynamics. Specifically, they found that employee collaboration networks were more isolated, with decreased interaction between different groups or departments. Additionally, there was a notable reduction in real-time interactions, such as video calls and instant messages, accompanied by a rise in “less rich” communication methods like emails and recorded messages, which did not facilitate immediate responses. Similarly, Liu et al. (2021) conducted a quasi-experiment with 60 elementary school students and found that the transition to online learning disrupted the critical social interactions necessary for effective tacit knowledge transfer. They also found that the transition from face-to-face interactions to digital platforms disrupted person-to-person knowledge exchange, indicating that both dyadic and group knowledge sourcing processes are likely to suffer under increased task virtuality. These findings illustrate that technology-mediated communication hampers the interpersonal

interactions crucial for effective knowledge sourcing. Given that high-quality social interactions are vital for innovation (González-Pernía et al., 2015), this erosion of communication quality and relational bonds is likely to impede innovative work performance. Therefore when task virtuality increases, the weakening of these relational and communicative conditions is expected to reduce the positive effect of knowledge sourcing on IWP.

Hypothesis 4 (H4): Task virtuality will have a negative influence on the relationship between knowledge sourcing and innovative work performance.

6.4.2 Conditional Moderation: The Role of Task Virtuality Level

The relationship between knowledge sourcing and IWP in hybrid settings may vary according to different levels of TV. At moderate levels of TV, where some face-to-face interaction is maintained (Orhan et al., 2016), the positive effects of knowledge sourcing on IWP are likely to be maintained. Media richness theorists emphasise the unique relational advantages of face-to-face, co-located communication for developing and maintaining relationships and for supporting collaboration, coordination, and knowledge exchange (Alavi & Leidner, 2001; Chen et al., 2020). Relational benefits from direct interaction remain and are complemented by employees' use of digital tools. This combination provides an effective basis for knowledge sourcing, since face-to-face contact supports informal exchanges that would otherwise become impeded when technologies are used (Bell & Kozlowski, 2002; Kirkman et al., 2004).

Moreover, the relationship development over time allowed by Social Information Processing (Walther, 1992) is arguably balanced by the inherent limitations of the medium emphasised by Media Richness Theory (Mumby & Stohl, 1996). This balance has been reinforced by the growth of visual communication tools, such as videoconferencing and platforms like Zoom, which replicate aspects of in-person interaction. By synchronising communication processes and supporting informal exchanges, these technologies extend opportunities for knowledge sharing beyond co-located settings (Kirkman & Mathieu, 2005; Kirkman et al., 2004; Theiss, 2019). Qureshi et al. (2018) found that digital communication tools supported knowledge sourcing, particularly in relationships grounded in competence-based trust. When face-to-face contact with job-interdependent colleagues decreased, these tools compensated by enabling continuous and meaningful interactions that enhanced knowledge acquisition and sustained the relational connections required for effective knowledge sharing.

Keppler and Leonardi (2023), in their study of a telecommunications company using enterprise social media (Chatter), found that digital tools not only offset the decline in face-to-face contact but also created an environment that actively supported knowledge sourcing. The tools built relational confidence, strengthening employees' willingness to seek and share knowledge, and enhanced awareness of who knows what and who knows who, both essential for navigating knowledge-based relationships. While the effectiveness of such tools depends on their successful adoption and use, Wu et al. (2023) found that negative effects are likely to be mitigated when employees' ease-of-use perceptions of communication technologies are aligned. This alignment is expected in hybrid contexts, since communication norms among colleagues who work closely together tend to already be established (Lin et al., 2009; Malhotra et al., 2007). As such, advice-seeking relationships and the positive effects of knowledge sourcing are most likely to be maintained in hybrid work arrangements where such mismatches are less likely.

At extremely high levels of TV, the drastic reduction in employees' physical presence severely limits opportunities for interaction and social connectedness (Taskin & Bridoux, 2010; Thatcher & Zhu, 2006). The absence of shared physical spaces undermines workplace relationships by reducing visibility and connection (Bartel et al., 2012; Orhan et al., 2016; Wang et al., 2021). Effective interpersonal communication is crucial for fostering strong relational bonds and facilitating knowledge exchange (Baltes et al., 2002). Informal communication, such as casual conversations and friendly banter (Koch & Denner, 2022), creates an environment where employees feel comfortable sharing challenges and seeking support (Carmeli & Gittel, 2009). When such interactions are depleted, employees are less likely to exchange knowledge.

Hybrid employees exposed to high levels of TV are likely to face similar relational challenges, leading to declines in informal communication and knowledge exchange. Empirical studies highlight that remote employees exhibit decreased effort and a decline in the volume of unique information shared (Baltes et al., 2002; Mesmer-Magnus et al., 2011; Perry et al., 2016). Moreover, when individuals are "out of sight," they are often "out of mind" (Gajendran & Joshi, 2012; McCloskey & Igbaria, 2003; Orhan et al., 2016). This generates perceptual distance, where employees feel physically and psychologically disconnected from colleagues, weakening their sense of connection and reducing their likelihood of engaging in knowledge sourcing behaviours (Gajendran & Joshi, 2012; Orhan et al., 2016). Reduced visibility also makes it harder to identify colleagues with relevant expertise (Palazzolo et al., 2006) and to sustain workplace relationships (Ellström, 2010; Stoffers et al., 2020). While the adoption of "less rich"

forms of communication can potentially indicate strengthened bonds, including normative bonds (Driskell et al., 2003), it can also signal a decline in the motivation to maintain relationships (Theiss, 2019). This creates doubts about relationship quality, fosters relational turbulence, and reduces the effort employees invest in maintaining them (Blaskovich, 2008; Perry et al., 2016).

While external virtual networks, such as online professional forums and social media groups, can provide access to distributed knowledge resources (Lin et al., 2016; van den Hooff et al., 2010) and support collaboration (Orhan et al., 2016), their effectiveness largely depends on employees' proactive engagement. At exceptionally high levels of task virtuality, interpersonal exchanges decline in quality, with employees increasingly relying on asynchronous communication such as email and instant messaging (Yang et al., 2021). In these conditions, serendipitous interactions that are vital for relationship development, informal learning and innovation (Jensen et al., 2007), are unlikely to occur. Without the social glue of rich face-to-face exchanges, virtual tools risk becoming static repositories of information rather than dynamic platforms for collective problem-solving (Ardichvili, 2008). Therefore, the following hypothesis is proposed:

Hypothesis 5 (H5): Task virtuality will moderate the positive relationship between knowledge sourcing and innovative work performance, such that the relationship weakens at exceptionally high levels of virtuality.

6.5 Conceptual Model

Figure 6.1 presents the conceptual model of how knowledge sourcing behaviour impacts innovative work performance and is moderated by the level of task virtuality in hybrid working environments.

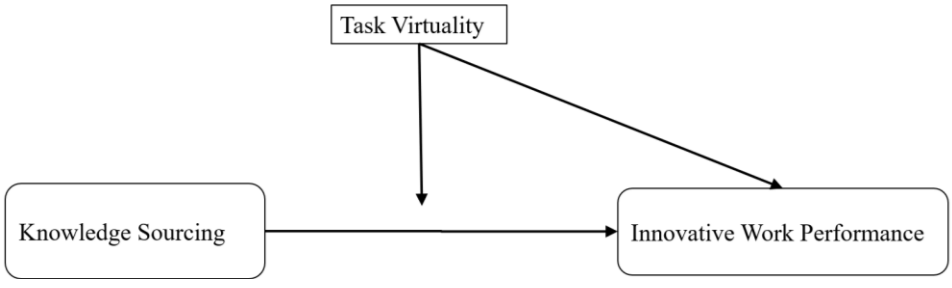


Figure 6.1 Conceptual Model (Study 3)

6.6 Methodology

6.6.1 Sample and Procedure

This study employed a two-wave, temporally separated cross-sectional design. Participants were recruited from three companies operating in different industries: Company A, a UK-headquartered multinational in the medical technology sector; Company B, a semi-state national research, advisory and teaching organisation; and Company C, an Irish telecommunications service provider.

The first wave of data collection was conducted between October and November 2022, with each organisation determining its own launch date (Company A in October 2022; Companies B and C in November 2022). During this phase, the independent variables were collected, including employees' informal support and knowledge resources from their personal networks, and descriptive information on their hybrid working arrangements.

The second wave of data collection occurred between late October 2022 and January 2023, depending on organisational scheduling constraints. Company A distributed the second survey in late October 2022, Company C did so in December 2022, and Company B launched the second survey in January 2023. This wave captured participants' work-related learning, innovative work performance (IWP) behaviours, and the relevant control variables. The staggered timing across organisations ensured meaningful temporal separation of the independent and dependent variables, thereby reducing common method bias (Jordan & Troth, 2020; Podsakoff et al., 2003). Each organisation controlled the duration for which the surveys remained open, typically allowing no less than two weeks for participation.

Based on estimates provided by organisational contacts, approximately 1,020 employees were invited to participate (Company A ≈ 30; Company B ≈ 850; Company C ≈ 140). In Wave one, 295 employees responded (29% response rate), and in Wave two, 305 employees responded (30% response rate), rates that are commonly observed for voluntary organisational surveys in management and behavioural science journals (Baruch & Holtom, 2008).

Company A granted access to its entire European division, resulting in 18 responses in the first survey (response rate of 60%) and 11 responses in the second survey (response rate of 37%) ($N_1 = 18$; $N_2 = 11$). Company B yielded 235 responses in the first survey (response rate of 28%) and 279 responses in the second survey (response rate of 33%) ($N_1 = 235$; $N_2 = 279$).

Company C provided 42 responses in the first survey (response rate of 30%) and 15 responses in the second survey (response rate of 11%) ($N_1 = 42$; $N_2 = 15$). Responses from the two waves were matched using anonymous, participant-generated identifiers, yielding a final usable sample of 102 individuals (N = 102).

Participants held diverse roles and occupied various hierarchical levels across the three organisations. In Company A, the sample included executive leaders, mid-level managers in sales, marketing and R&D, and operational engineers and specialists within its European division. In the two Ireland-based firms, participants were drawn from multiple divisions, departments and geographic locations across Ireland. The descriptive statistics for the study variables are presented in Table 6.1.

Participants were voluntarily invited to join the study and received a Plain Language Statement (PLS) that included a privacy notice explaining how their personal data would be collected, used, stored and protected during the research. They were also required to review and sign an informed consent letter outlining the study, their rights, and the data protection measures before voluntarily agreeing to participate. Importantly, they were informed of a key study requirement: that they must work away from their central office at least one day per week to ensure relevance to hybrid working conditions.

The primary data collection method was an online survey, which prioritised confidentiality through the anonymisation of personal information. All personal information and identifying labels were removed, and responses were coded to maintain anonymity. This ensured adherence to Dublin City University's ethics protocol and Irish data protection regulations, with personal data replaced by unique, auto-generated identifiers. The self-report survey was conducted in English via Qualtrics, an online platform.

Research ethics documentation, including the Plain Language Statement (PLS), privacy notice and informed consent form for each survey, are provided in Appendix B (B1 for Survey 1 and B2 for Survey 2).

Table 6.1 Descriptive Statistics for Study 3 (N=102)

Variable	Mean	Median	Median Category (Interpretation)	% in Category
Gender	1.61	2	Female	61.11%
Age Category	5.72	6	40-44 years	18.75%
Organisational Tenure	4.19	4	5-10 years	20.62%
Position Level	2.15	2	First-Line	23.76%
Education Level	4.65	5	Master's Degree	37.38%
Remote Working Days	-	2	2 days/week (Hybrid)	-
Positions ranged from entry level (47%) to first-line supervisors and managers (29%), middle management (18%) and senior management (7%).				

6.6.2 Measures

Innovative work performance (IWP): IWP was measured using three subdimensions from Griffin et al. (2007) 27-item performance scale, covering task proactivity, team proactivity and organisational proactivity (9 items). Participants rated their responses on a 5-point Likert scale ranging from "not at all" to "to a very great extent." A sample item from the task proactivity subdimension is: *"Initiated better ways of doing your core tasks."* A sample item from the team proactivity subdimension is: *"Suggested ways to make your work unit more effective."* A sample item from the organisational proactivity subdimension is: *"Made suggestions to improve the overall effectiveness of the organisation (e.g., by suggesting changes to administrative procedures)."* The measure demonstrated excellent reliability ($\alpha = 0.91$).

Knowledge sourcing: This variable was assessed using an adapted version of Gray and Meister's (2006) dyadic and group dimensions. The revised four-item measure was tailored for hybrid settings, capturing both one-to-one and one-to-many interactions in person or via technology. Responses were rated on a 7-point Likert scale (1 = strongly disagree, 7 = strongly agree). A sample item is: *"I rarely use targeted one-on-one conversations with others to acquire work-related knowledge."* The adaptation involved modifying the original scale items, which improved internal consistency; Cronbach's α increased from 0.67 for the original three-item measure to 0.76 after the addition of the fourth item.

Task virtuality: Task virtuality (TV) was assessed using the framework developed by Orhan et al. (2016). This measure captures the extent to which interdependent work is conducted without face-to-face interaction. Participants reported the percentage of interaction with key

groups (team members, coworkers, customers, suppliers, etc.) that occurred face-to-face, along with self-rated weights for the importance of each group to their role. These values ranged from 0% (fully virtual) to 100% (fully face-to-face) and were treated independently across groups. Participants also assigned interdependence weights (ω) to the same groups, indicating the extent to which their work depended on each group's input. These weights represented the full distribution of task dependency and needed to total 100% (converted to proportions summing to 1.00 for analysis). A weighted average was calculated to produce a composite TV score. As TV comprises heterogeneous indicators associated with different stakeholder groups and is therefore treated as a formative rather than a reflective construct (Orhan et al., 2016), internal consistency measures such as Cronbach's alpha are not suitable (Hair et al., 2017).

Control Variables: *Company* was included as a covariate to account for differences in culture, management practices, and policies that may shape employee experiences and perceptions (Pfeffer, 1998) and was modelled as a categorical variable using dummy coding, with Company 1 specified as the reference category. *Organisational tenure* was also controlled, as research shows it influences employees' attitudes, motivations, and innovation-related behaviours (Janssen, 2000). Tenure was classified into six categories: less than one year, 1-2 years, 2-5 years, 5-10 years, 10-15 years, and over 15 years. *Work centrality* was controlled because it is linked to intrinsic motivation, job involvement, and proactive knowledge-seeking that supports innovation (Mäkikangas, 2018; Mäkikangas et al., 2022; Parker & Ohly, 2008). Individuals with high work centrality view knowledge as integral to both their professional roles and personal identities (Hu et al., 2018; Hu et al., 2021). Accounting for this variable helped to capture relationship strength among co-workers (Tummers et al., 2013; Ziegler & Schlett, 2016) and provided a more accurate assessment of how knowledge-seeking behaviours affect innovative performance. It was measured using Bal and Kooij's (2011) 3-item scale, which assesses the extent to which individuals view work as central to their identity. Responses were rated on a 7-point Likert scale from (1) "*The most important things that happen to me involve my work"* to (7) *"I have other activities more important than my work"* (reverse coded). Reliability was acceptable (α = .79).

Survey Items can be found in appendix B (B1 for Survey 1 and B2 for Survey 2). Mathematical formulation of task virtuality is provided in Appendix A. Reliability reports are in Appendix C2.

6.7 Data Analysis Strategy

The study followed Podsakoff et al.'s (2003, 2012) guidelines to address common method variance by implementing procedural controls, such as guaranteeing anonymity and separating predictor and criterion measures within the survey. To mitigate non-response bias, the survey procedures included providing pre-notification to inform participants, and utilising reminder emails before the survey closed.

6.7.1 Measurement Model Evaluation: Model Fit, Validity, and Integrity

Confirmatory Factor Analysis (CFA) was conducted to assess the integrity of the measurement model, including convergent and discriminant validity. The CFA evaluated the fit of the model linking IWP to its latent constructs: knowledge sourcing (independent variable) and work centrality (control) (Kline, 2016). TV was excluded because its composite formula introduces measurement error and lacks self-report indicators needed for CFAMM, which also requires larger samples (Eid et al., 2003; Kline, 2016). Company affiliation and organisational tenure were excluded from the CFA because they do not measure latent constructs. Including categorical variables such as company or tenure could introduce measurement error, reduce model fit and interpretability, and compromise reliability given uneven sample sizes (Brown, 2015; Hair et al., 2010; Hurley et al., 1997; Kyriazos, 2018). Therefore, the CFA analysis maintained its focus on validating the key latent construct, ensuring the model's validity and minimising confounding effects by utilising appropriate Likert-scale measures. CFA was conducted in R (v. 4.1.2, Lavaan v. 0.6.15) on Windows 10 (x64) for a three-factor structure using the Likert-scale variables. Model fit was assessed with multiple indices. The chi-square goodness-of-fit test was significant, $\chi^2(72, N = 305) = 101.31$, $p = .013$, indicating some discrepancy between the observed and model-implied covariance matrices. However, the Comparative Fit Index (CFI = .987) and Tucker-Lewis Index (TLI = .978) both exceeded conventional cut-offs (Hu & Bentler, 1999). The Root Mean Square Error of Approximation (RMSEA = .036, 90% CI .02-.05) was below the .05 and .08 thresholds (Schumacker & Lomax, 2016). The Standardised Root Mean Square Residual (SRMR = .049) also indicated excellent fit (Hu & Bentler, 1999).

Discriminant Validity was supported, with a Fornell-Larcker criterion value of 0.895, exceeding the recommended 0.70 threshold (Fornell & Larcker, 1981) suggesting that there is clear discrimination between the indicators and their respective latent variables.

Convergent Validity was supported, with an Average Variance Extracted (AVE) of 0.534, exceeding the 0.50 threshold recommended by Fornell and Larcker (1981) and Hair et al. (2010) signifying satisfactory convergent validity.

6.7.2 Intraclass Correlation Coefficient Between Groups

Intra-Class Correlation Coefficients (ICCs) were calculated using the complete-case dataset to assess the need for multilevel modelling. ICCs estimate the proportion of variance attributable to group-level factors, in this case company membership. The ICCs for knowledge sourcing and IWP were 0.00026 and 0.00003 respectively, well below the 0.10 threshold that indicates meaningful clustering (Goldstein, 2011; Snijders et al., 2012). These results show negligible company-level effects, supporting the use of individual-level analysis.

6.7.3 POWER Analysis

Statistical power was assessed using G*Power. The sample showed strong power (0.99) for medium to high effect sizes, consistent with guidelines (Cohen, 1988; Hoenig & Heisey, 2001). Power dropped at very small effect sizes (0.19-0.22) for models with two or three independent variables. Significant beta coefficients typically ranged from $\leq$ -0.1 to $\geq$ 0.1, indicating moderate effect sizes and adequate sample power, though results at the extremes should be interpreted cautiously.

6.7.4 Data Management: Pre-Processing and Statistical Methods Employed

Data were processed and analysed in R with the packages lavaan, semTools, dplyr, tidyverse and lmtest. Preprocessing removed cases with missing data and variables that had little or no variance or were unrelated to the hypotheses. Interaction terms with continuous variables were mean centred to aid interpretation and reduce multicollinearity and composite scores for latent constructs were calculated using scale means. These steps ensured a clean and valid dataset. The mix of latent and observed variables, combined with the limited sample size (N = 102), made SEM impractical. Instead, linear regression was selected for its flexibility and interpretability in modelling interactions between knowledge sourcing and TV in determining IWP. This choice is consistent with applied research recommendations, where composite or factor scores are often used in regression to balance parsimony, interpretability and statistical power (Hayes 2018; Kline, 2016; Little, 2013). Linear regression was also preferred for its robustness in small samples, avoiding the overfitting risks of more complex SEM models (Wolf

et al., 2013). This reflects the principle of Occam's razor, favouring simpler models that yield clearer and more generalisable insights (Field, 2013). The chosen approach ultimately enhanced the reliability and validity of conclusions regarding how hybrid working conditions influence the effects of the knowledge sourcing variable.

In the full regression models, organisational membership was included as a categorical control variable and entered as a factor, with dummy (treatment) coding applied in R and Company 1 specified as the reference category. Company was omitted from the segmented analyses due to reduced sample sizes within each task virtuality range.

6.7.5 Moderation Analysis and Interpretation Strategy

Moderation was examined by interpreting the interaction between knowledge sourcing and TV in the linear regression models previously described. Following Aiken and West (1991) and Hayes (2018), interaction effects were probed using simple slopes analysis and visualised with ggplot2 to aid interpretation. The summary function in R provided the statistical significance of interaction terms, while interaction plots illustrated how the relationship between knowledge sourcing and IWP changed across levels of task virtuality.

To further explore these interactions, groupwise regression analyses were conducted to capture nuanced effects. Comparative analyses were performed by systematically varying the thresholds of task virtuality, initially comparing lower-than-average (0-50) and higher-than-average (50-100) levels, and then refining the contrast to 0-75 and 75-100. These stratified comparisons offered a structured framework for interpreting moderation effects across meaningful ranges of the moderator. This analysis strategy was applied specifically to the hypotheses that proposed moderation effects (H4-H6), enabling a detailed examination of how the relationship between knowledge sourcing and IWP changed across different levels of TV, particularly at higher virtuality levels where the strongest effects were expected.

6.8 Results

6.8.1 Correlation table

A summary of the means, standard deviations, correlations and reliabilities of the study's variables are presented in Table 6.2

Table 6.2 Correlation Table (Study 3)

	M	SD	1.	2.	3.	4.	5.	6.
1. Knowledge Sourcing	0.97	0.05	**(0.76)**					
2. Innovative Work Performance	0.63	0.14	-0.18***	**(0.91)**				
3. Task Virtuality	57.65	21.03	-0.1***	0.09*				
4. Work Centrality	0.43	0.11	-0.17***	-0.01*	-0.1	**(0.79)**		
5. Tenure (low to high)	4.19	1.88	0.06	-0.09**	0.04	0.31		
6. Company	2.10	0.41	0.2	0.1	0.04	-0.74	-0.22	

Notes: N = 102. Correlations were computed using pairwise deletion. Cronbach's alpha reliabilities are reported in parentheses. Mean (M); Standard Deviation (SD). Statistical Significance Indicators: ***p < .001, **p < .01, * p<.05 (two-tailed tests).

6.8.2 Hypothesis tests

To test the hypotheses, linear modelling (LM) was conducted using R Studio 2021.09.01, Build 372. An integrated linear model was initially adopted to address the first research question examining the impact of knowledge sourcing on innovative work performance (IWP). The moderated linear model was then adopted to investigate the moderating effect of task virtuality.

Hypothesis one (H1), which posited a positive relationship between knowledge sourcing and innovative work performance, was not supported. In the final model, knowledge sourcing was negatively associated with innovative work performance ($b = -10.02$, $p < .001$). Thus, H1 is not supported.

Hypothesis two (H2) proposed that task virtuality at low to moderate levels would be positively associated with innovative work performance. Two analyses were conducted to test this. In the first analysis (TV < 50), task virtuality showed a very small positive but non-significant association with innovative work performance ($b = 0.0185$, $p = 0.859$), providing no support for H2 in this range. However, in the second analysis (TV < 75), task virtuality was

positively and statistically significant (b = 0.0910, p < .001), supporting H2 within the low-to-moderate range. Thus, the findings provide partial support for Hypothesis 2.

Hypothesis three (H3) predicted a negative association between task virtuality at average to high levels and innovative work performance. The results indicate that task virtuality was negatively and significantly associated with innovative work performance (b = −0.28, p < .001), supporting H3.

Hypothesis four (H4) proposed that TV would negatively moderate the relationship between knowledge sourcing and IWP. However, results (see Figure 6.3) indicate a moderate, significant positive moderation effect (Effect = 0.126, $p < .001$), contrary to the proposed direction. This suggests that as task virtuality increases, the negative impact of knowledge sourcing on IWP diminishes, meaning task virtuality weakens the negative effect of knowledge sourcing. Therefore, H4 is not supported.

Hypothesis five (H5) proposed that TV would moderate the positive relationship between knowledge sourcing and IWP, such that the relationship weakens at exceptionally high levels of virtuality. Three separate analyses were conducted to test this hypothesis. The first two analyses explored the effect at low-to-moderate levels of virtuality. The analysis for the sample with a task virtuality score of less than or equal to the average (TV ≤ 50) revealed a minimal, negative, and statistically insignificant interaction effect (Effect = -0.017, p = .867). Similarly, the second analysis for the range between 50 and 75 (50 < TV < 75) also showed a minimal, negative, and statistically insignificant interaction effect (Effect = -9.99×10^{-16}, p = 0.435). Notably, the direct effect of knowledge sourcing was negative across both analyses (b = −2.97, p = .399 for the first group; b = −7.73, p < .001 for the second group); however, it reached statistical significance only in the second group. The third analysis, which tested the effect at the extreme end of the virtuality spectrum (TV ≥ 75), revealed a negative and significant interaction effect (Effect = -0.60, p < .05). This finding supports hypothesis five, as it indicates that the relationship between knowledge sourcing and IWP weakens when TV is exceptionally high. Interestingly, within this range, knowledge sourcing unexpectedly changed its directional influence from negative to positive (b = 44.93, p < .05). Additionally, the direct effect of TV was found to have a positive and significant association (b = 0.59, p < .05).

Table 6.3 presents the hierarchical (stepwise) regression analysis examining the direct effect of knowledge sourcing (H1) and the moderating role of task virtuality (H4) on innovative work performance.

A summary of the regression results for hypotheses H2, H3, and H5 across segmented levels of task virtuality is presented in Table 6.4

Table 7.3 *Hierarchical Regression Results for Innovative Work Performance* (Study 3)

Variable	Model 1	Model 2	Model 3
Controls			
Company 2	−0.180 (0.097)	−0.684 (0.208) **	0.381 (0.289)
Company 3	0.204 (0.110)	0.069 (0.117)	0.429 (0.128) **
Work Centrality	1.164 (0.313) ***	2.484 (0.575) ***	−0.140 (0.749)
Organisational Tenure	−0.004 (0.007)	−0.005 (0.007)	−0.004 (0.006)
Main Effects			
Knowledge Sourcing (KS)	—	1.566 (0.573) **	−10.019 (2.475) ***
Task Virtuality (TV)	—	0.001 (0.001)	−0.124 (0.026) ***
Interaction			
KS × TV	—	—	0.126 (0.026) ***
Model Statistics			
R^2	.165	.232	.391
ΔR^2	.165		
F	4.45 **	4.43 ***	8.07 ***

Note. Unstandardized coefficients (b) are reported with standard errors in parentheses. Reference category for Company = Company 1. $p < .05$*, $p < .01$**, $p < .001$***.

Table 8.4 *Linear regression results across segmented levels of task virtuality* (Study 3)

H	Range (TV)	KS, B (SE)	TV, B (SE)	KS × TV, B (SE)	R^2	Adj. R^2	F
H2	TV < 50	−2.97 (3.46)	0.02 (0.10)	−0.02 (0.10)	.642	.564	F(5, 23) = 8.24***
	TV < 75	−1.20 (1.01)	0.09 (0.02)***	−0.09 (0.02)***	.787	.770	F(5, 62) = 45.79***
H3	50 ≤ TV ≤ 100	−21.36 (4.47)***	−0.28 (0.06)***	0.29 (0.06)***	.282	.223	F(5, 60) = 4.72**
H5	TV < 50	−2.97 (3.46)	0.02 (0.10)	−0.02 (0.10)	.642	.564	F(5, 23) = 8.24***
	50 ≤ TV < 75	−7.73 (0.00)***	9.570e-16 (1.240e-15)	-9.986e-16 (1.263e-15)	1.000	1.000	F(5, 33) = 1.38 × 10^{29}***
	TV ≥ 75	44.93 (17.30)*	0.59 (0.23)*	−0.60 (0.23)*	.339	.182	F(5, 21) = 2.15

Note: Hypothesis (H); Knowledge sourcing (KS); Innovative work performance (IWP); Task virtuality (TV). Unstandardized coefficient (B); Standard error (SE); F-statistic (F); Coefficient of determination (R^2); Adjusted R-squared (Adj. R^2); KS × TV represents the interaction effect. Coefficients for KS and TV represent main (direct) effects. Company was omitted from the segmented regression analyses due to reduced sample sizes within each task virtuality range. $p < .05$*, $p < .01$**, $p < .001$***.

Figure 6.2 presents the general interaction effect of TV on IWP at low and high levels (H4). Figure 6.3 presents the interaction effect of task virtuality on innovative work performance at above-average levels (H5). In this analysis, the 'low' category corresponds to task virtuality between 50 and 75, while the 'high' category represents values ≥ 75. Figure 6.4 shows the results of the moderation model, illustrating the combined effect of TV and knowledge sourcing on IWP.

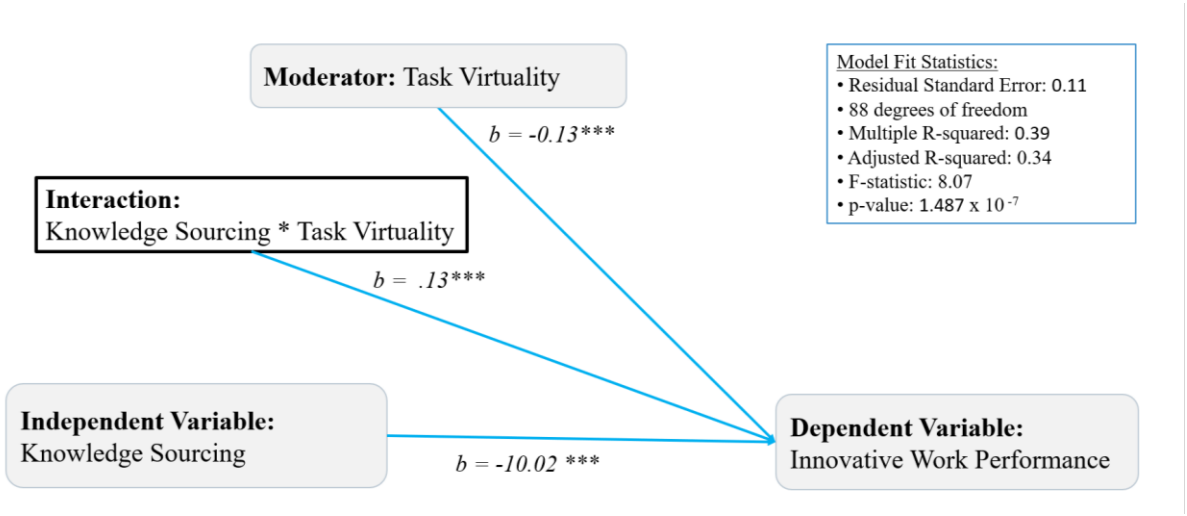


Figure 6.2 Moderated Regression Model (Study 3)

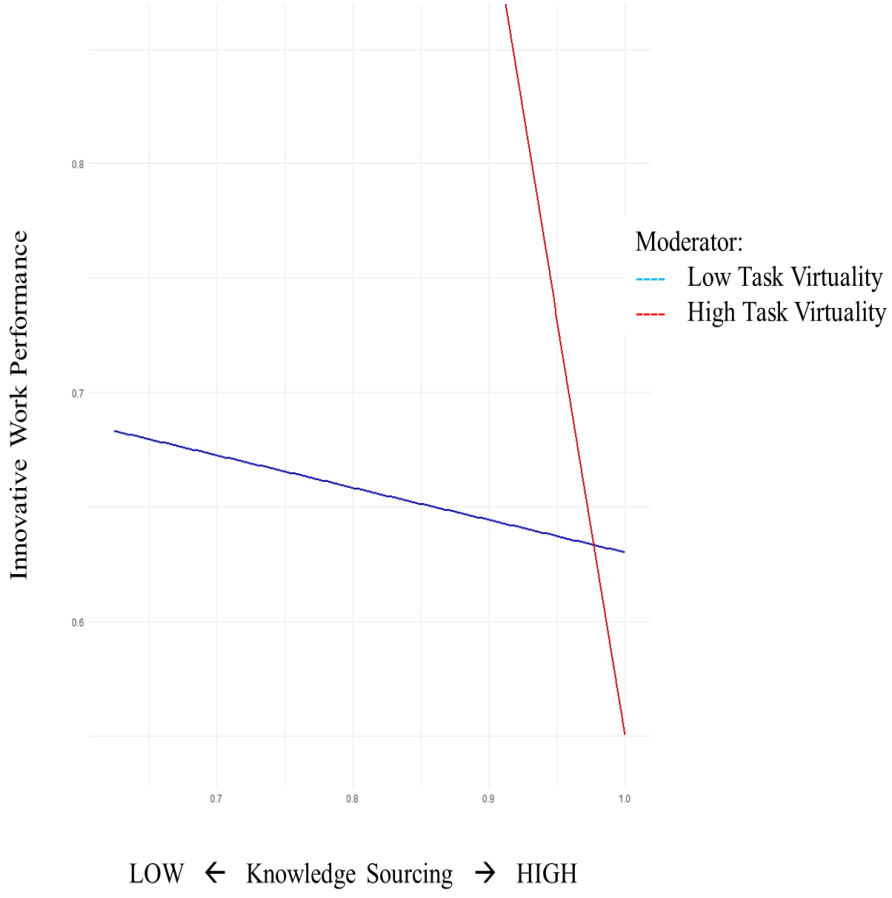


Figure 6.3 Interaction between Knowledge Sourcing and Innovative Work Performance at Low and High Levels of Task Virtuality (plot)

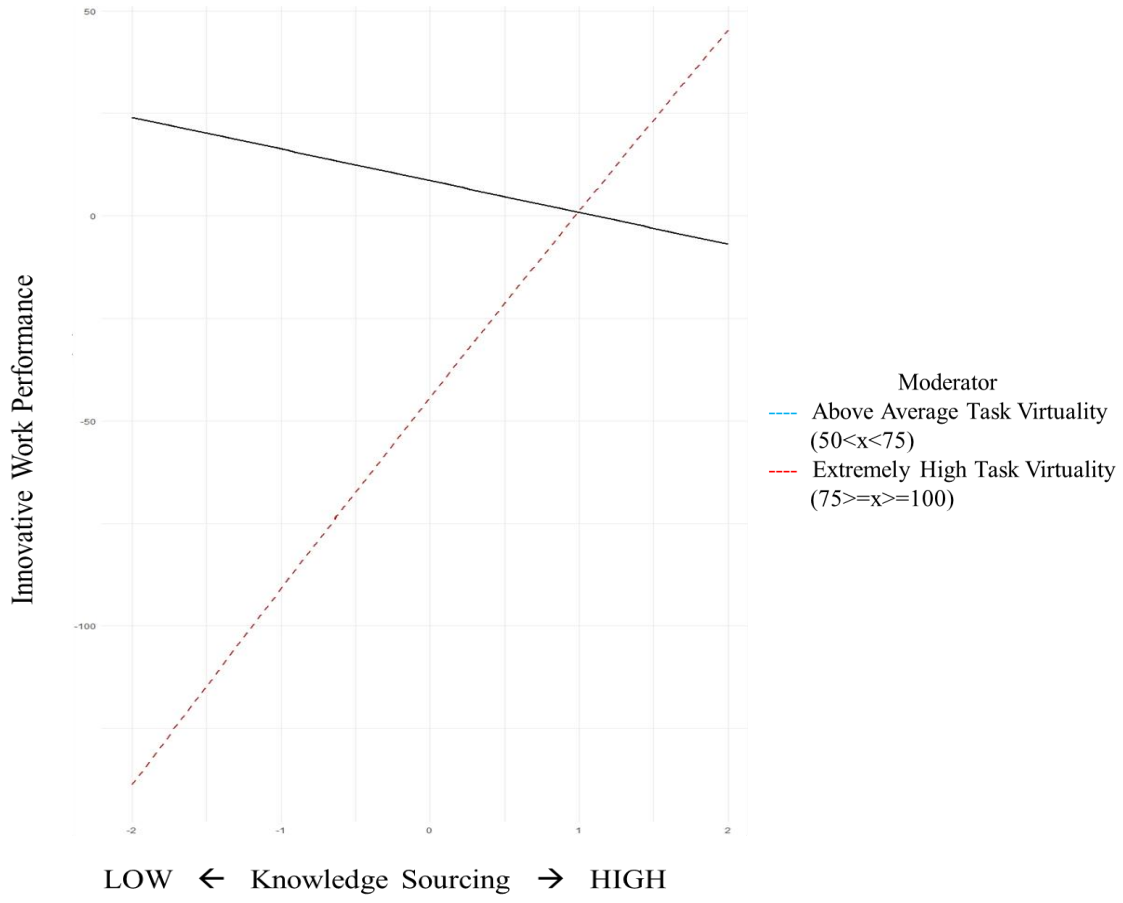


Figure 6.4 Interactions between Knowledge sourcing and task virtuality on innovative work performance at above average levels (plot)

The findings are discussed in the following section.

6.9 Discussion

6.9.1 Summary of the main findings

The findings of this study offer important insights into the dynamic relationship between knowledge sourcing, task virtuality (TV), and innovative work performance (IWP). The results showed that knowledge sourcing was significantly and negatively associated with IWP, with this relationship varying depending on task virtuality. This stands in contrast to prior research, which generally portrays knowledge sourcing as a driver of creativity and performance (e.g., Hsu & Chou, 2009; Kanawattanachai & Yoo, 2007). Instead, this study aligns with work highlighting how knowledge sharing can sometimes hinder rather than support performance, particularly when knowledge is complex, difficult to integrate, or produces a cognitive burden (Ahmad & Karim, 2019; Durcikova et al., 2011). These findings indicate that the benefits assumed in the theoretical model were not realised in this sample, suggesting that the relationship between knowledge sourcing and innovative work performance is more context-dependent than previously assumed.

The study found partial support for a positive direct effect of task virtuality (TV) on innovative work performance (IWP) at low to moderate levels. While no significant relationship was observed at very low levels of TV, a small but statistically significant positive effect emerged when the range was extended (TV < 75). This suggests that the benefits of task virtuality for innovative work performance begin to materialise at moderate levels. This finding is consistent with prior evidence suggesting that moderate levels of virtuality can create a balance between flexibility and opportunities for rich communication, enabling informal exchanges, autonomy, and proactive change-oriented action behaviours that facilitate EDI (Felstead & Henseke, 2017; Flocco et al., 2021; Gajendran & Harrison, 2007). However, this co-occurred with a persistent negative influence of knowledge sourcing, suggesting that it was not functioning as an effective mechanism for IWP at these levels of TV. Moreover, at average to high levels of TV, the direct effect, while negative, was non-significant indicating that higher TV did not directly hinder IWP in this sample. This outcome contrasts with prior research proposing that higher TV should hinder performance due to loss of social connection, reduced communication richness and weakened interpersonal ties (Allen & Griffeth, 2001; Orhan et al., 2016; Wiesenfeld et al., 2001).

In exploring the interaction between TV and knowledge sourcing, the analysis revealed an unexpected positive interaction effect, contrary to initial expectations. TV generally weakened, rather than intensified, the negative association between knowledge sourcing and IWP. At below average levels, the interaction effect was minimal and non-significant, and the direct effect of knowledge sourcing was negative. As task virtuality increased from low to moderate levels however, the interaction remained negative and became statistically significant. At very high levels of TV, a significant negative interaction effect emerged. Under these conditions, the direct effect of task virtuality was positive and significant, and knowledge sourcing shifted from having a negative to a positive influence. These findings contrast with prior research showing that high TV restricts spontaneous interaction and weakens the relational foundations needed for effective knowledge exchange (Golden et al., 2008; Orhan et al., 2016; Yang et al., 2021; Zheyu et al., 2021). Since the negative relationship between knowledge sourcing and IWP weakened and ultimately reversed as task virtuality increased, this suggests a complex interaction dynamic where the value of knowledge sourcing depends on the communication conditions surrounding it.

This reversal in the direction of the knowledge sourcing effect on IWP may be explained by Hung et al. (2020), who demonstrated that cognitive proximity could increase as teams adapt to high-virtuality environments by refining their communication processes and the use of collaborative tools. As cognitive proximity improved, team members developed shared understanding and greater ease in knowledge exchange, which in turn enhanced collaboration and innovation. This adaptation suggests that employee knowledge sourcing behaviour evolves, shifting from a resource-depleting burden (observed in the lower virtuality ranges) to a proactive and efficient knowledge sharing mechanism. This progression is further supported by Hsu and Chou (2009) and Kanawattanachai and Yoo (2007), who emphasise that as teams mature, task-oriented communication develops into more effective task-knowledge coordination that drives performance. The observed shift, where knowledge sourcing changed from negative to positive at very high levels of task virtuality, reflects employees' adaptation and increased effectiveness in virtual settings. Kock and Lynn (2012) and Wu et al. (2023) add to this perspective by highlighting how virtual teams behaviourally refine their communication strategies over time, overcoming initial barriers and perceptual misalignments to become more proficient at managing and directing the processes of knowledge exchange. Ultimately, the pattern of findings suggests that constraints on effective knowledge sourcing in hybrid work are not fixed;

they appear to be contingent on communication conditions of the employees hybrid arrangement.

6.9.2 Contribution

This study makes three contributions. *Theoretically,* it advances Knowledge Management (KM) theory by integrating it with Media Richness Theory (MRT). Prior KM research has tended to assume that knowledge sourcing is uniformly beneficial because it facilitates access to tacit knowledge through informal interpersonal interaction (Alavi & Leidner, 2001; Davenport & Prusak, 1998; Nonaka & Takeuchi, 1995). However, this perspective overlooks how communication conditions in hybrid environments may constrain or enable informal knowledge exchange (Gray & Meister, 2004; Wang & Noe, 2010). When communication is technologically mediated, the relational foundations of knowledge sourcing are often undermined. This occurs when reduced co-presence introduces the "mutual knowledge problem," in which interdependent colleagues lack full awareness of others' knowledge and assumptions (Cramton, 2001), or when it triggers counterproductive behaviours such as knowledge hiding (Cidade et al., 2022; Rudawska, 2023). Variation in communication quality therefore shapes the effectiveness of knowledge sourcing in hybrid settings. Unlike traditional MRT assumptions that equate high virtuality with poor communication, the results indicate that communication technology can, under certain conditions, substitute for face-to-face interaction by providing social cues, synchronous exchange and relational visibility (e.g., Keppler & Leonardi, 2023; Qureshi et al., 2018). The results reveal a non-linear relationship in which knowledge sourcing is on average negatively associated with IWP. However, this effect weakens as face-to-face communication declines. Moreover, a critical threshold emerges at very high levels of TV(approximately 75 per cent), where knowledge sourcing is associated with positive contributions to IWP. This clarifies that knowledge sourcing is not universally beneficial; its value depends on interpersonal communication quality in hybrid contexts.

The second *theoretical* contribution lies in the extension of MRT to hybrid environments by operationalising communication quality through TV. While MRT emphasises channel-task fit (Daft & Lengel, 1986), it has rarely been applied to contexts where face-to-face and digital interactions coexist. Prior studies of hybrid work have offered valuable insights into structural arrangements and formal coordination mechanisms (Lauring et al., 2022; Stray & Moe, 2020), as well as into the relational conditions that support innovation (Hill & Bartol, 2016; Høyrup,

2010). Hybrid communication fragments social cues and reduces immediacy and visibility, constraining relational processes and weakening opportunities for tacit knowledge sharing and informal collaboration, both critical for EDI (Cidade et al., 2022; Keppler & Leonardi, 2023; Maznevski & Chudoba, 2000; Qureshi et al., 2018). Dispersion-focused MRT perspectives often treat media features as fixed determinants, overlooking how employees negotiate blended, adaptive communication patterns across synchronous and asynchronous, co-located and remote modes. This limits MRT's ability to explain the relational, context-sensitive communication practices that underpin tacit knowledge sharing and innovation in hybrid environments (Leonardi, 2021; Rico et al., 2011; Wang et al., 2024). Communication effects are not properties of media alone but also reflect behavioural responses to changing levels of face-to-face interaction. The pattern is non-linear with IWP improving at very high levels of TV because digital tools are adopted as compensatory mechanisms that restore interpersonal communication and relational connectivity (Keppler & Leonardi, 2023; Qureshi et al., 2018). Communication quality in hybrid environments is therefore dynamic and socially constructed rather than technologically predetermined, extending MRT by demonstrating that media fit emerges from adaptive communication behaviour.

Finally, the *empirical* contribution lies in demonstrating that knowledge sourcing enhances IWP only under specific communication conditions in hybrid environments. Contrary to the prevailing assumption that knowledge sourcing consistently improves innovation (Alavi & Leidner, 2001; Davenport & Prusak, 1998; Nonaka & Takeuchi, 1995), a non-linear and contingent relationship exists between knowledge sourcing and IWP in hybrid settings. The effects of knowledge sourcing depend critically on the level of TV. At low to moderate levels of TV, hybrid employees do not appear to mobilise knowledge sourcing for innovative behaviour, which explains why expected positive outcomes fail to materialise (Høyrup, 2010; Kesting & Ulhøi, 2010). These findings challenge the prevailing view that knowledge sourcing is universally beneficial (Gray & Meister, 2006). Reduced face-to-face communication is often associated with weaker relationships and isolation (Furumo, 2009; Orhan & Altili, 2017; Pillis & Furumo, 2007), and this is reinforced by the negative and statistically significant association between task virtuality and IWP at average to high levels. A tipping point however emerges at very high TV, where knowledge sourcing shifts from a negative to a positive association with IWP. This shift reflects intensified engagement in knowledge sourcing when face-to-face interaction becomes minimal and employees rely more heavily on digital tools that support

relational visibility and interpersonal communication (Bjorklund et al., 2013; Lojeski et al., 2006). These insights extend the literature on EDI by showing that the impact of TV on IWP is context-dependent and that hybrid arrangements can facilitate the knowledge acquisition necessary for EDI (Renkema et al., 2021).

6.10 Implications for Practice

The study's findings provide practical guidance for organisations seeking to optimise innovative performance in hybrid work models. The relationship between knowledge sourcing and innovative work performance (IWP) is not uniform but contingent on the level of task virtuality (TV), requiring careful management of both interpersonal and psychological factors. For roles with high job interdependence, face-to-face interaction remains critical, and managers should intentionally schedule in-person collaboration, such as team meetings, to facilitate rich knowledge exchanges that strengthen IWP. At the same time, reductions in face-to-face contact should not only be viewed as a barrier. High task virtuality can provide a context that, if managed appropriately, fosters innovative work performance. For example, virtual work can reduce "relational noise" and promote more structured, intentional exchanges (Banbury & Berry, 2005; Mortensen & Hinds, 2001). Additionally, while hybrid workers may communicate less frequently, they can engage in more task-focused and efficient interactions when working virtually. In this regard, employees may at times benefit from more streamlined, job-relevant interactions, which can make knowledge sourcing more purposeful and closely tied to IWP.

When formulating work policies that allow employees to operate at high TV levels, managers should proceed with caution. TV, when combined with social isolation can undermine outcomes. Thus, organisations will need to ensure that hybrid workers are well-adjusted in their work roles. Negative dynamics such as abusive leadership, ostracism, lack of support, or overly rigid structures may stifle creativity and restrict knowledge sharing . Leaders must therefore remain attentive to employees' psychological well-being and workplace conditions to ensure that knowledge sourcing continues to enhance rather than hinder EDI. This can be achieved through extensive socialisation activities when employees first join, followed by extensive efforts to ensure that employees continue to feel involved and connected to co-workers through social activities organised both within and outside the organisation.

It may also be achieved by fostering flexible structures that encourage experimentation, discretion, and autonomy in problem-solving. Such conditions support employees' willingness to take risks, strengthening the "can do" and "reason to" motivational pathways outlined in the proactive goals model (Parker et al., 2010). By balancing flexibility with oversight, leaders can ensure that high task virtuality is channelled toward innovation rather than becoming a barrier to it.

6.11 Limitations and Future Directions

Several limitations should be considered when interpreting the findings of this study. First, the study's sample size of 102 participants is relatively small, though similar research using comparable or smaller samples has been identified. For example, Keppler and Leonardi's (2023) study had 78 participants, Mazzei et al.'s (2023) study had 109, Rebelo et al. (2024) considered 167, and Rahman et al. (2018) had 150. These studies indicate that sample sizes between 100 and 150 employees are common and can yield valuable insights. However, some organisational subsamples were particularly small, which limits the extent to which those responses can be considered representative of the wider organisational populations. Consequently, the results should be interpreted with caution. Replicating the findings with a larger sample would enhance reliability and generalisability (Cohen, 1992), and would strengthen theoretical insights into knowledge management, particularly regarding the impact of knowledge sourcing on IWP across varying levels of TV.

A second limitation relates to the potential for common method bias. Although this study followed the recommendations of Podsakoff et al. (2003) which included anonymity, confidentiality assurances, and pilot testing, it also employed a two-wave, time-separated design. Temporal separation of the independent and dependent variables was carried out following the suggestions of Podsakoff et al. (2012). Confirmatory factor analysis also supported clear discriminant validity between constructs. However, because all measures were self-reported, common method bias cannot be fully eliminated. Indeed, some research indicates that subjective and objective measures of organisational performance are positively associated, and have equivalent relationships, with a range of independent variables (Conway & Lance, 2010). Future research could use supervisor ratings, peer assessments, or objective performance

indicators to address this issue where possible. Multiple time points, or multi-source data collection would also help to reduce shared method.

Additionally, the model's adjusted R^2 value of 0.353 indicates that about 35 percent of the variability in IWP is explained. While this falls within the acceptable range (0.1 to 0.5) as per Ozili (2023), other factors which are related to knowledge sourcing and IWP may be relevant. Future research should therefore include additional determinants or moderators, such as autonomy (Theurer et al., 2018), job control (Janssen, 2000), or supervisor feedback (Zia et al., 2021), to improve explanatory power and provide a more comprehensive view of knowledge sourcing dynamics affecting EDI.

Finally, the study conceptualises communication quality primarily in terms of face-to-face physical co-location, using TV to examine how variations in co-location affect social interaction and knowledge exchange (Bartel et al., 2012; Carmody et al., 2022). It does not fully capture the role of technology-mediated communication, which is increasingly central to hybrid work, despite the growing significance of information technology and computer-mediated communication (Suh et al., 2011). Technologies now enable visual interactions that simulate face-to-face exchanges, but less immersive mediums may reduce informal communication and synchronicity (Bell & Kozlowski, 2002; Kirkman et al., 2004). Differences in the informational value and synchronicity of digital communication (Kirkman & Mathieu, 2005; Theiss, 2019) may impact social interaction and, consequently, the dynamics of knowledge sourcing. Some evidence even suggests that technologies with lower communication richness can support the maintenance of strong ties, activate weak or latent ties, and foster relational closeness and social capital at levels comparable to face-to-face interaction (Ellison et al., 2007; Haythornthwaite, 2002). Without examining technology, it remains unclear whether platforms that enable rich, synchronous exchanges (e.g., video calls) versus lean, asynchronous tools (e.g., email, messaging apps) influence how employees seek and share knowledge. By not fully accounting for technology-mediated communication, this study risks overstating the importance of physical co-location while underestimating the ways communication technologies shape EDI in hybrid environments. Future research should incorporate the role of technology-mediated interpersonal communication to examine how it shapes knowledge sourcing dynamics. This approach will offer a clearer understanding of how EDI is impacted in hybrid work environments.

6.12 Conclusion

This study demonstrates that the influence of knowledge sourcing on innovative work performance (IWP) depends critically on the level of task virtuality (TV). Drawing on media richness theory (MRT), this work establishes that TV acts as a crucial boundary condition shaping how communication quality impacts IWP. Through this lens, the link between knowledge sourcing and IWP proves more complex than typically assumed. Rather than consistently promoting IWP, overall, knowledge sourcing was found to be negatively related to IWP, a finding contrary to expectations and consistent with prior evidence that knowledge behaviours can have mixed outcomes depending on context. However, as TV increased, this negative relationship weakened and eventually reversed. At very high levels of virtuality, knowledge sourcing became a positive contributor to IWP, indicating that employees adapt their communication practices and use technology to exchange knowledge more effectively. These findings challenge the assumption that reduced face-to-face contact is inherently harmful to EDI. Practically, organisations should calibrate hybrid arrangements by ensuring rich, co-present collaboration when interdependence is high, while also recognising that high-virtuality settings can sustain innovation when communication routines are well managed.

These findings deepen understanding of how hybrid communication conditions shape EDI and complement the preceding studies. The next chapter brings together the contributions of all three studies, highlighting how communication dynamics unfold in hybrid environments.

CHAPTER 7: DISCUSSON AND CONCLUSIONS

7.1 Introduction

As organisations increasingly adopt hybrid models blending physical and virtual collaboration, they face new barriers to the spontaneous, informal exchanges that underpin EDI (Keppler & Leonardi, 2023; Van Dijcke et al., 2024). Specifically, greater reliance on digital and asynchronous communication fragments interaction and limits the exchange of tacit knowledge (Gibbs et al., 2024; Mesmer-Magnus et al., 2011). Inconsistent physical presence and reduced visibility foster social isolation, weaken trust, and erode the relational foundations essential for knowledge sharing (Mazzei et al., 2023; van Zoonen et al., 2024). Collectively, these dynamics undermine the relational and communicative foundations of EDI, particularly the mobilisation of social capital and knowledge sourcing (Høyrup, 2010; Wu et al., 2023).

Despite these challenges within hybrid work, limited research has conceptually clarified how the quality of interpersonal communication operates to either support or undermine EDI in such settings (Waizenegger et al., 2020). The thesis therefore asked the following research question: *How do hybrid environments shape employee-driven innovation (EDI) directly and indirectly, through social capital mobilisation (structural, relational, cognitive) and employees' knowledge sourcing behaviours?* To investigate this question, a scoping review and three empirical studies were conducted. While it is often assumed that hybrid work arrangements and access to knowledge resources have a consistently positive effect on EDI, the findings reveal a more nuanced reality where their influence is both direct and, at times, counterintuitive. This chapter synthesises and discusses these findings and their implications. It deepens understanding of the interpersonal and relational dynamics in hybrid settings and the conditions that shape the use of social capital and knowledge sourcing for EDI. In doing so, it outlines the overall theoretical and practical contributions of the research, acknowledges its limitations, and presents directions for future study.

7.2 Synthesis of Findings

The scoping review (Chapter 2) identified media richness theory (MRT) as a valuable framework for examining communication quality in hybrid work contexts. However, its established extensions, including structural-modality, technology-mediated communication and dispersion-separation lenses, were found to have limited explanatory power because they

underplay the interpersonal and context-sensitive dynamics that drive EDI (Choi, 2019; Daft & Lengel, 1986; Wang et al., 2024a). Task virtuality has been identified as a behaviourally grounded construct that captures the dynamic nature of communication in hybrid contexts (Orhan et al., 2016), but its full potential for capturing these dynamics remained unclear. This limitation prompted the development of the Hybrid Relational Communication Ratio (HRCR), a novel extension and operationalisation of MRT that aimed to capture the communicative and interpersonal conditions of hybrid work. The measure combined task virtuality (Orhan et al., 2016) with the quality of communication across media (Kirkman & Mathieu, 2005), providing a more comprehensive account of hybrid communication.

The scoping review also identified the potential to integrate MRT with interpersonal mechanisms of interaction central to DUI learning, specifically social capital mobilisation and knowledge sourcing (Choi, 2019; Wang et al., 2024). Prior research typically assumes that these mechanisms of social capital mobilisation and knowledge sourcing behaviour support EDI by enabling knowledge exchange, trust and shared understanding (Nahapiet & Ghoshal, 1998; Nonaka & Takeuchi, 1995). However, evidence also shows that the effectiveness of these behaviours depends on the quality of communication through which they occur (Cramton, 2001; Kirkman & Mathieu, 2005; Orhan et al., 2016). This insight informed the design of Studies 2 and 3, which investigated whether hybrid communication conditions determine when social capital mobilisation and knowledge sourcing enhance innovative work performance (IWP).

Study 1 introduced HRCR and compared it with other MRT-informed operationalisations including Remote Intensity (RI), Digital Information Communication Quality (DICQ) and task virtuality (TV). HRCR accounted for the largest proportion of variance in shared language, trust and network diversity, whereas RI and DICQ explained little variance. This reinforces the argument that structural or media-based MRT operationalisations fail to capture the complex dynamics of hybrid communication (Daft & Lengel, 1986; Dennis et al., 2008; Treviño et al., 1987). Although the effects of TV were marginal, its conceptual role in the structural foundation of HRCR supported its continued theoretical relevance. These findings established HRCR and TV as suitable moderators of interpersonal mechanisms in hybrid settings.

Study 2 tested whether HRCR conditioned the relationship between social capital mobilisation and IWP. Across shared language, trust and knowledge resources, social capital

mobilisation had a negative direct association with IWP, suggesting that it is not inherently beneficial for IWP. However, HRCR reduced and ultimately reversed this negative relationship at identified Johnson-Neyman thresholds. This demonstrates that the value of social capital for IWP depends on the quality of hybrid interpersonal communication.

Study 3 examined task virtuality as a second MRT-based operationalisation, representing the communication quality conditions that shape knowledge sourcing and IWP. Knowledge sourcing was negatively associated with IWP on average, challenging the assumption that it is uniformly beneficial (Davenport & Prusak, 1998; Nonaka & Takeuchi, 1995). The direct effect of task virtuality (TV) on IWP varied across levels of TV. While no significant relationship was observed at very low levels, a significant positive effect emerged at moderate levels, suggesting that some degree of task virtuality may support innovative work. TV also showed a positive moderating effect on the relationship between knowledge sourcing and IWP, weakening its negative impact. At very high levels of task virtuality, this relationship became positive, indicating that high levels of technology-mediated communication do not necessarily undermine IWP. Under such conditions, knowledge sourcing can become a productive driver of IWP.

Across the three studies, the empirical results consistently showed that interpersonal communication quality conditions both the mobilisation of social capital and knowledge sourcing and IWP in hybrid work. The research revealed contrasting direct effects in the relationship between hybrid communication and innovative work performance. Specifically, the measure of overall interpersonal communication quality (HRCR) was found to be negatively associated with IWP, but the extent of virtual interaction (task virtuality) showed a small positive association with IWP. This indicates that virtual interaction itself is not inherently detrimental to EDI, and that what matters most is the overall quality of exchanges across modes.

The research also identified critical contingent effects, establishing that the mobilisation of social capital and knowledge sourcing for IWP is highly dependent on communication conditions. HRCR and task virtuality acted as boundary conditions, mitigating negative main effects. HRCR turned the negative association between social capital and IWP to a positive one once the richness thresholds were surpassed, while TV offset the negative effect of knowledge sourcing at very high levels of TV. These results challenge the view that virtuality inevitably undermines EDI and align with Heubeck et al. (2024), who show that outcomes hinge on

mediating communication conditions such as social capital. They also demonstrate that employees mobilise social capital and knowledge sourcing adaptively in response to prevailing hybrid communication conditions.

7.3 Research Contributions

This section synthesises the findings of the three empirical studies to advance theoretical and empirical understanding of communication, social dynamics, and innovation in hybrid work environments. By integrating and comparing results across multiple methodological approaches and theoretical lenses, the thesis provides a set of coherent contributions to scholarship on media richness, social capital, knowledge sourcing, and employee-driven innovation (EDI). Four core contributions emerge.

The *first* theoretical contribution lies in the reconceptualisation of media richness theory (MRT). The research shifts the analytical focus from static media properties (Daft & Lengel, 1986; Marques-Quinteiro et al., 2022) toward a dynamic, human-centred understanding of communication quality (Leonardi, 2021; Orhan, 2014). Rather than treating richness as an inherent property of a medium, the thesis views communication quality through the lens of interpersonal interactions through which employees collaborate within hybrid environments (Keppler & Leonardi, 2023; Maznevski & Chudoba, 2000; Qureshi et al., 2018). This reconceptualisation was operationalised by using task virtuality (Orhan et al., 2016) and building on it to develop and operationalise the Hybrid Relational Communication Ratio (HRCR). Together, these operationalisations offer a more sensitive way to analyse how hybrid configurations shape interpersonal communication. Across the studies, these measures explained variation in interpersonal conditions and their impact on social capital mobilisation and knowledge sourcing.

The *second* theoretical contribution is the development of a context-sensitive framework for employee-driven innovation (EDI). The thesis integrates MRT with social capital theory and knowledge management theory to model when knowledge resources support IWP under hybrid conditions. Within this framework, social capital and knowledge sourcing are positioned as context-dependent mechanisms whose value depends on the quality of interpersonal communication, which shapes the mobilisation of knowledge resources and subsequently impacts IWP. HRCR and TV function as mechanisms communication quality for the purposes of IWP. The findings demonstrate, theoretically and empirically, that the quality and

nature of hybrid communication can either enable or constrain EDI (Cadeddu et al., 2023; Yang et al., 2021). By showing how hybrid work introduces vulnerabilities in interpersonal communication (Yang et al., 2021), the framework explains how employees mobilise social capital and engage in knowledge sourcing to sustain innovative performance. These insights refine both social capital theory and knowledge management theory by demonstrating that the mobilisation of social and knowledge resources depends fundamentally on interpersonal communication conditions.

The *third* contribution challenges the long-standing assumption that informal interpersonal networks and knowledge sourcing behaviours are uniformly beneficial. In the social capital tradition, strong and diverse networks have been portrayed as inherently enabling creativity and idea generation (e.g., Nahapiet & Ghoshal, 1998; Ortiz et al., 2018). Similarly, knowledge sourcing and informal advice-seeking are typically presented as constructive (Cross & Parker, 2004; Davenport & Prusak, 1998). The findings in this study suggest a more complex pattern, in which both social capital and knowledge sourcing are, for the most part, negatively associated with IWP. This result complicates prior evidence portraying these informal resources as inherently beneficial for EDI (e.g., Adler & Kwon, 2002; Alavi & Leidner, 2001; Nahapiet & Ghoshal, 1998).

Methodologically, the cross-sectional nature of the study captures relationships at a single point in time, limiting the ability to establish causality or fully unpack the underlying mechanisms (Ployhart & Ward, 2011). Therefore, while the measures capture engagement with interpersonal networks and knowledge sourcing behaviours, they do not distinguish the purpose or nature of this engagement. The sample and measurement approach may also help explain this pattern of findings. The respondents were predominantly hybrid, highly educated knowledge workers, many in entry-level and first-line roles. For such employees, reliance on informal networks may reflect coordination demands, uncertainty, or gaps in formal support rather than proactive innovation, as roles characterised by higher task interdependence and coordination demands are more likely to rely on other people for information and expertise (Hollingshead, 2001; Rico, 2005; Thompson, 1967).

Nevertheless, several alternative explanations may account for the observed negative relationships. First, a perceptual misalignment may exist between the intended function of informal resources and employees' propensity to mobilise them for innovative work

performance. Employees may not orient their personal networks or engage in informal knowledge sourcing for innovation, instead using them for purposes that do not directly support innovative outcomes. This is consistent with research on egocentric networks, which shows that individuals rely on close ties for emotionally sensitive purposes, such as emotional support, trust-building, and the exchange of high-quality or sensitive information, rather than for instrumental, innovation-oriented outcomes (Granovetter, 1973; Jones & George, 1998; Higgins & Thomas, 2001; Uzzi, 1997). Second, increased reliance on informal resources may signal underlying resource and performance challenges. Drawing on Nicholson's (1984) model, employees may prioritise core job performance before engaging in discretionary, innovation-oriented behaviour and may also seek psychologically safer sources of support for these purposes rather than using them for innovation (Frazier et al., 2017; Lee, 2021). As such, personal networks and knowledge sourcing may be activated as compensatory mechanisms rather than proactive strategies for innovation. Employees may turn to these networks when internal resources are insufficient or difficult to access, such that their use reflects resource constraints rather than innovation intent. In this sense, network activation may be reactive, supporting coping rather than the generation of novel ideas. This interpretation aligns with prior research suggesting that social capital can serve both enabling and substitutive functions depending on context (Balkundi & Kilduff, 2006).

Crucially, interpersonal communication conditions determined whether these resources could be effectively mobilised for IWP. When communication quality was below the observed transition points, social capital and knowledge sourcing were negatively associated with IWP; whereas above those thresholds, their effects reversed and became positive. Theoretically, this shifts EDI models beyond a simplistic "more is better" view of informal resources toward a contingent perspective that clarifies the conditions under which networks and knowledge flows enhance or constrain innovation. Rather than operating as fixed assets, social capital and knowledge sourcing were adaptively mobilised in response to variations in communication quality. Under conditions of low communication quality, employees perhaps repurposed their networks, consistent with theories of job crafting, which show that relational challenges can trigger self-initiated adjustments (Berg et al., 2010) and proactive adaptation (Parker et al., 2010). Consequently, the negative effects of hybrid communication are not inevitable, and employees may adjust their use of informal resources to sustain innovation under constrained communication conditions.

The *methodological contribution* of this thesis is that rather than relying on structural proxies such as remote days or channel choice, it prioritises communication quality. By examining employees' direct interactions, this study offers a more precise depiction of how communication unfolds in hybrid work environments. This is particularly useful for understanding the informal communication that underpins key mechanisms, such as social capital mobilisation and knowledge sourcing. This stance is operationalised through HRCR and task virtuality (TV), both of which were sensitive to shifts in media mix, co-presence, and interaction quality. Comparative validity evidence from Study 1 and sensitivity to contextual thresholds in Studies 2 and 3 demonstrate that structure-based MRT measures are insufficiently sensitive to the interpersonal dynamics of hybrid communication.

HRCR makes a distinctive contribution to research on hybrid work. By extending task virtuality to capture the quality of technology-mediated communication across multiple modalities, including computer-mediated communication, telephone and instant messaging, it provides a complementary lens that acknowledges the continued importance of in-person interaction (Virick et al., 2010), while recognising the growing dominance of virtual communication (Gilson et al., 2015; Wang et al., 2021). Evidence from Study 1 demonstrates HRCR's distinctive value by showing that it detects meaningful differences in social capital mobilisation that are not adequately reflected by task virtuality.

Although HRCR was not subjected to CFA-based discriminant validity testing due to its calculated composite structure, its distinctiveness is supported through both the methodological justification provided in the Data Analysis sections of Studies 2 and 3 and the conceptual and empirical evidence. As identified in the scoping review, existing operationalisations of communication in hybrid work tend to privilege structural or technological dimensions, such as work modality, dispersion, or media dependence, while underrepresenting the interpersonal dynamics through which communication quality is enacted across hybrid settings. HRCR was developed in response to this limitation and is therefore distinct from its component measures, task virtuality (TV) and digital information communication quality (DICQ), as well as broader structural proxies. While TV captures the extent to which work is conducted without face-to-face interaction (Orhan et al., 2016) and DICQ reflects the richness of digital communication channels, consistent with media richness theory (Daft and Lengel, 1986), HRCR integrates these dimensions to represent the overall configuration of interpersonal communication conditions in hybrid work. In doing so, it captures a higher-order and relationally grounded communication

condition rather than any single structural or technological feature. Empirical findings from this thesis further support this conceptual distinction by showing that HRCR exhibits distinct patterns of association with innovative work performance and social capital, including a moderating effect whereby relationships shift from negative to positive at higher levels of HRCR. This pattern demonstrates the value of integrating the structural configuration of communication, namely the balance between face-to-face and technology-mediated interaction, with the quality of communication within technology-mediated contexts. These conditions dynamically shift across hybrid work environments and are not captured when these dimensions are considered independently. Overall, these findings further support the conceptual and empirical distinctiveness of HRCR as a construct capable of capturing the dynamic and relational nature of communication in hybrid work settings.

7.4 Practical Implications

The central finding of this thesis is that sustaining Employee-Driven Innovation (EDI) in hybrid work depends less on structural aspects of work design, such as location, and more on how employees experience and enact their daily interactions. This highlights the importance of a communicative focus as a key lever for sustaining EDI. Drawing from this core insight, the study yields four key practical implications for managers and organisations.

The *first* implication is that organisations should move beyond simplistic structural metrics to understand and manage the communication conditions that generate social capital and EDI in hybrid work. Across all three studies, the quality and dynamics of communication were stronger determinants of social capital and innovative work performance (IWP) than structural measures of hybrid working. HRCR captured the quality of interpersonal exchanges and was reliably associated with shared language, trust and network diversity (Study 1). Both HRCR and task virtuality (TV) influenced when social capital and knowledge resources translated into IWP (Studies 2 and 3). The evidence shows that it is the quality of interpersonal daily interactions that shapes these factors. Traditional, presence-based approaches risk misdiagnosis and misplaced interventions, since measures such as mandating office attendance or expanding networking opportunities are often ineffective and can even diminish EDI in hybrid contexts. Instead, organisations should prioritise strategies that enhance communication quality by balancing digital and face-to-face interaction and using HRCR and TV to guide adjustments.

The practical goal is to ensure that each interaction, whether virtual or in person, fosters trust, clarity, and knowledge flow to sustain EDI.

The *second* implication is that hybrid work requires targeted, intentional communication-based management rather than one-size-fits-all location policies. Many organisations are now tightening return-to-office requirements, with the World Economic Forum (2025) reporting that "a growing number of major companies are increasing in-office mandates". However, the findings of this thesis show that IWP depends on interpersonal communication quality with location effects contingent on those conditions. As a result, uniform attendance rules are unlikely to improve collaboration or knowledge exchange and may lead organisations to intervene in the wrong areas. Instead, organisations should diagnose communication conditions and adapt working practices to the needs of different employees and their tasks. Measures such as HRCR and TV can help identify when communication quality is likely to support or constrain EDI, enabling tailored interventions such as improving mediated communication or increasing rich interaction among colleagues who need it. In this way, organisations can support innovation more effectively by aligning work practices with actual communication needs.

A *third* implication is that sustaining innovation in hybrid environments requires more deliberate design of everyday communication workflows, not only high-level policy changes. The findings showed that communication richness was not universally beneficial for IWP. HRCR had a small negative direct association with IWP and generally, social capital and knowledge sourcing were negatively associated with IWP, becoming positive only under particular communication conditions. This means that employees need clarity about how different communication modes should be used in their daily work, rather than being left to improvise. Managers can support this by establishing clear communication norms, including when teams should move from written communication to video or in-person interaction. Such guidance protects clarity, responsiveness and purpose, and prevents unnecessary complexity and cognitive load. In practical terms, straightforward day-to-day tasks can be managed through lean or asynchronous channels to protect focus, while richer or synchronous communication should be introduced when employees are dealing with ambiguous problems, integrating perspectives or working closely across boundaries, all of which are critical for innovation. This matters because co-located time is most valuable for activities that build trust, strengthen shared

language and support cross-boundary collaboration, whereas routine updates can be handled effectively through technology-mediated channels (Bloom et al., 2024).

The final implication is that the mobilisation of social resources for innovation is contingent on the interpersonal communication conditions of the hybrid environment. Since social capital and knowledge sourcing were found, on average, to be negatively associated with IWP, their value depends entirely on how well communication flows are managed. This relationship is contingent because interpersonal communication conditions act as a boundary mechanism, shifting the mobilisation of informal resources in ways that support innovation. The evidence shows that once these measures shift beyond certain thresholds, employees leverage their social networks and knowledge sourcing behaviours in ways that support IWP. In practice, organisations should pay deliberate attention to these dynamics and tailor strategies to the task context so that social resources are mobilised effectively.

At the micro-level, developing relational competence is central. Employees need clear communicative routines, effective feedback loops, and constructive conflict management to maintain relational quality in mediated exchanges. Where communication quality and task demands are misaligned, these skills must be strengthened, collaboration protocols adapted, and clear norms for responsiveness and purpose reinforced. At the macro-level, interventions should be context-sensitive. At low to moderate levels of HRCR and task virtuality, where social resources may not automatically foster innovation, intentional face-to-face interaction, structured opportunities for informal exchange, and monitoring the risks of shrinking networks become essential. Managers have a critical role in shaping interaction patterns, brokering across silos, and ensuring that channel selection aligns with task demands. In these ways, organisations can channel social capital and knowledge sourcing into productive mechanisms that support EDI.

7.5 Research Limitations

The thesis provides several novel insights into the dynamics of communication, social capital, knowledge sourcing and employee-driven innovation (EDI) in hybrid work settings. However, the findings should be interpreted in light of several limitations related to the scope of the literature review and the methodological approach of the empirical studies.

The *first* limitation concerns the theoretical foundation of the research, which was based on the scoping review. While a structured search protocol ensuring internal rigour was followed, concerns remain about the breadth and depth of the search strategy. The review was limited to the Scopus database, which provided a consistent and reliable data foundation but also introduced a risk of selection bias by excluding studies indexed in other major repositories such as Web of Science and PsycINFO. Consequently, the review may not have fully captured the range of factors influencing EDI. Concerns about the depth of coverage also arose from the conceptual focus of the search strategy. To maintain thematic coherence for model development, the review concentrated on specific domains, including social capital, knowledge sourcing, proactive behaviours such as performance and job crafting, and well-being.

A *second* key limitation involves the reliance on self-reported cross-sectional data. Although suitable for the exploratory and developmental aims of this research, this design restricts causal interpretation and increases the risk of common method bias. Despite following Podsakoff et al.'s (2003) recommendations, such as using pilot testing, anonymity assurances and careful instrument design to reduce such risks, self-reported data inevitably reflect individual perceptions and may be affected by recall or social desirability bias. As noted by many researchers, employees are perhaps the most accurate source of information regarding their own unobservable psychological states and work experiences (Chan, 2010; Conway & Lance, 2009; Spector, 1994). The cross-sectional nature of the studies provides only a static view of the relationships among communication quality, social capital, knowledge sourcing and innovative work performance (IWP), limiting understanding of how these evolve over time. Furthermore, the network data were collected through self-reported egocentric methods, which depend on participants' own identification and evaluation of their work relationships. While consistent with social network analysis conventions, this approach may not fully capture the structural complexity or reciprocity of actual communication networks. Nevertheless, the use of objective measures of all constructs, where possible, should be incorporated in future research. Future research could strengthen validity by combining self-reported data with alter perspectives or behavioural communication records.

A *third* limitation concerns the adequacy of the sample sizes relative to the complexity of the models tested. Although each study included a diverse mix of organisations and professional roles, the final usable samples (Study 1: N = 141; Study 2: N = 204; Study 3: N = 102) were modest given the number of variables and interaction terms examined. This

imbalance may have constrained the statistical power to detect smaller effects and limits the generalisability of the findings beyond similar hybrid-working contexts. This limitation is compounded by relatively low overall response rates of approximately 20 to 30% across the studies.[2] While these rates fall within the range commonly observed for voluntary organisational surveys in management and behavioural science journals (Baruch & Holtom, 2008), future research should aim to achieve larger and more representative samples to enhance statistical robustness and external validity.

A *final limitation* relates to the omission of company-level controls in Study 1. While Studies 2 and 3 included company as a covariate to account for organisational and contextual variation, this was not feasible in Study 1. However, primary aim was to compare alternative operationalisations of media richness theory (MRT) rather than to examine organisational differences. Given the relatively small overall sample (N = 141) and the uneven distribution of participants across three companies, including company as a control variable would have produced cell sizes too that would be too small for reliable estimation in group-wise regression models. The analytical focus therefore remained on testing conceptual equivalence among MRT-based determinants of social capital outcomes rather than isolating contextual effects attributable to specific organisations.

7.6 Future Research Directions

The findings of this thesis highlight important directions for future research, particularly the need to examine how hybrid communication conditions shape the behavioural and psychological mechanisms through which employees mobilise social capital and enact knowledge sourcing behaviours that support innovative work performance (IWP).

One promising avenue for future research is to examine why employees mobilise informal mechanisms of support and knowledge sourcing in hybrid environments. This research shows that when communication quality declines beyond a certain threshold, employees rely more heavily on informal strategies, yet the motivations behind this adaptive response remain unclear. Qualitative research could explore whether these behaviours reflect proactive, change-oriented action (Parker et al., 2010) or reactive, coping-oriented responses (Rafferty & Griffin,

[2] Response rate was expected given evidence of reduced survey engagement following the COVID-19 pandemic due to "survey fatigue" (De Koning et al., 2021) and diminished motivation for non-essential activities reflecting cognitive and emotional exhaustion (Zarowsky & Rashid, 2023).

2006). Remote and virtual work studies typically interpret such behaviours as detrimental (Cramton, 2001; Gibson & Gibbs, 2006). However, if these were simply negative responses to communication deficits, they would not have resulted in the promotion of IWP observed in this research. Nicholson's (1984) Work Role Transition Model suggests that only successful adjustment is associated with discretionary innovation, indicating that the behaviours observed here may represent a form of behavioural competency flexing. Employees may be drawing on adaptability or agility (Fugate et al., 2004; Tugade & Fredrickson, 2004), or hybrid work may provide cognitive space that enables more deliberate engagement with informal learning and innovation (Rupčić, 2024; Vega et al., 2015). Understanding whether these mechanisms are proactive or reactive, and identifying when they become innovation-enhancing, would advance theory on hybrid work adaptation and inform strategies for supporting EDI. In-depth qualitative designs such as interviews, critical incident techniques, or diary studies would be well suited to uncover the cognitive and motivational processes involved.

A second important avenue concerns the individual-level mechanisms that enable IWP in hybrid environments. While their effectiveness may compensate for communication constraints in established hybrid arrangements, research has not yet examined why some employees leverage these mechanisms more effectively than others. Reliance on informal mechanisms to offset communication constraints may increasingly be viewed as an expected element of employees' roles. If so, their effectiveness may depend on individual-level competencies. Two competencies are worth exploring. These are personal adaptability, defined as the ability to modify behaviour in response to changing situations (Fugate et al., 2004; Helens-Hart, 2019), and agility, understood as the capacity to pivot, solve problems, and manage diverse relational demands (Pipe et al., 2012; Tugade & Fredrickson, 2004). These traits are theoretically aligned with EDI-relevant behaviours, such as proactively seeking resources and knowledge outside formal structures (Høyrup, 2010). According to Wang et al. (2017), employee adaptability, conceptualised as a positive motivational orientation, plays a key role in driving proactive behaviour. Their study found that employees with higher adaptability were more likely to engage in job crafting, particularly seeking resources and seeking challenges. These behaviours closely resemble those that underpin EDI, where employees take initiative, solve problems, and acquire knowledge outside formal structures (Cadeddu et al., 2023; Høyrup, 2010). Building on this, future research should examine whether adaptability and agility strengthen employees' ability to repurpose informal mechanisms under hybrid constraints.

Demonstrating this would position these competencies as critical factors that explain when hybrid contexts foster EDI, thereby extending theory on proactive behaviour in distributed work and informing practices aimed at enabling it.

The findings of this thesis highlight the need to re-examine assumptions drawn from remote work research. as hybrid work introduces distinct interpersonal conditions arising from the interplay between face-to-face and virtual communication, conditions which are absent in fully remote settings. The identification of new communication thresholds that prompt employees to mobilise informal mechanisms for innovation reinforces this point. It suggests that insights from remote work studies, which assume consistently technology-mediated contexts, cannot be directly generalised to hybrid models (Lauring & Jonasson, 2025; Vartiainen & Vanharanta, 2024). Although employees can use informal mechanisms such as social capital mobilisation and knowledge sourcing behaviours to support EDI when communication quality is low, the combination of in-person and technology-mediated interactions also introduces vulnerabilities that shape how networks evolve and how relationships are perceived (Jaß et al., 2024; Keppler & Leonardi, 2023; Wu et al., 2023). These vulnerabilities can produce unintended consequences, such as shrinking networks, reduced reliance on social capital from personal ties, and a long-term decline in knowledge sourcing behaviours. Hybrid work should therefore be treated as a distinct research domain, requiring approaches that both build on and critically re-evaluate insights from remote work research. To capture these evolving dynamics more fully, future studies should adopt longitudinal and network-based designs. Prior work has already demonstrated the value of these approaches, with Maznevski and Chudoba (2000) showing how longitudinal designs capture evolving team processes and Iñiguez et al. (2023) illustrating how network-based approaches reveal dynamic patterns in interpersonal ties. Building on this, such methods can be used in hybrid contexts to track how communication patterns evolve and how interpersonal ties and knowledge flows are reshaped, offering a deeper understanding of the mechanisms through which hybrid work influences innovation (Leonardi & Treem, 2020).

Finally, the findings highlight the need to refine MRT-based operationalisations so that they better capture the complexity of hybrid work conditions and their effects on EDI. Existing MRT operationalisations that focus only on structural or technological measures (Daft & Lengel, 1986; Dennis et al., 2008) may be insufficient for explaining the interpersonal dynamics that shape outcomes in hybrid environments. The discrepancy between task virtuality and the HRCR illustrates this point. Although HRCR incorporates task virtuality, the two measures

show different direct effects on innovative work performance. Measuring only the extent of virtual interaction overlooks a key interpersonal dimension of communication quality that influences EDI (Gibson & Gibbs, 2006; O'Leary & Cummings, 2007). HRCR offers a more comprehensive view by incorporating a dimension that captures the cumulative quality of interpersonal communication across multiple technology-mediated channels. In its current form, however, it remains constrained by broad categorical ranges and assigns greater weight to task virtuality. This design reflects the original MRT principle that prioritises face-to-face contact as the most critical element of communication quality (Daft & Lengel, 1986). Future research should refine and validate HRCR by developing more granular measures, adjusting weightings, and testing the model across diverse hybrid configurations. As HRCR is a newly developed construct, future studies adopting it should also continue to examine its construct validity, including its discriminant validity in relation to conceptually adjacent constructs such as task virtuality, digital communication quality, and broader structural measures of hybrid work. A longitudinal design with multiple measurement points is essential to identify dynamic thresholds at which declining face-to-face interaction, combined with poor-quality virtual communication, begins to have a sustained negative impact on innovative work performance (Maznevski & Chudoba, 2000). While face-to-face communication may support EDI (Høyrup, 2010), this study suggests that the overall quality of communication, regardless of medium, matters most. Refining MRT to reflect hybrid dynamics would enable researchers to address key questions such as how much face-to-face interaction is sufficient (Kirkman et al., 2004), and when high-quality virtual communication can effectively compensate for reduced co-location (Leonardi et al., 2010; Maznevski & Chudoba, 2000).

7.7 Conclusion

Across the programme of research, the findings show that in hybrid environments, employee-driven innovation (EDI) depends critically on interpersonal communication quality. Innovative work performance (IWP), the behavioural representation of EDI, is shaped not only by the availability of social capital and knowledge but by the communicative conditions that determine whether these resources are mobilised effectively (Cadeddu et al., 2023; Høyrup, 2010). The three studies together highlight that a granular analysis is essential for capturing this complexity and reveal the context-dependent role that communication quality plays in hybrid innovation processes. Building on these findings, this thesis has demonstrated that a human-

centric relationally-based lens, which captures the cumulative quality of interpersonal communication across both in-person and technology-mediated contexts and is operationalised through two extensions of MRT (Daft & Lengel, 1986), provides a more comprehensive and powerful means for understanding the role of communication in hybrid work than traditional structural and channel-focused operationalisations. The research consistently shows how communication quality, measured through the HRCR, is associated with variations in social capital and IWP. It further demonstrates how both HRCR and task virtuality moderate the use of social capital and knowledge sourcing in supporting EDI. By tracing these complex relationships, this thesis establishes a new theoretical foundation for future research on communication and interpersonal dynamics in the evolving hybrid landscape. They also underscore the practical importance of designing hybrid work environments that prioritise communication quality as a strategic lever for sustaining innovation.

REFERENCES

Abbasi, A., Wigand, R. T., & Hossain, L. (2014). Measuring social capital through network analysis and its influence on individual performance. *Library & Information Science Research*, *36*(1), 66-73. *https://doi.org/10.1016/j.lisr.2013.08.001*

Abdelmoteleb, S. A. (2019). A new look at the relationship between job stress and organizational commitment: A three-wave longitudinal study. *Journal of Business and Psychology*, *34*(3), 321-336. *https://doi.org/10.1007/s10869-018-9543-z*

Adler, P. S., & Kwon, S.-W. (2002). Social capital: Prospects for a new concept. *Academy of Management Review*, *27*(1), 17-40. *https://doi.org/10.5465/amr.2002.5922314*

Afsar, B., & Umrani, W. A. (2020). Does thriving and trust in the leader explain the link between transformational leadership and innovative work behaviour? A cross-sectional survey. *Journal of Research in Nursing*, *25*(1), 37-51. *https://doi.org/10.1177/1744987119880583*

Aguinis, H., Ramani, R. S., & Villamor, I. (2019). The first 20 years of Organizational Research Methods: Trajectory, impact, and predictions for the future. *Organizational Research Methods*, *22*(2), 463-489. *https://journals.sagepub.com/doi/10.1177/1094428118786564*

Ahmad, F., & Karim, M. (2019). Impacts of knowledge sharing: A review and directions for future research. *Journal of Workplace Learning*, *31*(3), 207-230. *https://doi.org/10.1108/jwl-07-2018-0096*

Aiken, L. S., & West, S. G. (1991). *Multiple regression: Testing and interpreting interactions*. Sage Publications.

Akahori, W., Yamashita, N., Jamieson, J., Nakatani, M., Hashimoto, R., & Watanabe, M. (2023). Impacts of the strength and conformity of social norms on well-being: A mixed-method study among hybrid workers in Japan. In *Proceedings of the 2023 CHI Conference on Human Factors in Computing Systems* (Article 273, pp. 1-17). Association for Computing Machinery. *https://doi.org/10.1145/3544548.3581383*

Aksoy, C. G., Barrero, J. M., Bloom, N., Davis, S., Dolls, M., & Zarate, P. (2025). *The global persistence of work from home* (Becker Friedman Institute Working Paper No. 2025-65). University of Chicago, Becker Friedman Institute for Economics. *https://doi.org/10.2139/ssrn.5253261*

Al Mohamed, A. A., Al Mohamed, S., & Alebrahem, M. (2024). The remote revolution: Assessing the impact of working from home on finance professionals. *Future Business Journal*, *10*(1), 1-22. *https://doi.org/10.1186/s43093-024-00345-1*

Alavi, M., & Leidner, D. E. (2001). Knowledge management and knowledge management systems: Conceptual foundations and research issues. *MIS Quarterly*, *25*(1), 107-137. *https://doi.org/10.2307/3250961*

Ale Ebrahim, N., Ahmed, S., & Taha, Z. (2009). Virtual teams: A literature review. *Australian Journal of Basic and Applied Sciences*, *3*(3), 2653-2669.

Alhusen, H., Kanerva, M., Møen, J., & Rammer, C. (2021). A new measurement conception for the "doing-using-interacting" mode of innovation. *Research Policy*, *50*(4), 104214. *https://doi.org/10.1016/j.respol.2021.104214*

Allahverdi, F. Z., & Bayer, N. (2024). Cognitive control/flexibility, social isolation, and intrinsic job satisfaction of intensive care unit nurses. *Behavioral Sciences*, *14*(7), Article 605. *https://doi.org/10.3390/bs14070605*

Allen, D. G., & Griffeth, R. W. (2001). Test of a mediated performance-turnover relationship highlighting the moderating roles of visibility and reward contingency. *Journal of Applied Psychology*, *86*(5), 1014-1021. *https://doi.org/10.1037/0021-9010.86.5.1014*

Allen, T. D., Golden, T. D., & Shockley, K. M. (2015). How effective is telecommuting? Assessing the status of our scientific findings. *Psychological Science in the Public Interest*, *16*(2-3), 40-68. *https://doi.org/10.1177/1529100615593273*

Almasradi, R. B., Romdhane, M., & Triki, M. B. (2023). Organizational creativity and remote working in the deployment of COVID-19 in Saudi Arabia. *International Journal of Advanced and Applied Sciences*, *10*(6), 195-200. *https://doi.org/10.21833/ijaas.2023.06.023*

Al-Qdah, M. S., & Salim, J. (2013). A conceptual framework for managing tacit knowledge through ICT perspective. *Procedia Technology*, *11*(ICCEI), 1188-1194. *https://doi.org/10.1016/j.protcy.2013.12.312*

Alsharo, M., Gregg, D., & Ramirez, R. (2017). Virtual team effectiveness: The role of knowledge sharing and trust. *Information & Management*, *54*(4), 479-490. *https://doi.org/10.1016/j.im.2016.10.005*

Althubaiti, A. (2016). Information bias in health research: Definition, pitfalls, and adjustment methods. *Journal of Multidisciplinary Healthcare*, *9*, 211-217. *https://doi.org/10.2147/JMDH.S104807*

Amabile, T. M., Conti, R., Coon, H., Lazenby, J., & Herron, M. (1996). Assessing the work environment for creativity. *Academy of Management Journal*, *39*(5), 1154-1184. *https://doi.org/10.2307/256995*

Amenduni, F., Fregnan, E., De Angelis, M., & Marocco, D. (2022). Facing disruptive changes with informal workplace learning strategies: The experience of European companies. *Frontiers in Psychology*, *13*, 889850. *https://doi.org/10.3389/fpsyg.2022.889850*

Anderson, N., Potočnik, K., & Zhou, J. (2014). Innovation and creativity in organizations: A state-of-the-science review, prospective commentary, and guiding framework. *Journal of Management*, *40*(5), 1297-1333. *https://doi.org/10.1177/0149206314527128*

Ardichvili, A. (2008). Learning and knowledge sharing in virtual communities of practice: Motivators, barriers, and enablers. *Advances in Developing Human Resources*, *10*(4), 541-554. *https://doi.org/10.1177/1523422308319536*

Ardichvili, A., Page, V., & Wentling, T. (2003). Motivation and barriers to participation in virtual knowledge-sharing communities of practice. *Journal of Knowledge Management*, *7*(1), 64-77. *https://doi.org/10.1108/13673270310463626*

Argote, L., & Ingram, P. (2000). Knowledge transfer: A basis for competitive advantage in firms. *Organizational Behavior and Human Decision Processes*, *82*(1), 150-169. *https://doi.org/10.1006/obhd.2000.2893*

Argyres, N. S. (1999). The impact of information technology on coordination: Evidence from the B-2 "Stealth" Bomber. *Organization Science*, *10*(2), 162-180. *https://doi.org/10.1287/orsc.10.2.162*

Arling, P. A. (2004, August). The impact of telework on performance: A social network approach [Conference paper]. In *Proceedings of the Tenth Americas Conference on Information Systems (AMCIS 2004)*. Association for Information Systems. *https://www.researchgate.net/publication/220893740_The_Impact_of_Telework_on_Performance_A_Social_Network_Approach*

Armstrong, D. J., & Cole, P. (2002). Managing distance in distributed work groups. In P. J. Hinds & S. Kiesler (Eds.), *Distributed work* (pp. 167-186). MIT Press. *https://doi.org/10.7551/mitpress/2464.003.0012*

Arroyo, A., Segrin, C., & Harwood, J. (2014). Appearance-related communication mediates the link between self-objectification and health and well-being outcomes. *Human Communication Research*, *40*(4), 463-482. *https://doi.org/10.1111/hcre.12036*

Ashforth, B. E., Kreiner, G. E., & Fugate, M. (2000). All in a day's work: Boundaries and micro role transitions. *Academy of Management Review*, *25*(3), 472-491. *https://doi.org/10.2307/259305*

Arksey, H., & O'Malley, L. (2005). Scoping studies: Towards a methodological framework. *International Journal of Social Research Methodology*, *8*(1), 19-32. *https://doi.org/10.1080/1364557032000119616*

Baer, M. (2012). Putting creativity to work: The implementation of creative ideas in organizations. *Academy of Management Journal*, *55*(5), 1102-1119. *https://doi.org/10.5465/amj.2009.0470*

Baer, M., & Frese, M. (2003). Innovation is not enough: Climates for initiative and psychological safety, process innovations, and firm performance. *Journal of Organizational Behavior*, *24*(1), 45-68. *https://doi.org/10.1002/job.179*

Bailey, B. P., & Konstan, J. A. (2006). On the need for attention-aware systems: Measuring effects of interruption on task performance, error rate, and affective state. *Computers in Human Behavior*, *22*(4), 685-708. *https://doi.org/10.1016/j.chb.2005.12.009*

Bailey, D. E., & Kurland, N. B. (2002). A review of telework research: Findings, new directions, and lessons for the study of modern work. *Journal of Organizational Behavior*, *23*(4), 383-400. *https://doi.org/10.1002/job.144*

Baker, W. E. (2019). Emotional energy, relational energy, and organizational energy: Toward a multilevel model. *Annual Review of Organizational Psychology and Organizational Behavior*, *6*, 373-395. *https://doi.org/10.1146/annurev-orgpsych-012218-015047*

Bal, P. M., & Kooij, D. A. M. (2011). The relations between work centrality, psychological contracts, and job attitudes: The influence of age. *European Journal of Work and Organizational Psychology*, *20*(4), 497-523. *https://doi.org/10.1080/13594321003669079*

Balkundi, P., & Kilduff, M. (2006). The ties that lead: A social network approach to leadership. *The Leadership Quarterly*, *17*(4), 419-439. *https://doi.org/10.1016/j.leaqua.2006.01.001*

Baltes, B. B., Dickson, M. W., Sherman, M. P., Bauer, C. C., & LaGanke, J. S. (2002). Computer-mediated communication and group decision making: A meta-analysis. *Organizational Behavior and Human Decision Processes*, *87*(1), 156-179. *https://doi.org/10.1006/obhd.2001.2961*

Banbury, S. P., & Berry, D. C. (2005). Office noise and employee concentration: Identifying causes of disruption and potential improvements. *Ergonomics*, *48*(1), 25-37. *https://doi.org/10.1080/00140130412331311390*

Bandura, A. (1986). *Social foundations of thought and action: A social cognitive theory*. Prentice-Hall.

Bandura, A., & Schunk, D. H. (1981). Cultivating competence, self-efficacy, and intrinsic interest through proximal self-motivation. *Journal of Personality and Social Psychology*, *41*(3), 586-598. *https://doi.org/10.1037/0022-3514.41.3.586*

Bargagli Stoffi, F. J., Cevolani, G., & Gnecco, G. (2022). Simple models in complex worlds: Occam's razor and statistical learning theory. *Minds and Machines*, *32*(1), 13-35. *https://doi.org/10.1007/s11023-022-09592-z*

Barker, B. A., & Manning, M. R. (2024). Designing the collaborative organization: A framework for how collaborative work relationships promote innovation. *The Journal of Applied Behavioral Science*, *60*(1), 149-193. *https://doi.org/10.1177/00218863221106245*

Baron, R. M., & Kenny, D. A. (1986). The moderator-mediator variable distinction in social psychological research: Conceptual, strategic, and statistical considerations. *Journal of Personality and Social Psychology*, *51*(6), 1173-1182. *https://doi.org/10.1037/0022-3514.51.6.1173*

Barrero, J. M., Bloom, N., & Davis, S. J. (2021). *Why working from home will stick* (NBER Working Paper No. 28731). National Bureau of Economic Research. *https://doi.org/10.3386/w28731*

Bartel, C. A., Wrzesniewski, A., & Wiesenfeld, B. M. (2012). Knowing where you stand: Physical isolation, perceived respect, and organizational identification among virtual employees. *Organization Science*, *23*(3), 743-757. *https://doi.org/10.1287/orsc.1110.0661*

Baruch, Y. (2000). Teleworking: Benefits and pitfalls as perceived by professionals and managers. *New Technology, Work and Employment*, *15*(1), 34-49. *https://doi.org/10.1111/1468-005X.00063*

Baruch, Y., & Holtom, B. C. (2008). Survey response rate levels and trends in organizational research. Human Relations, 61(8), 1139–1160. *https://doi.org/10.1177/0018726708094863*

Baruch, Y., & Nicholson, N. (1997). Home, sweet work: Requirements for effective home working. *Journal of General Management*, *23*(2), 15-30. *https://doi.org/10.1177/030630709702300202*

Batarseh, F. S., Usher, J. M., & Daspit, J. J. (2017). Collaboration capability in virtual teams: Examining the influence on diversity and innovation. *International Journal of Innovation Management*, *21*(4), Article 1750034. *https://doi.org/10.1142/s1363919617500347*

Baym, N. K. (2002). Interpersonal life online. In L. Lievrouw & S. Livingston (Eds.), *The handbook of new media: Social shaping and consequences of ICTs* (pp. 62-76). SAGE Publications.

Begemann, V., Handke, L., & Lehmann-Willenbrock, N. (2024). Enabling and constraining factors of remote informal communication: A socio-technical systems perspective. *Journal of Computer-Mediated Communication*, *29*(5), Article zmae008. *https://doi.org/10.1093/jcmc/zmae008*

Belanger, F. (1999). Communication patterns in distributed work groups: A network analysis. *IEEE Transactions on Professional Communication*, *42*(4), 261-275. *https://doi.org/10.1109/47.807962*

Bell, A., Ward, P., Tamal, M. E. H., & Killilea, M. E. (2019). Assessing recall bias and measurement error in high-frequency social data collection for human-environment research. *Population and Environment*, *40*(3), 325-345. *https://doi.org/10.1007/s11111-019-0314-1*

Bell, B. S., McAlpine, K. L., & Hill, N. S. (2023). Leading Virtually. Annual Review of Organizational Psychology and Organizational Behavior, 10, 339-362. *https://doi.org/10.1146/annurev-orgpsych-120920-050115*

Bell, B. S., & Kozlowski, S. W. J. (2002). A typology of virtual teams: Implications for effective leadership. *Group & Organization Management*, *27*(1), 14-49. *https://doi.org/10.1177/1059601102027001003*

Ben Hador, B. (2016). How intra-organizational social capital influences employee performance. *Journal of Management Development*, *35*(9), 1119-1133. *https://doi.org/10.1108/JMD-12-2015-0172*

Beno, M. (2022). Differences between managing face-to-display workers and in-house workers (hybrid work model): A qualitative study from Austria. *Academic Journal of Interdisciplinary Studies*, *11*(2), 30-40. *https://doi.org/10.36941/ajis-2022-0033*

Berg, J. M., Wrzesniewski, A., & Dutton, J. E. (2010). Perceiving and responding to challenges in job crafting at different ranks: When proactivity requires adaptivity. *Journal of Organizational Behavior*, *31*(2-3), 158-186. *https://doi.org/10.1002/job.645*

Berger, C. R., & Bradac, J. J. (1982). *Language and social knowledge: Uncertainty in interpersonal relationships*. Edward Arnold.

Berger, C. R., & Gudykunst, W. B. (1991). Uncertainty and communication. In B. Dervin & M. J. Voight (Eds.), *Progress in communication sciences* (Vol. 10, pp. 21-66). Ablex Publishing.

Berger, P. L., & Luckmann, T. (1966). *The social construction of reality: A treatise in the sociology of knowledge*. Anchor Books.

Beretta, M., & Søndergaard, H. A. (2021). Employee behaviours beyond innovators in internal crowdsourcing: What do employees do in internal crowdsourcing, if not innovating, and why? *Creativity and Innovation Management*, *30*(3), 542-562. *https://doi.org/10.1111/caim.12449*

Berraies, S., Lajili, R., & Chtioui, R. (2020). Social capital, employees' well-being and knowledge sharing: Does enterprise social networks use matter? Case of Tunisian knowledge-intensive firms. *Journal of Intellectual Capital*, *21*(6), 1153-1183. *https://doi.org/10.1108/jic-01-2020-0012*

Bhaskar, R. (1978). *A realist theory of science* (2nd ed.). Harvester Press.

Bierstel, S. J., Farrell, A. K., Briskin, J. L., Harvey, M. W., Gable, S. L., Ha, T., Ickes, W., Lin, W.-F., Orina, M. M., Saxbe, D., Simpson, J. A., Ta, V. P., & Slatcher, R. B. (2020). Associations between language style matching and relationship commitment and satisfaction: An integrative data analysis. *Journal of Social and Personal Relationships*, *37*(8-9), 2459-2481. *https://doi.org/10.1177/0265407520923754*

Birkinshaw, J., & Duke, L. (2013). How can employees take the lead in innovation? *Business Strategy Review*, *24*(2), 46-51. *https://doi.org/10.1111/j.1467-8616.2013.00952.x*

Bissani, M., Curado, C., Gonçalves, T., & Oliveira, M. (2024). Knowledge sharing and protection mechanisms in hybrid and remote work settings. In *European Conference on Knowledge Management* (Vol. 1, pp. 78-85). *https://doi.org/10.34190/eckm.25.1.2886*

Bjorklund, T., Bhatli, D., & Laakso, M. (2013). Understanding idea advancement efforts in innovation through proactive behavior. *Journal of Research in Marketing and Entrepreneurship*, *15*(2), 124-142. *https://doi.org/10.1108/jrme-01-2013-0001*

Blaikie, N. (2007). *Approaches to social enquiry: Advancing knowledge* (2nd ed.). Polity Press.

Blaskovich, J. L. (2008). Exploring the effect of distance on communication and group decisions. *Journal of Information Systems*, *22*(1), 27-46.

Blau, P. M. (1964). *Exchange and power in social life*. John Wiley & Sons.

Bliese, P. D., Adler, A. B., & Edwards, J. R. (2020). Bridging methodological divides between macro- and microresearch: Endogeneity and methods for panel data. *Journal of Management*, *46*(1), 70-99. *https://doi.org/10.1177/0149206319868016*

Bliese, P. D., & Ployhart, R. E. (2002). Growth modeling using random coefficient models: Model building, testing, and illustrations. *Organizational Research Methods*, *5*(4), 362-387. *https://doi.org/10.1177/109442802237116*

Bloom, N., Han, R., & Liang, J. (2024). Hybrid working from home improves retention without damaging performance. *Nature*, *630*(7989), 164-170. *https://doi.org/10.1038/s41586-024-07500-2*

Bloom, N., Liang, J., Roberts, J., & Ying, Z. J. (2015). Does working from home work? Evidence from a Chinese experiment. *Quarterly Journal of Economics*, *130*(1), 165-218. *https://doi.org/10.1093/qje/qju032*

Bodhi, R., Luqman, A., Hina, M., & Papa, A. (2023). Work-related social media use and employee-related outcomes: A moderated mediation model. *International Journal of Emerging Markets*, *18*(11), 4948-4967. *https://doi.org/10.1108/IJOEM-09-2021-1359*

Boland, R. J., Jr., & Tenkasi, R. V. (1995). Perspective making and perspective taking in communities of knowing. *Organization Science*, *6*(4), 350-372. *https://doi.org/10.1287/orsc.6.4.350*

Borgatti, S. P., & Cross, R. (2003). A relational view of information seeking and learning in social networks. *Management Science*, *49*(4), 432-445. *https://doi.org/10.1287/mnsc.49.4.432.14428*

Borgatti, S. P., & Foster, P. C. (2003). The network paradigm in organizational research: A review and typology. *Journal of Management*, *29*(6), 991-1013. *https://doi.org/10.1016/S0149-2063(03)00087-4*

Bos, N., Shami, N. S., Olson, J. S., Cheshin, A., Nan, N., Eschenbrenner, B., & Olson-Buchanan, J. B. (2004). In-group/out-group effects in distributed teams: An experimental simulation. In *Proceedings of the 2004 ACM Conference on Computer Supported Cooperative Work* (pp. 429-436). Association for Computing Machinery. *https://doi.org/10.1145/1031607.1031679*

Boud, D., & Middleton, H. (2003). Learning from others at work: Communities of practice and informal learning. *Journal of Workplace Learning*, *15*(5), 194-202. *https://doi.org/10.1108/13665620310483895*

Bouncken, R. B., & Reuschl, A. J. (2018). Coworking-spaces: How a phenomenon of the sharing economy builds a novel trend for the workplace and for entrepreneurship. *Review of Managerial Science*, *12*(1), 317-334. *https://doi.org/10.1007/s11846-016-0215-y*

Brass, D. J., Galaskiewicz, J., Greve, H. R., & Tsai, W. (2004). Taking stock of networks and organizations: A multilevel perspective. *Academy of Management Journal*, *47*(6), 795-817. *https://doi.org/10.2307/20159624*

Braun, V., & Clarke, V. (2006). Using thematic analysis in psychology. *Qualitative Research in Psychology*, *3*(2), 77-101. *https://doi.org/10.1191/1478088706qp063oa*

Breuer, C., Hüffmeier, J., & Hertel, G. (2016). Does trust matter more in virtual teams? A meta-analysis of trust and team effectiveness considering virtuality and documentation as moderators. *Journal of Applied Psychology*, *101*(8), 1151-1177. *https://doi.org/10.1037/apl0000113*

Brewer, D. D. (2000). Forgetting in the recall-based elicitation of personal and social networks. *Social Networks*, *22*(1), 29-43. *https://doi.org/10.1016/S0378-8733(99)00013-6*

Brewer, M. B. (1991). The social self: On being the same and different at the same time. *Personality and Social Psychology Bulletin*, *17*(5), 475-482. *https://doi.org/10.1177/0146167291175001*

Brinberg, M., & Ram, N. (2021). Do new romantic couples use more similar language over time? Evidence from intensive longitudinal text messages. *Journal of Communication*, *71*(3), 454-477. *https://doi.org/10.1093/joc/jqab012*

Brown, T. A. (2015). *Confirmatory factor analysis for applied research* (2nd ed.). Guilford Press.

Bryan, B. T., Lambert, A., Haddon, A., & White, C. (2023). Loneliness in the workplace: A mixed-method systematic review and meta-analysis. *Occupational Medicine*, *73*(9), 557-567. *https://doi.org/10.1093/occmed/kqad138*

Buła, P., Thompson, A., & Żak, A. A. (2024). Nurturing teamwork and team dynamics in a hybrid work model. *Central European Management Journal*. Advance online publication. *https://doi.org/10.1108/CEMJ-12-2022-0277*

Bunger, A. C., Doogan, N., Hanson, R. F., Birken, S. A., Powell, B. J., Cao, Y., Dunn, J., Wagner, C., Dillahunt, T., & Aarons, G. A. (2018). Advice-seeking during implementation: A network study of clinicians participating in a learning collaborative. *Implementation Science*, *13*(1), Article 101. *https://doi.org/10.1186/s13012-018-0797-7*

Burden, R. L., & Faires, J. D. (2011). *Numerical analysis* (9th ed.). Brooks/Cole, Cengage Learning.

Burt, R. S. (1992). *Structural holes: The social structure of competition*. Harvard University Press.

Burt, R. S. (2000). The network structure of social capital. *Research in Organizational Behavior*, *22*, 345-423. *https://doi.org/10.1016/s0191-3085(00)22009-1*

Burt, R. S. (2004). Structural holes and good ideas. *American Journal of Sociology*, *110*(2), 349-399. *https://doi.org/10.1086/421787*

Butler, J. K. (1991). Toward understanding and measuring conditions of trust: Evolution of a Conditions of Trust Inventory. *Journal of Management*, *17*(3), 643-663. *https://doi.org/10.1177/014920639101700307*

Cabrera, E. F., & Cabrera, A. (2005). Fostering knowledge sharing through people management practices. *The International Journal of Human Resource Management*, *16*(5), 720-735. *https://doi.org/10.1080/09585190500083020*

Cadeddu, S. B. M., Dare, L. O., & Denis, J.-L. (2023). Employee-driven innovation in health organizations: Insights from a scoping review. *International Journal of Health Policy and Management*, *12*(1), Article 6734. *https://doi.org/10.34172/ijhpm.2023.6734*

Carillo, K. D. A., Cachat-Rosset, G., Marsan, J., Saba, T., & Klarsfeld, A. (2021). Adjusting to epidemic-induced telework: Empirical insights from teleworkers in France. *European Journal of Information Systems*, *30*(1), 69-88. *https://doi.org/10.1080/0960085X.2020.1829512*

Carlson, J. R., & Zmud, R. W. (1999). Channel expansion theory and the experiential nature of media richness perceptions. *Academy of Management Journal*, *42*(2), 153-170. *https://doi.org/10.2307/257090*

Campbell, J. P., McCloy, R. A., Oppler, S. H., & Sager, C. E. (1993). *A theory of performance.* In N. Schmitt & W. C. Borman (Eds.), *Personnel selection in organizations* (pp. 35-70). Jossey-Bass.

Carey, S., Lawson, B., & Krause, D. R. (2011). Social capital configuration, legal bonds, and performance in buyer-supplier relationships. *Journal of Operations Management, 29*(4), 277-288. *https://doi.org/10.1016/j.jom.2010.08.003*

Carmeli, A., & Gittell, J. H. (2009). High-quality relationships, psychological safety, and learning from failures in work organizations. *Journal of Organizational Behavior*, *30*(6), 709-729. *https://doi.org/10.1002/job.565*

Carmeli, A., Reiter-Palmon, R., & Ziv, E. (2010). Inclusive leadership and employee involvement in creative tasks in the workplace: The mediating role of psychological safety. *Creativity Research Journal*, *22*(3), 250-260. *https://doi.org/10.1080/10400419.2010.504654*

Carmeli, A., & Spreitzer, G. M. (2009). Trust, connectivity, and thriving: Implications for innovative behaviors at work. *Journal of Creative Behavior*, *43*(3), 169-191. *https://doi.org/10.1002/j.2162-6057.2009.tb01313.x*

Carmody, D., Mazzarello, M., Santi, P., Harris, T., Lehmann, S., Abbiasov, T., Dunbar, R., & Ratti, C. (2022). The effect of co-location on human communication networks. *Nature Computational Science*, *2*(8), 494-503. *https://doi.org/10.1038/s43588-022-00296-z*

Castellani, P., Rossato, C., & Mas-Verdu, F. (2021). Tacit knowledge sharing in knowledge-intensive firms: The perceptions of team members and team leaders. *Review of Managerial Science*. Advance online publication. *https://doi.org/10.1007/s11846-019-00368-x*

Ceci, F., Masciarelli, F., & Poledrini, S. (2021). Fostering knowledge sharing in the innovation process: Information and communication technology-based versus face-to-face relationships. *Knowledge and Process Management*, *28*(3), 302-316. *https://doi.org/10.1002/kpm.1668*

Central Statistics Office (CSO). (2025, March 25). *COVID-19- Our lives five years on: Social impact - Working from home*. Government of Ireland. *https://www.cso.ie/en/releasesandpublications/fp/fp-c19si/covid-19-ourlivesfiveyearsonsocialimpact/workingfromhome/*

Centola, D., & Macy, M. (2007). Complex contagions and the weakness of long ties. *American Journal of Sociology*, *113*(3), 702-734. *https://doi.org/10.1086/521848*

Central Statistics Office (CSO). (2025, March 25). *COVID-19 - Our lives five years on: Social impact - Working from home*. Government of Ireland. *https://www.cso.ie/en/releasesandpublications/fp/fp-c19si/covid-19-ourlivesfiveyearsonsocialimpact/workingfromhome/*

Cerasoli, C. P., Alliger, G. M., Donsbach, J. S., Mathieu, J. E., Tannenbaum, S. I., & Orvis, K. A. (2018). Antecedents and outcomes of informal learning behaviors: A meta-analysis. *Journal of Business and Psychology*, *33*(2), 203-230. *https://doi.org/10.1007/s10869-017-9492-y*

Chae, B., Paradice, D. B., Koch, H., & Van Huy-Vo, V. (2005). Exploring knowledge management using network theories: Questions, paradoxes and prospects. *Journal of Computer Information Systems*, *45*(4), 62-74.

Chamakiotis, P., Dekoninck, E. A., & Panteli, N. (2013). Factors influencing creativity in virtual design teams: An interplay between technology, teams and individuals. *Creativity and Innovation Management*, *22*(3), 265-279. *https://doi.org/10.1111/caim.12039*

Chan, D. (2009). So why ask me? Are self-report data really that bad? In C. E. Lance & R. J. Vandenberg (Eds.), *Statistical and methodological myths and urban legends: Doctrine, verity*

and fable in the organizational and social sciences (pp. 309-336). Routledge. *https://doi.org/10.4324/9780203867266*

Chan, M. (2015). Multimodal connectedness and quality of life: Examining the influences of technology adoption and interpersonal communication on well-being across the lifespan. *Journal of Computer-Mediated Communication*, *20*(1), 3-18. *https://doi.org/10.1111/jcc4.12089*

Chang, C. M., & Hsu, M. H. (2016). Understanding the determinants of users' subjective well-being in social networking sites: An integration of social capital theory and social presence theory. *Behaviour & Information Technology*, *35*(9), 720-729. *https://doi.org/10.1080/0144929x.2016.1141321*

Che, T., Wu, Z., Wang, Y., & Yang, R. (2019). Impacts of knowledge sourcing on employee innovation: The moderating effect of information transparency. *Journal of Knowledge Management*, *23*(2), 221-239. *https://doi.org/10.1108/jkm-11-2017-0554*

Chen, C.-J., Huang, J.-W., & Hsiao, Y.-C. (2010). Knowledge management and innovativeness: The role of organizational climate and structure. *International Journal of Manpower*, *31*(8), 848-870. *https://doi.org/10.1108/01437721011088548*

Chen, W. (2015). Mediatizing the network model of cultural capital: Network diversity, media use, and cultural knowledge along and across ethnic boundaries. *Social Networks*, *40*, 185-196. *https://doi.org/10.1016/j.socnet.2014.10.003*

Chen, X., Carpenter, D., & Su, L. (2020). How does a team's virtuality impact knowledge transfer effectiveness among its members? A multi-mediator-moderator model. *Behaviour & Information Technology*, *39*(8), 843-859. *https://doi.org/10.1080/0144929x.2019.1711455*

Cheung, S. Y., Gong, Y., Wang, M., Zhou, L. ("Betty"), & Shi, J. (2016). When and how does functional diversity influence team innovation? The mediating role of knowledge sharing and the moderation role of affect-based trust in a team. *Human Relations*, *69*(7), 1507-1531. *https://doi.org/10.1177/0018726715615684*

Cherry, B. (2015). Entrepreneur as trust-builder: Interaction frequency and relationship duration as moderators of the factors of perceived trustworthiness. *International Journal of Business and Globalisation*, *14*(1), 97-121. *https://doi.org/10.1504/ijbg.2015.066098*

Chiaburu, D. S., Marinova, S. V., & Lim, A. S. (2007). Helping and proactive extra-role behaviors: The influence of motives, goal orientation, and social context. *Personality and Individual Differences*, *43*(8), 2282-2293. *https://doi.org/10.1016/j.paid.2007.07.007*

Chiu, C. M., Hsu, M. H., & Wang, E. T. G. (2006). Understanding knowledge sharing in virtual communities: An integration of social capital and social cognitive theories. *Decision Support Systems*, *42*(3), 1872-1888. *https://doi.org/10.1016/j.dss.2006.04.001*

Conway, J. M., & Lance, C. E. (2010). What reviewers should expect from authors regarding common method bias in organizational research. *Journal of Business and Psychology, 25*(3), 325-334. *https://doi.org/10.1007/s10869-010-9181-6*

Choi, G., Im, I., & Lee, J. (2020). Where does knowledge-sharing motivation come from? The case of third-party developers in mobile platforms. *Journal of Knowledge Management*, *24*(7), 1681-1704. *https://doi.org/10.1108/JKM-08-2019-0449*

Choi, S. (2019). The roles of media capabilities of smartphone-based SNS in developing social capital. *Behaviour & Information Technology*, *38*(6), 609-620. *https://doi.org/10.1080/0144929x.2018.1546903*

Choi, W., Noe, R. A., & Cho, Y. (2019). What is responsible for the psychological capital-job performance relationship? An examination of the role of informal learning and person-environment fit. *Journal of Managerial Psychology*, *35*(1), 28-41. *https://doi.org/10.1108/jmp-12-2018-0562*

Choudhury, P., Foroughi, C., & Larson, B. (2021). Work-from-anywhere: The productivity effects of geographic flexibility. *Strategic Management Journal*, *42*(4), 655-683. *https://doi.org/10.1002/smj.3251*

Choudhary, S., & Mishra, K. (2023). Understanding knowledge hiding in the context of virtual workplaces. *VINE Journal of Information and Knowledge Management Systems, 53*(3), 566–589. *https://doi.org/10.1108/VJIKMS-10-2020-0185*

Chow, W. S., & Chan, L. S. (2008). Social network, social trust and shared goals in organizational knowledge sharing. *Information & Management*, *45*(7), 458-465. *https://doi.org/10.1016/j.im.2008.06.007*

Chua, A. Y. K. (2002). The influence of social interaction on knowledge creation. *Journal of Intellectual Capital*, *3*(4), 375-392. *https://doi.org/10.1108/14691930210448297*

Chudoba, K. M., Wynn, E., Lu, M., & Watson-Manheim, M. B. (2005). How virtual are we? Measuring virtuality and understanding its impact in a global organization. *Information Systems Journal*, *15*(4), 279-306. *https://doi.org/10.1111/j.1365-2575.2005.00199.x*

Chumg, H. F., Cooke, L., & Fincham, R. (2022). What drives working habits for sharing knowledge in virtual teams? An organizational embeddedness perspective. *SAGE Open*, *12*(1). *https://doi.org/10.1177/21582440221079924*

Cichobłaziński, L. (2022). Counterproductive aspects of remote work in the context of exchange of knowledge. In *Proceedings of the European Conference on Knowledge Management* (Vol. 1, pp. 218-225). *https://doi.org/10.34190/eckm.23.1.799*

Cichobłaziński, L. (2023). Knowledge management in the context of remote work in the opinions of employees: Challenges and opportunities. In *Proceedings of the European Conference on Knowledge Management* (Vol. 1, pp. 232-239). *https://doi.org/10.34190/eckm.24.1.1793*

Cidade, D. F., Bissani, M., & Oliveira, M. (2022). The relationship between remote work, knowledge sharing and knowledge hiding. In *Proceedings of the European Conference on Knowledge Management* (Vol. 1, pp. 226-235). *https://doi.org/10.34190/eckm.23.1.519*

Clardy, A. (2018). 70-20-10 and the dominance of informal learning: A fact in search of evidence. *Human Resource Development Review*, *17*(2), 153-178. *https://doi.org/10.1177/1534484318759399*

Cohen, J. (1988). *Statistical power analysis for the behavioral sciences* (2nd ed.). Lawrence Erlbaum Associates.

Cohen, J. (1992). A power primer. *Psychological Bulletin*, *112*(1), 155-159. *https://doi.org/10.1037/0033-2909.112.1.155*

Cohen, L., Manion, L., & Morrison, K. (2018). *Research methods in education* (8th ed.). Routledge.

Cohen, S. G., & Gibson, C. B. (2003). In the beginning: Introduction and framework. In C. B. Gibson & S. G. Cohen (Eds.), *Virtual teams that work: Creating conditions for virtual team effectiveness* (pp. 1-13). Jossey-Bass.

Cohen, S., & Wills, T. A. (1985). Stress, social support, and the buffering hypothesis. Psychological Bulletin, 98(2), 310–357. *https://doi.org/10.1037/0033-2909.98.2.310*

Colazo, J. A. (2014). Structural changes associated with temporal dispersion in software development teams: Evidence from open source software project teams. *International Journal of Innovation Management*, *18*(5), Article 1450030. *https://doi.org/10.1142/s1363919614500303*

Colazo, J. A., & Fang, Y. (2010). Following the sun: Temporal dispersion and performance in open source software project teams. *Journal of the Association for Information Systems*, *11*(11), 684-707. *https://doi.org/10.17705/1jais.00243*

Coleman, J. S. (1988). Social capital in the creation of human capital. *American Journal of Sociology*, *94*(S), S95-S120. *https://doi.org/10.1086/228965*

Collins, C. J., & Smith, K. G. (2006). Knowledge exchange and combination: The role of human resource practices in the performance of high-technology firms. *Academy of Management Journal*, *49*(3), 544-560. *https://doi.org/10.5465/AMJ.2006.21794671*

Colquitt, J. A., Scott, B. A., & LePine, J. A. (2007). Trust, trustworthiness, and trust propensity: A meta-analytic test of their unique relationships with risk taking and job performance. *Journal of Applied Psychology*, *92*(4), 909-927. *https://doi.org/10.1037/0021-9010.92.4.909*

Colquitt, J. A., & Zapata-Phelan, C. P. (2007). Trends in theory building and theory testing: A five-decade study of the Academy of Management Journal. *Academy of Management Journal*, *50*(6), 1281-1303. *https://doi.org/10.5465/amj.2007.28165855*

Constant, D., Sproull, L., & Kiesler, S. (1996). The kindness of strangers: The usefulness of electronic weak ties for technical advice. *Organization Science*, *7*(2), 119-135. *https://doi.org/10.1287/orsc.7.2.119*

Cooper, C. D., & Kurland, N. B. (2002). Telecommuting, professional isolation, and employee development in public and private organizations. *Journal of Organizational Behavior*, *23*(4), 511-532. *https://doi.org/10.1002/job.145*

Coovert, M. D., Miller, E. E. P., & Bennett, W. (2017). Assessing trust and effectiveness in virtual teams: Latent growth curve and latent change score models. *Social Sciences*, *6*(3), Article 87. *https://doi.org/10.3390/socsci6030087*

Coromina, L., & Coenders, G. (2006). Reliability and validity of egocentered network data collected via web: A meta-analysis of multilevel multitrait multimethod studies. *Social Networks*, *28*(3), 209-231. *https://doi.org/10.1016/j.socnet.2005.07.006*

Costa, P., Passos, A. M., Rico, R., & Santos, C. M. (2024). Team perceived virtuality: Empirical exploration of its two dimensions. *Group Dynamics: Theory, Research, and Practice*, *28*(2), 101-119. *https://doi.org/10.1037/gdn0000202*

Costa, P. L., Handke, L., & O'Neill, T. A. (2021). Are all lockdown teams created equally? Work characteristics and team perceived virtuality. *Small Group Research*, *52*(5), 600-628. *https://doi.org/10.1177/1046496421997897*

Costantini, A., & Weintraub, J. (2022). The benefits of being proactive while working remotely: Leveraging self-leadership and job crafting to achieve higher work engagement and task significance. *Frontiers in Psychology*, *13*, 833776. *https://doi.org/10.3389/fpsyg.2022.833776*

Covey, S. M. R., & Merrill, R. R. (2008). *The speed of trust: The one thing that changes everything*. Free Press.

Cox, R. B., Jr., deSouza, D. K., Bao, J., Lin, H., Sahbaz, S., Greder, K. A., Larzelere, R. E., Washburn, I. J., Leon-Cartagena, M., & Arredondo-Lopez, A. (2021). Shared language

erosion: Rethinking immigrant family communication and impacts on youth development. *Children*, *8*(4), 256. *https://doi.org/10.3390/children8040256*

Cramton, C. D. (2001). The mutual knowledge problem and its consequences for dispersed collaboration. *Organization Science*, *12*(3), 346–371. *https://doi.org/10.1287/orsc.12.3.346.10098*

Crant, J. M. (1995). The proactive personality scale and objective job performance among real estate agents. *Journal of Applied Psychology*, *80*(4), 532-537.

Crant, J. M. (2000). Proactive behavior in organizations. *Journal of Management*, *26*(3), 435-462.

Creswell, J. W. (2014). *Research design: Qualitative, quantitative, and mixed methods approaches* (4th ed.). SAGE Publications.

Creswell, J. W., & Plano Clark, V. L. (2011). *Designing and conducting mixed methods research* (2nd ed.). SAGE Publications.

Crisp, B. C., & Jarvenpaa, S. L. (2013). Swift trust in global virtual teams: Trusting beliefs and normative actions. *Journal of Personnel Psychology*, *12*(1), 45-56. *https://doi.org/10.1027/1866-5888/a000075*

Cross, R., Borgatti, S. P., & Parker, A. (2002). Making invisible work visible: Using social network analysis to support strategic collaboration. *California Management Review*, *44*(2), 25-46. *https://doi.org/10.2307/41166121*

Cross, R., & Parker, A. (2004). *The hidden power of social networks*. Harvard Business School Press.

Cross, R., Opie, T., Pryor, G., & Rollag, K. (2018). Connect and adapt: How network development and transformation improve retention and engagement in employees' first five years. *Organizational Dynamics*, *47*(2), 115-123. *https://doi.org/10.1016/j.orgdyn.2017.08.003*

Cross, R., & Sproull, L. (2004). More than an answer: Information relationships for actionable knowledge. *Organization Science*, *15*(4), 446-462. *https://doi.org/10.1287/orsc.1040.0075*

Crossley, C. D., Bennett, R. J., Jex, S. M., & Burnfield, J. L. (2007). Development of a global measure of job embeddedness and integration into a traditional model of voluntary turnover. *Journal of Applied Psychology*, *92*(4), 1031-1042. *https://doi.org/10.1037/0021-9010.92.4.1031*

Crotty, M. (1998). *The foundations of social research: Meaning and perspective in the research process* (1st ed.). Routledge. *https://doi.org/10.4324/9781003115700*

Cummings, J. N. (2004). Work groups, structural diversity, and knowledge sharing in a global organization. *Management Science*, *50*(3), 352-364. *https://doi.org/10.1287/mnsc.1030.0134*

Cummings, J. N., Espinosa, J. A., & Pickering, C. K. (2007). Spatial and temporal boundaries in global teams: Distinguishing where you work from when you work. In P. Hinds & D. Bailey (Eds.), *Global teams: How top multinationals span boundaries and cultures with high-speed teamwork* (pp. 85-98). Springer. *https://doi.org/10.1007/978-0-387-73025-7_8*

Cuypers, I. R. P., Ertug, G., Cantwell, J., Zaheer, A., & Kilduff, M. (2020). Making connections: Social networks in international business. *Journal of International Business Studies*, *51*(5), 714-736. *https://doi.org/10.1057/s41267-020-00319-9*

Daft, R. L., & Lengel, R. H. (1986). Organizational information requirements, media richness and structural design. *Management Science*, *32*(5), 554-571. *https://doi.org/10.1287/mnsc.32.5.554*

Dainton, M., & Stafford, L. (1993). Routine maintenance behaviors: A comparison of relationship type, partner similarity and sex differences. *Journal of Social and Personal Relationships*, *10*(2), 255-272. *https://doi.org/10.1177/026540759301000206*

Dang, V. T., Vu, T. T., & Nguyen, P. T. (2020). Workplace learning and foreign workers' commitment to host cultural organizations: The effects of cross-cultural adjustment and supervisor trust. *Employee Relations*, *43*(1), 297-317. *https://doi.org/10.1108/ER-02-2020-0039*

Darban, M. (2022). Learning in virtual student teams: An examination of shared leadership. *Journal of Research on Technology in Education*, *54*(5), 736-753. *https://doi.org/10.1080/15391523.2021.1916800*

Darban, M. (2024). Reviving dormant ties: The impact of team virtuality and shared leadership on innovative performance. *ECIS 2024 TREOS*, 39. *https://aisel.aisnet.org/treos_ecis2024/39*

Davenport, T. H., & Prusak, L. (1998). *Working knowledge: How organizations manage what they know*. Harvard Business School Press.

De Clercq, D., & Pereira, R. (2020). Knowledge-sharing efforts and employee creative behavior: The invigorating roles of passion for work, time sufficiency and procedural justice. *Journal of Knowledge Management*, *24*(5), 1131-1155. *https://doi.org/10.1108/JKM-06-2019-0274*

Decius, J., Schaper, N., & Seifert, A. (2019). Informal workplace learning: Development and validation of a measure. *Human Resource Development Quarterly*, *30*(4), 495-535. *https://doi.org/10.1002/hrdq.21368*

Deci, E. L., & Ryan, R. M. (1985). *Intrinsic motivation and self-determination in human behavior*. Plenum. *https://doi.org/10.1007/978-1-4899-2271-7*

Deci, E. L., & Ryan, R. M. (2000). The "what" and "why" of goal pursuits: Human needs and the self-determination of behavior. *Psychological Inquiry*, *11*(4), 227-268. *https://doi.org/10.1207/S15327965PLI1104_01*

De Jong, J. P. J., & Den Hartog, D. N. (2007). How leaders influence employees' innovative behaviour. *European Journal of Innovation Management*, *10*(1), 41-64. *https://doi.org/10.1108/14601060710720546*

De Jong, J., & Den Hartog, D. (2010). Measuring innovative work behaviour. *Creativity and Innovation Management*, *19*(1), 23-36. *https://doi.org/10.1111/j.1467-8691.2010.00547.x*

de Laat, M. (2012). *Enabling professional development networks: How connected are you?* Open Universiteit.

DeKay, S. H. (2012). Interpersonal communication in the workplace: A largely unexplored region. *Business Communication Quarterly*, *75*(4), 449-452. *https://doi.org/10.1177/1080569912458964*

Delanoeije, J., & Verbruggen, M. (2020). Between-person and within-person effects of telework: A quasi-field experiment. *European Journal of Work and Organizational Psychology*, *29*(6), 795-808. *https://doi.org/10.1080/1359432X.2020.1774557*

De Koning, R., Filip, R., Das, S., Karim, H., van Dellen, J. R., & Raslan, A. M. (2021). Survey fatigue during the COVID-19 pandemic: An analysis of neurosurgery survey response rates. *Frontiers in Surgery, 8*, 690680. *https://doi.org/10.3389/fsurg.2021.690680*

de Lucas Ancillo, A., del Val Núñez, M. T., & Gavrila, S. G. (2021). Workplace change within the COVID-19 context: A grounded theory approach. *Economic Research-Ekonomska Istraživanja*, *34*(1), 2297-2316. *https://doi.org/10.1080/1331677X.2020.1862689*

De Meuse, K. P., Dai, G., & Hallenbeck, G. S. (2010). Learning agility: A construct whose time has come. *Consulting Psychology Journal: Practice and Research*, *62*(2), 119-130. *https://doi.org/10.1037/a0019988*

Den Hartog, D. N., & Belschak, F. D. (2007). Personal initiative, commitment and affect at work. *Journal of Occupational and Organizational Psychology*, *80*(4), 601-622. *https://doi.org/10.1348/096317906X171442*

Dennis, A. R., Fuller, R. M., & Valacich, J. S. (2008). Media, tasks, and communication processes: A theory of media synchronicity. *MIS Quarterly*, *32*(3), 575-600. *https://doi.org/10.2307/25148857*

Dennis, A. R., & Kinney, S. T. (1998). Testing media richness theory in the new media: The effects of cues, feedback, and task equivocality. *Information Systems Research*, *9*(3), 256-274. *https://doi.org/10.1287/isre.9.3.256*

Dennis, A. R., & Valacich, J. S. (1999). Rethinking media richness: Towards a theory of media synchronicity. *Proceedings of the 32nd Annual Hawaii International Conference on System Sciences*, 12. *https://doi.org/10.1109/HICSS.1999.772701*

Denzin, N. K. (2017). Strategies of multiple triangulation. In N. K. Denzin, *The research act: A theoretical introduction to sociological methods* (pp. xx-xx). Routledge.

DeSanctis, G., & Poole, M. S. (1994). Capturing the complexity in advanced technology use: Adaptive structuration theory. *Organization Science*, *5*(2), 121-147. *https://doi.org/10.1287/orsc.5.2.121*

De Spiegelaere, S., Van Gyes, G., & Van Hootegem, G. (2016). Not all autonomy is the same: Different dimensions of job autonomy and their relation to work engagement and innovative workbehavior. *Human Factors and Ergonomics in Manufacturing & Service Industries*, *26*(4), 515-527. *https://doi.org/10.1002/hfm.20666*

Dewett, T. (2006). Exploring the role of risk in employee creativity. *The Journal of Creative Behavior*, *40*(1), 27-45. *https://doi.org/10.1002/j.2162-6057.2006.tb01265.x*

Di Martino, V., & Wirth, L. (1990). Telework: A new way of work. *International Labour Review*, *129*(5), 529-554.

Dillman, D. A., Smyth, J. D., & Christian, L. M. (2009). *Internet, mail, and mixed-mode surveys: The tailored design method*. Wiley.

Ding, X., Feng, L., Huang, Y., & Li, W. (2024). The interactive effects of communication network structure and organizational size on task performance in project-based organizations: The mediating role of bootleg innovation behavior. *Buildings*, *14*(1), 98. *https://doi.org/10.3390/buildings14010098*

Dittes, S., & Smolnik, S. (2019). Towards a digital work environment: The influence of collaboration and networking on employee performance within an enterprise social media platform. *Journal of Business Economics*, *89*(8-9), 1215-1243. *https://doi.org/10.1007/s11573-019-00951-4*

Do, H., Budhwar, P. S., & Patel, C. (2018). Relationship between innovation-led HR policy, strategy, and firm performance: A serial mediation investigation. *Human Resource Management*, *57*(5), 1271-1284. *https://doi.org/10.1002/hrm.21903*

Dobrow, S. R., Chandler, D. E., Murphy, W. M., & Kram, K. E. (2012). A review of developmental networks: Incorporating a mutuality perspective. *Journal of Management*, *38*(1), 210-242. *https://doi.org/10.1177/0149206311415858*

Doherty, L. (2023). *Leading in a hybrid world*. Harvard Business School Publishing. *https://www.harvardbusiness.org/leading-in-a-hybrid-world/*

Doornbos, A. J., Simons, R.-J., & Denessen, E. (2008). Relations between characteristics of workplace practices and types of informal work-related learning: A survey study among Dutch police. *Human Resource Development Quarterly*, *19*(2), 129-151. *https://doi.org/10.1002/hrdq.1231*

Dorairaj, S., Noble, J., & Malik, P. (2012). Understanding lack of trust in distributed agile teams: A grounded theory study. *IET Seminar Digest*, *2012*(1), 81-90. *https://doi.org/10.1049/ic.2012.0011*

Dragojevic, M., & Giles, H. (2014). Language and interpersonal communication: Their intergroup dynamics. In C. R. Berger (Ed.), *Interpersonal communication* (pp. 29-51). De Gruyter Mouton. *https://doi.org/10.1515/9783110276794.29*

Driskell, J. E., Radtke, P. H., & Salas, E. (2003). Virtual teams: Effects of technological mediation on team performance. *Group Dynamics: Theory, Research, and Practice*, *7*(4), 297-323. *https://doi.org/10.1037/1089-2699.7.4.297*

Dubreuil, P., Forest, J., Courcy, F., & Fernet, C. (2021). Strengths use at work: Positive and negative emotions as key processes explaining work performance. *Canadian Journal of Administrative Sciences*, *38*(2), 150-161. *https://doi.org/10.1002/cjas.1595*

Duck, S. (1994). Steady as (s)he goes: Relational maintenance as a shared meaning system. In D. J. Canary & L. Stafford (Eds.), *Communication and relational maintenance* (pp. 45-60). Academic Press.

Durcikova, A., Fadel, K. J., Butler, B. S., & Galletta, D. F. (2011). Knowledge exploration and exploitation: The impacts of psychological climate and knowledge management system access. *Information Systems Research*, *22*(4), 855-866. *https://doi.org/10.1287/isre.1100.0286*

Dwivedi, Y. K., Hughes, L., Coombs, C., Constantiou, I., Duan, Y., Edwards, J. S., Gupta, B., Lal, B., Misra, S., Prashant, P., Raman, R., Rana, N. P., Sharma, S. K., & Upadhyay, N. (2020). Impact of COVID-19 pandemic on information management research and practice: Transforming education, work and life. *International Journal of Information Management*, *55*, 102211. *https://doi.org/10.1016/j.ijinfomgt.2020.102211*

Dzandu, M. D., Hatsu, S., & De Cesare, S. (2023). Remote working and task innovativeness: An integrated resource-based view and antecedent-behaviour-consequence perspective. *Information Systems Frontiers*, *27*(2), 539-562. *https://doi.org/10.1007/s10796-023-10452-z*

Eagle, D. E., & Proeschold-Bell, R. J. (2015). Methodological considerations in the use of name generators and interpreters. *Social Networks*, *40*, 75-83. *https://doi.org/10.1016/j.socnet.2014.07.005*

Easterby-Smith, M., Thorpe, R., & Jackson, P. R. (2018). *Management and business research* (6th ed.). SAGE Publications.

Easton, G. (2010). Critical realism in case study research. *Industrial Marketing Management*, *39*(1), 118-128. *https://doi.org/10.1016/j.indmarman.2008.06.004*

Echebiri, C. K. (2021). *Employee-driven innovation: An empowerment-based view* [Doctoral dissertation, Inland Norway University of Applied Sciences]. Inland Norway University of Applied Sciences.

Echebiri, C., Amundsen, S., & Engen, M. (2020). Linking structural empowerment to employee-driven innovation: The mediating role of psychological empowerment. *Administrative Sciences*, *10*(3), 42. *https://doi.org/10.3390/admsci10030042*

Edmondson, A. (1999). Psychological safety and learning behavior in work teams. *Administrative Science Quarterly*, *44*(2), 350-383. *https://doi.org/10.2307/2666999*

Edmondson, A. C., & Lei, Z. (2014). Psychological safety: The history, renaissance, and future of an interpersonal construct. *Annual Review of Organizational Psychology and Organizational Behavior*, *1*(1), 23-43. *https://doi.org/10.1146/annurev-orgpsych-031413-091305*

Eid, M., Lischetzke, T., Nussbeck, F. W., & Trierweiler, L. I. (2003). Separating trait effects from trait-specific method effects in multitrait-multimethod models: A multiple-indicator CT-C(M-1) model. *Psychological Methods*, *8*(1), 38-60. *https://doi.org/10.1037/1082-989X.8.1.38*

Eisenberg, J., Post, C., & DiTomaso, N. (2019). Team dispersion and performance: The role of team communication and transformational leadership. *Small Group Research*, *50*(3), 348-380. *https://doi.org/10.1177/1046496419827376*

Eiteneyer, N., Bendig, D., & Brettel, M. (2019). Social capital and the digital crowd: Involving backers to promote new product innovativeness. *Research Policy*, *48*(8), 103744. *https://doi.org/10.1016/j.respol.2019.01.017*

Ellison, N. B., Steinfield, C., & Lampe, C. (2007). The benefits of Facebook "friends:" Social capital and college students' use of online social network sites. *Journal of Computer-Mediated Communication*, *12*(4), 1143-1168. *https://doi.org/10.1111/j.1083-6101.2007.00367.x*

Ellström, P. E. (2010). Informal learning at work: Conditions, processes, and logics. In M. Malloch, L. Cairns, K. Evans, & B. N. O'Connor (Eds.), *The SAGE handbook of workplace learning* (pp. 249-266). SAGE Publications.

Ertug, G., Gargiulo, M., Galunic, C., & Zou, T. (2018). Homophily and individual performance. *Organization Science*, *29*(5), 912-930. *https://doi.org/10.1287/orsc.2018.1207*

Escribá-Carda, N., Canet-Giner, T., & Balbastre-Benavent, F. (2023). The role of engagement and knowledge-sharing in the high-performance work systems-innovative behaviour relationship. *European Journal of Management and Business Economics*. *https://doi.org/10.1108/EJMBE-07-2022-0206*

Eurofound and the International Labour Office. (2017). *Working anytime, anywhere: The effects on the world of work*. Publications Office of the European Union, Luxembourg, and the International Labour Office, Geneva. *http://eurofound.link/ef1658*

European Agreement Framework on Telework. (2002). *European framework agreement on telework*. Retrieved September 9, 2024, from *https://resourcecentre.etuc.org/sites/default/files/2020-09/Telework%202002_Framework%20Agreement%20-%20EN.pdf*

Fang, R., Duffy, M. K., & Shaw, J. D. (2011). The organizational socialization process: Review and development of a social capital model. *Journal of Management*, *37*(1), 127-152. *https://doi.org/10.1177/0149206310384630*

Fang, Y. H., & Chiu, C. M. (2010). In justice we trust: Exploring knowledge-sharing continuance intentions in virtual communities of practice. *Computers in Human Behavior*, *26*(2), 235-246. *https://doi.org/10.1016/j.chb.2009.09.005*

Farh, J. L., Hackett, R. D., & Liang, J. (2007). Individual-level cultural values as moderators of perceived organizational support-employee outcome relationships in China: Comparing the effects of power distance and traditionality. *Academy of Management Journal*, *50*(3), 715-729. *https://doi.org/10.5465/amj.2007.25530866*

Farmer, S. M., Tierney, P., & Kung-McIntyre, K. (2003). Employee creativity in Taiwan: An application of role identity theory. *Academy of Management Journal*, *46*(5), 618-630. *https://doi.org/10.5465/300*

Faul, F., Erdfelder, E., Buchner, A., & Lang, A.-G. (2009). Statistical power analyses using G*Power 3.1: Tests for correlation and regression analyses. *Behavior Research Methods*, *41*(4), 1149-1160. *https://doi.org/10.3758/BRM.41.4.1149*

Felstead, A., Gallie, D., Green, F., & Henseke, G. (2020). Getting the measure of employee-driven innovation and its workplace correlates. *British Journal of Industrial Relations*, *58*(4), 904-935. *https://doi.org/10.1111/bjir.12528*

Felstead, A., & Henseke, G. (2017). Assessing the growth of remote working and its consequences for effort, well-being and work-life balance. *New Technology, Work and Employment*, *32*(3), 195-212. *https://doi.org/10.1111/ntwe.12097*

Fetters, M. D., & Freshwater, D. (2015). The 1 + 1 = 3 integration challenge. *Journal of Mixed Methods Research*, *9*(2), 115-117. *https://doi.org/10.1177/1558689815581222*

Field, A. (2013). *Discovering statistics using IBM SPSS statistics* (4th ed.). Sage Publications.

Fiol, C. M., & O'Connor, E. J. (2005). Identification in face-to-face, hybrid, and pure virtual teams: Untangling the contradictions. *Organization Science*, *16*(1), 19-32. *https://doi.org/10.1287/orsc.1040.0101*

Fischer, C. S. (1982). *To dwell among friends: Personal networks in town and city*. University of Chicago Press.

Flick, U. (2018). *An introduction to qualitative research* (6th ed.). SAGE Publications.

Flocco, N., Canterino, F., & Cagliano, R. (2021). Leading innovation through employees' participation: Plural leadership in employee-driven innovation practices. *Leadership*, *17*(5), 499-518. *https://doi.org/10.1177/1742715020987928*

Ford, D., Storey, M.-A., Zimmermann, T., Bird, C., Jaffe, S., Maddila, C., Butler, J. L., Houck, B., & Nagappan, N. (2022). A tale of two cities: Software developers working from home during the COVID-19 pandemic. *ACM Transactions on Software Engineering and Methodology*, *31*(2), Article 27. *https://doi.org/10.1145/3487567*

Fornell, C., & Larcker, D. F. (1981). Evaluating structural equation models with unobservable variables and measurement error. *Journal of Marketing Research*, *18*(1), 39-50. *https://doi.org/10.2307/3151312*

Frazier, M. L., Fainshmidt, S., Klinger, R. L., Pezeshkan, A., & Vracheva, V. (2017). Psychological safety: A meta-analytic review and extension. *Personnel Psychology*, *70*(1), 113-165. *https://doi.org/10.1111/peps.12183*

Fregnan, E., Sarnacchiaro, P., Masino, G., & Morselli, D. (2022). New working capabilities for coping with COVID time challenges. *Frontiers in Psychology*, *13*, 814348. *https://doi.org/10.3389/fpsyg.2022.814348*

Frese, M., Teng, E., & Wijnen, C. J. D. (1999). Helping to improve suggestion systems: Predictors of making suggestions in companies. *Journal of Organizational Behavior, 20*(7), 1139–1155. *https://www.jstor.org/stable/3100351*

Frese, M., Fay, D., Hilburger, T., Leng, K., & Tag, A. (1997). The concept of personal initiative: Operationalization, reliability and validity in two German samples. *Journal of Occupational and Organizational Psychology*, *70*(2), 139-161. *https://doi.org/10.1111/j.2044-8325.1997.tb00639.p*

Fugate, M., Kinicki, A. J., & Ashforth, B. E. (2004). Employability: A psycho-social construct, its dimensions, and applications. *Journal of Vocational Behavior*, *65*(1), 14-38. *https://doi.org/10.1016/j.jvb.2003.10.005*

Furumo, K. (2009). The impact of conflict and conflict management style on deadbeats and deserters in virtual teams. *Journal of Computer Information Systems*, *49*(4), 66-73.

Gagné, M., Tian, A. W., Soo, C., Zhang, B., Ho, K. S. B., & Hosszu, K. (2019). Different motivations for knowledge sharing and hiding: The role of motivating work design. *Journal of Organizational Behavior*, *40*(7), 783-799. *https://doi.org/10.1002/job.2364*

Gajendran, R. S., & Harrison, D. A. (2007). The good, the bad, and the unknown about telecommuting: Meta-analysis of psychological mediators and individual consequences. *Journal of Applied Psychology*, *92*(6), 1524-1541. *https://doi.org/10.1037/0021-9010.92.6.1524*

Gajendran, R. S., Harrison, D. A., & Delaney-Klinger, K. (2015). Are telecommuters remotely good citizens? Unpacking telecommuting's effects on performance via ideals and job resources. *Personnel Psychology*, *68*(2), 353-393. *https://doi.org/10.1111/peps.12082*

Gajendran, R. S., & Joshi, A. (2012). Innovation in globally distributed teams: The role of LMX, communication frequency, and member influence on team decisions. *Journal of Applied Psychology*, *97*(6), 1252-1261. *https://doi.org/10.1037/a0028958*

Gallois, C., Ogay, T., & Giles, H. (2005). Communication accommodation theory: A look back and a look ahead. In W. B. Gudykunst (Ed.), *Theorizing about intercultural communication* (pp. 121-148). SAGE Publications.

Ganguly, A., Talukdar, A., & Chatterjee, D. (2019). Evaluating the role of social capital, tacit knowledge sharing, knowledge quality and reciprocity in determining innovation capability of an organization. *Journal of Knowledge Management*, *23*(6), 1105-1135. *https://doi.org/10.1108/JKM-03-2018-0190*

Gannon, B., & Roberts, J. (2020). Social capital: Exploring the theory and empirical divide. *Empirical Economics*, *58*(3), 899-919. *https://doi.org/10.1007/s00181-018-1556-y*

George, J. M., & Zhou, J. (2001). When openness to experience and conscientiousness are related to creative behavior. *Journal of Applied Psychology*, *86*(3), 513-524. *https://doi.org/10.1037/0021-9010.86.3.513*

Gibbs, M., Mengel, F., & Siemroth, C. (2024). Employee innovation during office work, work from home and hybrid work. *Scientific Reports*, *14*(1), 67122. *https://doi.org/10.1038/s41598-024-67122-6*

Gibson, C. B., & Gibbs, J. L. (2006). Unpacking the concept of virtuality: The effects of geographic dispersion, electronic dependence, dynamic structure, and national diversity on team innovation. *Administrative Science Quarterly*, *51*(3), 451-495. *https://doi.org/10.2189/asqu.51.3.451*

Gillespie, N. (2013, August). *Measuring trust in working relationships: The behavioral trust inventory*. Paper presented at the Academy of Management Annual Meeting, Orlando, FL.

Gilson, L. L., Maynard, M. T., Jones Young, N. C., Vartiainen, M., & Hakonen, M. (2015). Virtual teams research: 10 years, 10 themes, and 10 opportunities. *Journal of Management*, *41*(5), 1313-1337. *https://doi.org/10.1177/0149206314559946*

Gittell, J. H. (2002). Coordinating mechanisms in care provider groups: Relational coordination as a mediator and input uncertainty as a moderator of performance effects. *Management Science*, *48*(11), 1408-1426. *https://doi.org/10.1287/mnsc.48.11.1408.268*

Glanville, J. L., & Andersson, M. A. (2013). Do social connections create trust? An examination using new longitudinal data. *Social Forces*, *92*(2), 545-562. *https://doi.org/10.1093/sf/sot079*

Golden, T. D., & Veiga, J. F. (2005). The impact of extent of telecommuting on job satisfaction: Resolving inconsistent findings. *Journal of Management*, *31*(2), 301-318. *https://doi.org/10.1177/0149206304271768*

Golden, T. D., Veiga, J. F., & Dino, R. N. (2008). The impact of professional isolation on teleworker job performance and turnover intentions: Does time spent teleworking, interacting face-to-face, or having access to communication-enhancing technology matter? *Journal of Applied Psychology*, *93*(6), 1412-1421. *https://doi.org/10.1037/a0012722*

Goldkuhl, G. (2012). Pragmatism vs interpretivism in qualitative information systems research. *European Journal of Information Systems*, *21*(2), 135-146. *https://doi.org/10.1057/ejis.2011.54*

Goldman, M. M., Kihl, L. A., & Ditmore, M. (2016). I am distinctive when I belong: Meeting the need for optimal distinctiveness through team identification. *International Journal of Sport Management and Marketing*, *16*(3), 198-220. https://doi.org/10.1504/IJSMM.2016.077930

Goldstein, H. (2011). *Multilevel statistical models* (4th ed.). Wiley.

Gomez-Baya, D., & Lucia-Casademunt, A. M. (2018). A self-determination theory approach to health and well-being in the workplace: Results from the sixth European working conditions survey in Spain. *Journal of Applied Social Psychology*, *48*(5), 269-283. https://doi.org/10.1111/jasp.12513

González-Pernía, J. L., Parrilli, M. D., & Peña-Legazkue, I. (2015). STI-DUI learning modes, firm-university collaboration and innovation. *Journal of Technology Transfer*, *40*(3), 475-492. https://doi.org/10.1007/s10961-014-9352-0

Granovetter, M. S. (1973). The strength of weak ties. *American Journal of Sociology*, *78*(6), 1360-1380. https://doi.org/10.1086/225469

Grant, A. M. (2008). The significance of task significance: Job performance effects, relational mechanisms, and boundary conditions. *Journal of Applied Psychology*, *93*(1), 108-124. https://doi.org/10.1037/0021-9010.93.1.108

Grant, A. M., & Parker, S. K. (2009). Redesigning work design theories: The rise of relational and proactive perspectives. In J. P. Walsh & A. P. Brief (Eds.), *The Academy of Management annals* (Vol. 3, No. 1, pp. 317-375). Routledge. https://doi.org/10.1080/19416520903047327

Grant, R. M. (1996a). Prospering in dynamically competitive environments: Organizational capability as knowledge integration. *Organization Science*, *7*(4), 375-387. https://doi.org/10.1287/orsc.7.4.375

Grant, R. M. (1996b). Toward a knowledge-based theory of the firm. *Strategic Management Journal*, *17*(S2), 109-122. *https://doi.org/10.1002/smj.4250171110*

Gray, P. H., & Meister, D. B. (2004). Knowledge sourcing effectiveness. *Management Science*, *50*(6), 821-834. *https://doi.org/10.1287/mnsc.1030.0192*

Gray, P. H., & Meister, D. B. (2006). Knowledge sourcing methods. *Information & Management*, *43*(2), 142-156. *https://doi.org/10.1016/j.im.2005.03.002*

Griffin, M. A., Neal, A., & Parker, S. K. (2007). A new model of work role performance: Positive behavior in uncertain and interdependent contexts. *Academy of Management Journal*, *50*(2), 327-347. *https://doi.org/10.5465/amj.2007.24634438*

Griffith, T. L., Sawyer, J. E., & Neale, M. A. (2003). Virtualness and knowledge in teams: Managing the love triangle of organizations, individuals, and information technology. *MIS Quarterly*, *27*(2), 265-287. *https://doi.org/10.2307/30036531*

Guba, E. G., & Lincoln, Y. S. (1994). Competing paradigms in qualitative research. In N. K. Denzin & Y. S. Lincoln (Eds.), *Handbook of qualitative research* (pp. 105-117). Sage Publications.

Guba, E. G., & Lincoln, Y. S. (2005). Paradigmatic controversies, contradictions, and emerging confluences. In N. K. Denzin & Y. S. Lincoln (Eds.), *The Sage handbook of qualitative research* (3rd ed., pp. 191-215). Sage Publications.

Gubbins, C., & Dooley, L. (2021). Delineating the tacit knowledge-seeking phase of knowledge sharing: The influence of relational social capital components. *Human Resource Development Quarterly*, *32*(3), 1-30. *https://doi.org/10.1002/hrdq.21423*

Gupta, S., Pathak, G. S., & Biswas, B. (2024). The roles of conflict management and psychological empowerment in virtual teams. *Information Technology & People*, *37*(8), 66-108. *https://doi.org/10.1108/ITP-04-2022-0265*

Hacker, J. V., Johnson, M., Saunders, C., & Thiel, S. (2019). Trust in virtual teams: A multidisciplinary review and integration. *Australasian Journal of Information Systems*, *23*, 1-36. *https://doi.org/10.3127/ajis.v23i0.1757*

Hackman, J. R., & Oldham, G. R. (1980). *Work redesign*. Addison-Wesley.

Hair, J. F., Black, W. C., Babin, B. J., & Anderson, R. E. (2010). *Multivariate data analysis* (7th ed.). Pearson Prentice Hall.

Hair, J. F., Hult, G. T. M., Ringle, C. M., & Sarstedt, M. (2017). *A primer on partial least squares structural equation modeling (PLS-SEM)* (2nd ed.). SAGE.

Hambley, L. A., O'Neill, T. A., & Kline, T. J. B. (2007). Virtual team leadership: The effects of leadership style and communication medium on team interaction styles and outcomes. *Organizational Behavior and Human Decision Processes*, *103*(1), 1-20. *https://doi.org/10.1016/j.obhdp.2006.09.004*

Han, S. H., Yoon, S. W., & Chae, C. (2020). Building social capital and learning relationships through knowledge sharing: A social network approach of management students' cases. *Journal of Knowledge Management*, *24*(4), 921-939. *https://doi.org/10.1108/JKM-11-2019-0641*

Handke, L., Schulte, E. M., Schneider, K., & Kauffeld, S. (2024). Hybrid teamwork: What we know and where we can go from here. *Small Group Research*. *https://doi.org/10.1177/10464964241279078*

Handke, L., Schulte, E.-M., Schneider, K., & Kauffeld, S. (2019). Teams, time, and technology: Variations of media use over project phases. *Small Group Research*, *50*(2), 266-305. *https://doi.org/10.1177/1046496418824151*

Hanneman, R. A., & Riddle, M. (2005). *Introduction to social network methods*. University of California, Riverside. *https://faculty.ucr.edu/~hanneman/nettext/*

Hansen, K., Madsen, S., & Vatrapu, R. (2017). Management practices for promoting employee-driven innovation. In R. Nuottila (Ed.), *Perspectives on competence development* (pp. 321-338). Springer. *https://doi.org/10.1007/978-3-319-56333-6_19*

Hansen, M. T. (1999). The search-transfer problem: The role of weak ties in sharing knowledge across organization subunits. *Administrative Science Quarterly*, *44*(1), 82-111. *https://doi.org/10.2307/2667032*

Hansen, M. T., Mors, M. L., & Løvås, B. (2005). Knowledge sharing in organizations: Multiple networks, multiple phases. *Academy of Management Journal*, *48*(5), 776-793. *https://doi.org/10.5465/amj.2005.18803922*

Hao, Q., Shi, Y., & Zhang, M. (2022). How trust in coworkers fosters knowledge sharing in virtual teams? A multilevel moderated mediation model of psychological safety, team virtuality, and self-efficacy. *Frontiers in Psychology*, *13*, 899142. *https://doi.org/10.3389/fpsyg.2022.899142*

Harmaakorpi, V., & Melkas, H. (Eds.). (2012). *Practice-based innovation: Insights, applications and policy implications*. Springer.

Harmaakorpi, V., Melkas, H., & Uotila, T. (2017). Re-categorizing innovation policy according to broad-based innovation. *European Planning Studies*, *25*(9), 1477-1496. *https://doi.org/10.1080/09654313.2017.1327035*

Hartley, J., Sørensen, E., & Torfing, J. (2013). Collaborative innovation: A viable alternative to market competition and organisational entrepreneurship. *Public Administration Review*, *73*(6), 821-830. *https://doi.org/10.1111/puar.12136*

Haslam, C., Jetten, J., Cruwys, T., Dingle, G. A., & Haslam, S. A. (2021). Life change, social identity, and health. *Annual Review of Psychology*, *72*, 635-661. *https://doi.org/10.1146/annurev-psych-060120-111721*

Hatmaker, D. M., Park, H. H., & Rethemeyer, R. K. (2011). Learning the ropes: Communities of practice and social networks in the public sector. *International Public Management Journal*, *14*(4), 395-419. *https://doi.org/10.1080/10967494.2011.656051*

Hathcoat, J. D., Sanders, C. B., & Gregg, N. (2016). *Selecting and designing instruments: Item development, reliability, and validity* (Center for Assessment and Research Studies (CARS) Technical Report, 36).

Hattie, J., & Timperley, H. (2007). The power of feedback. *Review of Educational Research*, *77*(1), 81-112. *https://doi.org/10.3102/003465430298487*

Hau, L. N., & Evangelista, F. (2007). Acquiring tacit and explicit marketing knowledge from foreign partners in IJVs. *Journal of Business Research*, *60*(11), 1152-1165. *https://doi.org/10.1016/j.jbusres.2007.04.006*

Havakhor, T., & Sabherwal, R. (2018). Team processes in virtual knowledge teams: The effects of reputation signals and network density. *Journal of Management Information Systems*, *35*(1), 266-318. *https://doi.org/10.1080/07421222.2018.1440755*

Hayes, A. F. (2018). *Introduction to mediation, moderation, and conditional process analysis: A regression-based approach* (2nd ed.). Guilford Press.

Hayes, A. F. (2015). An index and test of linear moderated mediation. Multivariate Behavioral Research, 50(1), 1–22. https://doi.org/10.1080/00273171.2014.962683

Hayes, A. F., & Krippendorff, K. (2007). Answering the call for a standard reliability measure for coding data. *Communication Methods and Measures*, *1*(1), 77-89. *https://doi.org/10.1080/19312450709336664*

Haythornthwaite, C. (2002). Strong, weak, and latent ties and the impact of new media. *The Information Society*, *18*(5), 385-401. *https://doi.org/10.1080/01972240290108195*

Haythornthwaite, C. (2005). Social networks and Internet connectivity effects. *Information, Communication & Society*, *8*(2), 125-147. *https://doi.org/10.1080/13691180500146185*

Haythornthwaite, C., & Wellman, B. (1998). Work, friendship, and media use for information exchange in a networked organization. *Journal of the American Society for Information Science*, *49*(12), 1101-1114. *https://doi.org/10.1002/(SICI)1097-4571(1998)49:12*<1101::AID-ASI6>3.0.CO;2-Z

Heiden, M., Widar, L., Wiitavaara, B., Boman, E., & Boström, M. (2020). Telework in academia: Associations with health and well-being among staff. *Higher Education*, *80*(5), 707-722. *https://doi.org/10.1007/s10734-020-00569-4*

Helens-Hart, R. (2019). The employability self-assessment: Identifying and appraising career identity, personal adaptability, and social and human capital. *Management Teaching Review*, *4*(1), 6-13. *https://doi.org/10.1177/2379298118775937*

Hennink, M., Hutter, I., & Bailey, A. (2020). *Qualitative research methods*. Sage Publications Ltd.

Hertzum, M. (2014). Expertise seeking: A review. *Information Processing & Management*, *50*(5), 775-795. *https://doi.org/10.1016/j.ipm.2014.04.005*

Heubeck, T., Storz, A. S., & Meckl, R. (2024). Success factors of global virtual teamwork: A social capital perspective. *Digital Business*, *4*(2), 100081. *https://doi.org/10.1016/j.digbus.2024.100081*

Heydari, S., Dunbar, R. I. M., & Saramäki, J. (2018). Multichannel social signatures and persistent features of ego networks. *Applied Network Science*, *3*(1), 1-12. *https://doi.org/10.1007/s41109-018-0065-4*

Higgins, M. (2001). The effects of social context. *Journal of Organizational Behavior*, *22*(6), 595-618. *https://doi.org/10.1002/job*

Higgins, M. C., & Kram, K. E. (2001). Reconceptualizing mentoring at work: A developmental network perspective. *Academy of Management Review*, *26*(2), 264-288. *https://doi.org/10.2307/259122*

Higgins, M. C., & Thomas, D. A. (2001). Constellations and careers: Toward understanding the effects of multiple developmental relationships. *Journal of Organizational Behavior*, *22*(3), 223-247. *https://doi.org/10.1002/job.66*

Hill, N. S., & Bartol, K. M. (2016). Empowering leadership and effective collaboration in geographically dispersed teams. *Personnel Psychology*, *69*(1), 159-198. *https://doi.org/10.1111/peps.12108*

Hiller, F., & Zarnow, S. (2024). Fostering innovative learning and satisfaction in virtual teamwork: Shedding light on apprentices. *International Journal for Research in Vocational Education and Training*, *11*(2), 171-199. *https://doi.org/10.13152/IJRVET.11.2.2*

Hinds, P., & McGrath, C. (2006). Structures that work: Social structure, work structure and coordination ease in geographically distributed teams. In *Proceedings of the 2006 20th*

anniversary conference on Computer supported cooperative work (pp. 343-352). ACM. *https://doi.org/10.1145/1180875.1180928*

Hinkin, T. R. (1998). A brief tutorial on the development of measures for use in survey questionnaires. Organizational Research Methods, 1(1), 104–121. *https://doi.org/10.1177/109442819800100106*

Hoch, J. E., & Kozlowski, S. W. J. (2014). Leading virtual teams: Hierarchical leadership, structural supports, and shared team leadership. *Journal of Applied Psychology*, *99*(3), 390-403. *https://doi.org/10.1037/a0030264*

Hodzic, S., Ripoll, P., Lira, E., & Zenasni, F. (2024). When telework is a burden rather than a perk: The roles of knowledge sharing and supervisor social support in mitigating adverse effects of telework during the COVID-19 pandemic. *Applied Psychology*, *73*(2), 599-621. *https://doi.org/10.1111/apps.12491*

Hoenig, J. M., & Heisey, D. M. (2001). The abuse of power: The pervasive fallacy of power calculations for data analysis. *The American Statistician*, *55*(1), 19-24. *https://doi.org/10.1198/000313001300339897*

Hogg, M. A., & Reid, S. A. (2006). Social identity, self-categorization, and the communication of group norms. *Communication Theory*, *16*(1), 7-30. *https://doi.org/10.1111/j.1468-2885.2006.00003.x*

Hogg, M. A., & Terry, D. J. (2000). Social identity and self-categorization processes in organizational contexts. *Academy of Management Review*, *25*(1), 121-140. *https://doi.org/10.2307/259266*

Hollingshead, A. B. (2001). Cognitive interdependence and convergent expectations in transactive memory. *Journal of Personality and Social Psychology, 81*(6), 1080–1089. *https://doi.org/10.1037/0022-3514.81.6.1080*

Holman, D., Totterdell, P., Axtell, C., Stride, C., Port, R., Svensson, R., & Zibarras, L. (2012). Job design and the employee innovation process: The mediating role of learning strategies. *Journal of Business and Psychology*, *27*(2), 177-191. *https://doi.org/10.1007/s10869-011-9242-5*

Hornsey, M. J., & Jetten, J. (2004). The individual within the group: Balancing the need to belong with the need to be different. *Personality and Social Psychology Review*, *8*(3), 248-264. *https://doi.org/10.1207/s15327957pspr0803_2*

Høyrup, S. (2010). Employee-driven innovation and workplace learning: Basic concepts, approaches and themes. *Transfer: European Review of Labour and Research*, *16*(2), 143-154. *https://doi.org/10.1177/1024258910364102*

Hsiao, C. C., & Chiou, J. S. (2012). The effect of social capital on community loyalty in a virtual community: Test of a tripartite-process model. *Decision Support Systems*, *54*(1), 750-757. *https://doi.org/10.1016/j.dss.2012.09.003*

Hsu, J. L., & Chou, H. W. (2009). The effects of communicative genres on intra-group conflict in virtual student teams. *International Journal of Distance Education Technologies*, *7*(1), 1-22. *https://doi.org/10.4018/jdet.2009010101*

Hsu, M. H., Ju, T. L., Yen, C. H., & Chang, C. M. (2007). Knowledge sharing behavior in virtual communities: The relationship between trust, self-efficacy, and outcome expectations.

International Journal of Human-Computer Studies, *65*(2), 153-169. *https://doi.org/10.1016/j.ijhcs.2006.09.003*

Hu, L. T., & Bentler, P. M. (1999). Cutoff criteria for fit indexes in covariance structure analysis: Conventional criteria versus new alternatives. *Structural Equation Modeling*, *6*(1), 1-55. *https://doi.org/10.1080/10705519909540118*

Hu, L., & Randel, A. E. (2014). Knowledge sharing in teams: Social capital, extrinsic incentives, and team innovation. *Group & Organization Management*, *39*(2), 213-243. *https://doi.org/10.1177/1059601114520969*

Hu, S., Zhong, Z., Zhang, J., & Zheng, X. (2018). Cognitive flexibility and advice network centrality: The moderating role of self-monitoring. *Frontiers in Psychology*, *9*, 1947. *https://doi.org/10.3389/fpsyg.2018.01947*

Hu, S., Zong, Z., Zhang, J., Zheng, X., & Chen, C. (2021). The relationship between qualitative job insecurity and subjective well-being in Chinese employees: The role of work-family conflict and work centrality. *Economic and Industrial Democracy*, *42*(2), 203-225. *https://doi.org/10.1177/0143831X18759793*

Huang, X., & Lai, C. (2020). Connecting formal and informal workplace learning with teacher proactivity: A proactive motivation perspective. *Journal of Workplace Learning*, *32*(6), 437-456. *https://doi.org/10.1108/JWL-01-2020-0005*

Hughes, M., Rigtering, J. P. C., Covin, J. G., Bouncken, R. B., & Kraus, S. (2018). Innovative behaviour, trust and perceived workplace performance. *British Journal of Management*, *29*(4), 750-768. *https://doi.org/10.1111/1467-8551.12305*

Hülsheger, U. R., Anderson, N., & Salgado, J. F. (2009). Team-level predictors of innovation at work: A comprehensive meta-analysis spanning three decades of research. *Journal of Applied Psychology*, *94*(5), 1128-1145. *https://doi.org/10.1037/a0015978*

Hung, S. W., Chen, J., & Lee, M. H. (2020). Inclusion in global virtual teams: Exploring non-spatial proximity and knowledge sharing on innovation. *Journal of Business Research*, *120*, 37-49. *https://doi.org/10.1016/j.jbusres.2020.11.022*

Hung, W. (2013). Team-based complex problem solving: A collective cognition perspective. *Educational Technology Research and Development*, *61*(3), 365-384. *https://doi.org/10.1007/s11423-013-9296-3*

Hunt, D. F., De Jong, K., O'Connor, C., Ruud, T., & Slade, M. (2021). Enhancing psychological safety in mental health services. *International Journal of Mental Health Systems*, *15*(1), 1-18. *https://doi.org/10.1186/s13033-021-00439-1*

Hunter, S. T., Thoroughgood, C. N., Myer, A. T., & Ligon, G. S. (2011). Paradoxes of leading innovative endeavors: Summary, solutions, and future directions. *Psychology of Aesthetics, Creativity, and the Arts*, *5*(1), 54-66. *https://doi.org/10.1037/a0017776*

Hurley, A. E., Scandura, T. A., Schriesheim, C. A., Brannick, M. T., Seers, A., Vandenberg, R. J., & Williams, L. J. (1997). Exploratory and confirmatory factor analysis: Guidelines, issues, and alternatives. *Journal of Organizational Behavior*, *18*(6), 667-683. *https://doi.org/10.1002/(SICI)1099-1379(199711)18:6*

Ibarra, H. (1993). Personal networks of women and minorities in management: A conceptual framework. *Academy of Management Review*, *18*(1), 56-87. *https://doi.org/10.2307/258823*

Iñiguez, G., Heydari, S., Kertész, J., & Saramäki, J. (2023). Universal patterns in egocentric communication networks. *Nature Communications*, *14*(1), Article 5217. *https://doi.org/10.1038/s41467-023-40888-5*

Inkpen, A. C., & Tsang, E. W. K. (2005). Social capital, networks, and knowledge transfer. *Academy of Management Review*, *30*(1), 146-165. *https://doi.org/10.5465/amr.2005.15281445*

Iqbal, K. M. J., Khalid, F., & Barykin, S. Y. (2021). Hybrid workplace: The future of work. In B. A. Khan, M. H. Kuofie, & S. Suman (Eds.), *Handbook of research on future opportunities for technology management education* (pp. 28-48). IGI Global. *https://doi.org/10.4018/978-1-7998-8327-2.ch003*

Irish Business and Employers Confederation (IBEC). (2024, September 30). *Navigating the hybrid work paradox*. IBEC Insights. *https://www.ibec.ie/connect-and-learn/insights/insights/2024/09/30/ibec-networks-navigating-the-hybrid-work-paradox*

Ishii, K., Lyons, M. M., & Carr, S. A. (2019). Revisiting media richness theory for today and future. *Human Behavior and Emerging Technologies*, *1*(2), 124-131. *https://doi.org/10.1002/hbe2.138*

Jackowska, M., & Lauring, J. (2021). What are the effects of working away from the workplace compared to using technology while being at the workplace? Assessing work context and personal context in a global virtual setting. *Journal of International Management*, *27*(1), 100826. *https://doi.org/10.1016/j.intman.2021.100826*

Jaiswal, A., & Arun, C. J. (2024). Working from home during COVID-19 and its impact on Indian employees' stress and creativity. *Asian Business & Management*, *23*(2), 312-336. *https://doi.org/10.1057/s41291-022-00202-5*

Jamal, M. T., Anwar, I., Khan, N. A., & Ahmad, G. (2024). How do teleworkers escape burnout? A moderated-mediation model of the job demands and turnover intention. *International Journal of Manpower*, *45*(1), 169-199. *https://doi.org/10.1108/IJM-12-2022-0628*

Janssen, O. (2000). Job demands, perceptions of effort-reward fairness and innovative work behaviour. *Journal of Occupational and Organizational Psychology*, *73*(3), 287-302. *https://doi.org/10.1348/096317900167038*

Janssen, O. (2001). Fairness perceptions as a moderator in the curvilinear relationships between job demands and job performance and job satisfaction. *Academy of Management Journal*, *44*(5), 1039-1050.

Janssen, O., Van de Vliert, E., & Veenstra, C. (1999). How task and person conflict shape the role of positive interdependence in management teams. *Journal of Management*, *25*(2), 117-141. *https://doi.org/10.1177/014920639902500201*

Janssen, O., Van de Vliert, E., & West, M. (2004). The bright and dark sides of individual and group innovation: A special issue introduction. *Journal of Organizational Behavior*, *25*(2), 129-145. *https://doi.org/10.1002/job.242*

Jämsen, R., Sivunen, A., & Blomqvist, K. (2022). Employees' perceptions of relational communication in full-time remote work in the public sector. *Computers in Human Behavior*, *132*, Article 107240. *https://doi.org/10.1016/j.chb.2022.107240*

Jarvenpaa, S. L., & Leidner, D. E. (1999). Communication and trust in global virtual teams. *Organization Science*, *10*(6), 791-815. *https://doi.org/10.1287/orsc.10.6.791*

Jarvenpaa, S. L., Rao, S., & Huber, G. (1988). Computer support for meetings of groups working on unstructured problems: A field experiment. *MIS Quarterly*, *12*(4), 645-667.

Jashapara, A. (2003). Cognition, culture and competition: An empirical test of the learning organization. *The Learning Organization*, *10*(1), 31-50. *https://doi.org/10.1108/09696470310457487*

Jaß, L., Klußmann, A., Harth, V., & Mache, S. (2024). Job demands and resources perceived by hybrid working employees in German public administration: A qualitative study. *Journal of Occupational Medicine and Toxicology*, *19*(1), 1-24. *https://doi.org/10.1186/s12995-024-00426-5*

Jehn, K. A., Northcraft, G. B., & Neale, M. A. (1999). Why differences make a difference: A field study of diversity, conflict, and performance in workgroups. *Administrative Science Quarterly*, *44*(4), 741-763. *https://doi.org/10.2307/2667054*

Jensen, M. B., Johnson, B., Lorenz, E., & Lundvall, B.-Å. (2007). Forms of knowledge and modes of innovation. *Research Policy*, *36*(5), 680-693. *https://doi.org/10.1016/j.respol.2007.01.006*

Jeong, S., Han, S. J., Lee, J., Sunalai, S., & Yoon, S. W. (2018). Integrative literature review on informal learning: Antecedents, conceptualizations, and future directions. *Human Resource Development Review*, *17*(2), 128-152. *https://doi.org/10.1177/1534484318772242*

Johnson, D. W., & Johnson, R. T. (2008). Social interdependence theory and cooperative learning: The teacher's role. In R. M. Gillies, A. F. Ashman, & J. Terwel (Eds.), *The teacher's role inimplementing cooperative learning in the classroom* (pp. 9-37). Springer. *https://doi.org/10.1007/978-0-387-70892-8_1*

Johnson, D. W., Johnson, R. T., & Smith, K. A. (2007). Social interdependence theory and group work. In D. W. Johnson, R. T. Johnson, & K. A. Smith (Eds.), *The state of the art in cooperative learning* (pp. 115-150). Routledge.

Johnson, P. O., & Neyman, J. (1936). Tests of certain linear hypotheses and their application to some educational problems. *Statistical Research Memoirs*, *1*, 57-93.

Johnson, P., & Duberley, J. (2000). *Understanding management research: An introduction to epistemology*. Sage Publications Ltd.

Johnson, R. E., Rosen, C. C., & Djurdjevic, E. (2011). Assessing the impact of common method variance on higher order multidimensional constructs. *Journal of Applied Psychology*, *96*(4), 744-761. *https://doi.org/10.1037/a0021504*

Jones, G. R., & George, J. M. (1998). The experience and evolution of trust: Implications for cooperation and teamwork. *Academy of Management Review*, *23*(3), 531-546.

Jordan, P. J., & Troth, A. C. (2020). Common method bias in applied settings: The dilemma of researching in organizations. *Australian Journal of Management*, *45*(1), 3-14. *https://doi.org/10.1177/0312896219871976*

Junaidi, J., Chih, W., & Ortiz, J. (2020). Antecedents of information seeking and sharing on social networking sites: An empirical study of Facebook users. *International Journal of Communication*, *14*, 24. *https://ijoc.org/index.php/ijoc/article/view/15742*

Kacmar, K. M., Witt, L. A., Zivnuska, S., & Gully, S. M. (2003). The interactive effect of leader-member exchange and communication frequency on performance ratings. *Journal of Applied Psychology*, *88*(4), 764-772. *https://doi.org/10.1037/0021-9010.88.4.764*

Kahn, W. A. (1990). Psychological conditions of personal engagement and disengagement at work. *Academy of Management Journal*, *33*(4), 692-724. *https://doi.org/10.5465/256287*

Kanawattanachai, P., & Yoo, Y. (2007). The impact of knowledge coordination on virtual team performance over time. *MIS Quarterly*, *31*(4), 783-808.

Kane, G. C., & Alavi, M. (2007). Information technology and organizational learning: An investigation of exploration and exploitation processes. *Organization Science*, *18*(5), 796-812. *https://doi.org/10.1287/orsc.1070.0286*

Kane, G. C., Nanda, R., Phillips, A., & Copulsky, J. (2021). Redesigning the post-pandemic workplace. *MIT Sloan Management Review*, *62*(3), 12-14. *https://sloanreview.mit.edu/article/redesigning-the-post-pandemic-workplace/*

Kang, M., Gao, Y., Wang, T., & Zheng, H. (2016). Understanding the determinants of funders' investment intentions on crowdfunding platforms: A trust-based perspective. *Industrial Management & Data Systems*, *116*(8), 1800-1819. *https://doi.org/10.1108/IMDS-07-2015-0312*

Kang, M., & Lee, M.-J. (2017). Absorptive capacity, knowledge sharing, and innovative behaviour of R&D employees. *Technology Analysis & Strategic Management*, *29*(2), 219-232. *https://doi.org/10.1080/09537325.2016.1211265*

Kankanhalli, A., Tan, B. C. Y., & Wei, K. K. (2005). Contributing knowledge to electronic knowledge repositories: An empirical investigation. *MIS Quarterly*, *29*(1), 113-143. *https://doi.org/10.2307/25148670*

Kanter, R. M. (1983). *The change masters: Innovation and entrepreneurship in the American corporation.* Simon & Schuster.

Karan, A., Rosenthal, R., & Robbins, M. L. (2019). Meta-analytic evidence that we-talk predicts relationship and personal functioning in romantic couples. *Journal of Social and Personal Relationships*, *36*(9), 2624-2651. *https://doi.org/10.1177/0265407518795336*

Karr-Wisniewski, P., & Lu, Y. (2010). When more is too much: Operationalizing technology overload and exploring its impact on knowledge worker productivity. *Computers in Human Behavior*, *26*(5), 1061-1072. *https://doi.org/10.1016/j.chb.2010.03.008*

Kaše, R., Paauwe, J., & Zupan, N. (2009). HR practices, interpersonal relations, and intrafirm knowledge transfer in knowledge-intensive firms: A social network perspective. *Human Resource Management*, *48*(4), 615-632. *https://doi.org/10.1002/hrm*

Kattenbach, R., Demerouti, E., & Nachreiner, F. (2010). Flexible working times: Effects on employees' exhaustion, work-nonwork conflict and job performance. *Career Development International*, *15*(3), 279-295. *https://doi.org/10.1108/13620431011053749*

Keppler, S. M., & Leonardi, P. M. (2023). Building relational confidence in remote and hybrid work arrangements: Novel ways to use digital technologies to foster knowledge sharing. *Journal of Computer-Mediated Communication*, *28*(4), zmad020. *https://doi.org/10.1093/jcmc/zmad020*

Kesting, P., & Ulhøi, J. P. (2010). Employee-driven innovation: Extending the license to foster innovation. *Management Decision*, *48*(1), 65-84. *https://doi.org/10.1108/00251741011014463*

Kickul, J., & Gundry, L. K. (2001). Breaking through boundaries for organizational innovation: New managerial roles and practices in e-commerce firms. *Journal of Management*, *27*(3), 347-361. *https://doi.org/10.1177/014920630102700307*

Kim, J., & de Dear, R. (2013). Workspace satisfaction: The privacy-communication trade-off in open-plan offices. *Journal of Environmental Psychology*, *36*, 18-26. *https://doi.org/10.1016/j.jenvp.2013.06.007*

Kirchmeyer, C. (2005). The effects of mentoring on academic careers over time: Testing performance and political perspectives. *Human Relations*, *58*(5), 637-660. *https://doi.org/10.1177/0018726705055966*

Kirkman, B. L., & Mathieu, J. E. (2005). The dimensions and antecedents of team virtuality. *Journal of Management*, *31*(5), 700-718. *https://doi.org/10.1177/0149206305279113*

Kirkman, B. L., Rosen, B., Gibson, C. B., Tesluk, P. E., & McPherson, S. O. (2002). Five challenges to virtual team success: Lessons from Sabre, Inc. *Academy of Management Executive*, *16*(3), 67-79. *https://doi.org/10.5465/ame.2002.8540322*

Kirkman, B. L., Rosen, B., Tesluk, P. E., & Gibson, C. B. (2004). The impact of team empowerment on virtual team performance: The moderating role of face-to-face interaction. *Academy of Management Journal*, *47*(2), 175-192. *https://doi.org/10.2307/20159571*

Kline, R. B. (2017). *Principles and practice of structural equation modeling* (4th ed.). Guilford Press.

Knapp, M. L., & Hall, J. A. (2010). *Nonverbal communication in human interaction* (7th ed.). Wadsworth, Cengage Learning.

Kniffin, K. M., Narayanan, J., Anseel, F., Antonakis, J., Ashford, S. P., Bakker, A. B., Bamberger, P., Bapuji, H., Bhave, D. P., Choi, V. K., Creary, S. J., Demerouti, E., Flynn, F. J., Gelfand, M. J., Greer, L. L., Johns, G., Kesebir, S., Klein, P. G., Lee, S. Y., Ozcelik, H., Petriglieri, J. L., Rothbard, N. P., Rudolph, C. W., Shaw, J. D., Sirola, N., Wanberg, C. R., Whillans, A. V., Wilmot, M. P., & van Vugt, M. (2021). COVID-19 and the workplace: Implications, issues, and insights for future research and action. *American Psychologist*, *76*(1), 63-77. *https://doi.org/10.1037/amp0000716*

Knobloch, L. K., & Satterlee, K. L. (2009). Relational uncertainty: Theory and application. In T. D. Afifi & W. A. Afifi (Eds.), *Uncertainty, information management, and disclosure decisions: Theories and applications* (pp. 106-127). Routledge.

Knobloch, L. K., & Solomon, D. H. (1999). Measuring the sources and content of relational uncertainty. *Communication Studies*, *50*(4), 261-278. *https://doi.org/10.1080/10510979909388499*

Kmieciak, R. (2020). Trust, knowledge sharing, and innovative work behavior: Empirical evidence from Poland. *European Journal of Innovation Management*, *24*(5), 1832-1859. *https://doi.org/10.1108/EJIM-04-2020-0134*

Ko, M. C. (2021). An examination of the links between organizational social capital and employee well-being: Focusing on the mediating role of quality of work life. *Review of Public Personnel Administration*, *41*(1), 163-193. *https://doi.org/10.1177/0734371X19865996*

Koch, T., & Denner, N. (2022). Informal communication in organizations: Work time wasted at the water-cooler or crucial exchange among co-workers? *Corporate Communications*, *27*(3), 494-508. *https://doi.org/10.1108/CCIJ-08-2021-0087*

Kock, N. (2005). Media richness or media naturalness? The evolution of our biological communication apparatus and its influence on our behavior toward e-communication tools. *IEEE Transactions on Professional Communication*, *48*(2), 117-130. *https://doi.org/10.1109/TPC.2005.849649*

Kock, N., & Lynn, G. S. (2012). Electronic media variety and virtual team performance: The mediating role of task complexity coping mechanisms. *IEEE Transactions on Professional Communication*, *55*(4), 325-344. *https://doi.org/10.1109/TPC.2012.2208393*

König, C. J., Debus, M. E., Häusler, S., Lendenmann, N., & Kleinmann, M. (2010). Examining occupational self-efficacy, work locus of control and communication as moderators of the job insecurity-job performance relationship. *Economic and Industrial Democracy*, *31*(2), 231-247. *https://doi.org/10.1177/0143831X09358629*

Kossen, C., & van der Berg, A. M. (2022). When the exception becomes the norm: A quantitative analysis of the dark side of work from home. *German Journal of Human Resource Management, 36*(3), 213–237. *https://doi.org/10.1177/23970022221083695*

Kram, K. E., & Isabella, L. A. (1985). Mentoring alternatives: The role of peer relationships in career development. *Academy of Management Journal*, *28*(1), 110-132.

Kramer, R. M., & Tyler, T. R. (Eds.). (1996). *Trust in organizations: Frontiers of theory and research*. Sage Publications.

Kraut, R., Kiesler, S., Boneva, B., Cummings, J., Helgeson, V., & Crawford, A. (2002). Internet paradox revisited. *Journal of Social Issues*, *58*(1), 49-74. *https://doi.org/10.1111/1540-4560.00248*

Kreiner, G. E., Hollensbe, E., & Sheep, M. (2009). Balancing borders and bridges: Negotiating the work-home interface via boundary work tactics. *Academy of Management Journal*, *52*(4), 704-730. *https://doi.org/10.5465/amj.2009.43669916*

Kreitchmann, R. S., Gaudio, F., Olea, J., Marsh, H. W., & Quinn, D. (2019). Controlling for response biases in self-report scales: Forced-choice vs. psychometric methods. *Psychological Methods*, *24*(5), 617-633. *https://doi.org/10.1037/met0000200*

Kuegler, M., Smolnik, S., & Kane, G. C. (2015). What's in IT for employees? Understanding the relationship between use and performance in enterprise social software. *Journal of Strategic Information Systems*, *24*(2), 90-112. *https://doi.org/10.1016/j.jsis.2015.04.001*

Kumar, N., Alok, S., & Banerjee, S. (2023). Personal attributes and job resources as determinants of amount of work done under work-from-home: Empirical study of Indian white-collar employees. *International Journal of Manpower*, *44*(1), 113-132. *https://doi.org/10.1108/IJM-08-2021-0466*

Kuo, Y. K., Kuo, T. H., & Ho, L. A. (2014). Enabling innovative ability: Knowledge sharing as a mediator. *Industrial Management & Data Systems*, *114*(5), 696-710. *https://doi.org/10.1108/IMDS-10-2013-0434*

Kuvaas, B., & Dysvik, A. (2009). Perceived investment in employee development, intrinsic motivation and work performance. *Human Resource Management Journal*, *19*(3), 217-236. *https://doi.org/10.1111/j.1748-8583.2009.00103.x*

Kyriazos, T. A. (2018). Applied psychometrics: Sample size and sample power considerations in factor analysis (EFA, CFA) and SEM in general. *Psychology*, *9*(8), 2207-2230. *https://doi.org/10.4236/psych.2018.98126*

Lai, G., Lin, N., & Leung, S. Y. (1998). Network resources, contact resources, and status attainment. *Social Networks*, *20*(2), 159-178. *https://doi.org/10.1016/S0378-8733(97)00012-9*

Lal, B., Dwivedi, Y. K., & Haag, M. (2021). Working from home during COVID-19: Doing and managing technology-enabled social interaction with colleagues at a distance. *Information Systems Frontiers*, *25*, 1333-1350. *https://doi.org/10.1007/s10796-021-10182-0*

Lam, A. (2000). Tacit knowledge, organizational learning and societal institutions: An integrated framework. *Organization Studies*, *21*(3), 487-513. *https://doi.org/10.1177/0170840600213001*

Lam, L. W., Loi, R., & Leong, C. (2013). Reliance and disclosure: How supervisory justice affects trust in supervisor and extra-role performance. *Asia Pacific Journal of Management*, *30*(1), 231-249. *https://doi.org/10.1007/s10490-011-9249-5*

Lang, J. C. (2004). Social context and social capital as enablers of knowledge integration. *Journal of Knowledge Management*, *8*(3), 89-105. *https://doi.org/10.1108/13673270410541060*

Lankau, M. J., & Scandura, T. A. (2002). An investigation of personal learning in mentoring relationships: Content, antecedents, and consequences. *Academy of Management Journal*, *45*(4), 779-790. *https://doi.org/10.5465/3069311*

Lau, D. C., & Murnighan, J. K. (1998). Demographic diversity and faultlines: The compositional dynamics of organizational groups. *Academy of Management Review*, *23*(2), 325-340.

Laudan, L. (1996). *Beyond positivism and relativism: Theory, method, and evidence*. Westview Press.

Lauring, J., Drogendijk, R., & Kubovcikova, A. (2022). The role of context in overcoming distance-related problems in global virtual teams: An organizational discontinuity theory perspective. *International Journal of Human Resource Management*, *33*(21), 4251-4283. *https://doi.org/10.1080/09585192.2021.1960584*

Lauring, J., & Jonasson, C. (2025). What is hybrid work? Towards greater conceptual clarity of a common term and understanding its consequences. *Human Resource Management Review*, *35*(1), Article 101044. *https://doi.org/10.1016/j.hrmr.2024.101044*

Lawson, B., Petersen, K. J., Cousins, P. D., & Handfield, R. B. (2009). Knowledge sharing in interorganizational product development teams: The effect of formal and informal

socialization mechanisms. *Journal of Product Innovation Management*, *26*(2), 156-172. *https://doi.org/10.1111/j.1540-5885.2009.00343.x*

Le, P. B., & Lei, H. (2018). The mediating role of trust in stimulating the relationship between transformational leadership and knowledge sharing processes. *Journal of Knowledge Management*, *22*(3), 521-537. *https://doi.org/10.1108/JKM-10-2016-0463*

Ledbetter, A. M., & Mazer, J. P. (2014). Do online communication attitudes mitigate the association between Facebook use and relational interdependence? An extension of media multiplexity theory. *New Media & Society*, *16*(5), 806-822. *https://doi.org/10.1177/1461444813495159*

Lee, H. (2021). Changes in workplace practices during the COVID-19 pandemic: The roles of emotion, psychological safety and organisational support. *Journal of Organizational Effectiveness: People and Performance, 8*(1), 97–128. *https://doi.org/10.1108/JOEPP-06-2020-0104*

Lee, H., Park, J. G., & Lee, J. (2021). Knowledge sharing in ISD projects: Role of task interdependence and social capital. *International Journal of Managing Projects in Business*, *14*(3), 580-599. *https://doi.org/10.1108/IJMPB-12-2019-0307*

Lee, K. (2020). The joint effects of leader-member exchange and team-member exchange in predicting job crafting. *Sustainability*, *12*(24), Article 10536. *https://doi.org/10.3390/su122410536*

Lee, R. (2009). Social capital and business and management: Setting a research agenda. *International Journal of Management Reviews*, *11*(3), 247-273. *https://doi.org/10.1111/j.1468-2370.2008.00244.x*

Leonardelli, G. J., & Loyd, D. L. (2016). Optimal distinctiveness signals membership trust. *Personality and Social Psychology Bulletin*, *42*(7), 843-854. *https://doi.org/10.1177/0146167216643934*

Leonardi, P. M. (2009). Why do people reject new technologies and stymie organizational changes of which they are in favor? Exploring misalignments between social interactions and materiality. *Human Communication Research*, *35*(3), 407-441. *https://doi.org/10.1111/j.1468-2958.2009.01357.x*

Leonardi, P. M. (2011). When flexible routines meet flexible technologies: Affordance, constraint, and the imbrication of human and material agencies. *MIS Quarterly*, *35*(1), 147-167. *https://doi.org/10.2307/23043493*

Leonardi, P. M. (2021). COVID-19 and the new technologies of organizing: Digital exhaust, digital footprints, and artificial intelligence in the wake of remote work. *Journal of Management Studies*, *58*(1), 247-251. *https://doi.org/10.1111/joms.12648*

Leonardi, P. M., & Treem, J. W. (2020). Behavioral visibility: A new paradigm for organization studies in the age of digitization, digitalization, and datafication. *Organization Studies*, *41*(12), 1601-1625. *https://doi.org/10.1177/0170840620970728*

Leonardi, P. M., Treem, J. W., & Jackson, M. H. (2010). The connectivity paradox: Using technology to both decrease and increase perceptions of distance in distributed work arrangements. *Journal of Applied Communication Research*, *38*(1), 85-105. *https://doi.org/10.1080/00909880903483599*

Levac, D., Colquhoun, H., & O'Brien, K. K. (2010). Scoping studies: Advancing the methodology. *Implementation Science*, *5*, 69. *https://doi.org/10.1186/1748-5908-5-69*

Levin, D. Z., & Cross, R. (2004). The strength of weak ties you can trust: The mediating role of trust in effective knowledge transfer. *Management Science*, *50*(11), 1477-1490. *https://doi.org/10.1287/mnsc.1030.0136*

Levin, D. Z., Whitener, E. M., & Cross, R. (2006). Perceived trustworthiness of knowledge sources: The moderating impact of relationship length. *Journal of Applied Psychology*, *91*(5), 1163-1171. *https://doi.org/10.1037/0021-9010.91.5.1163*

Lewicki, R. J., & Bunker, B. B. (1995). Trust in relationships: A model of development and decline. In B. B. Bunker & J. Z. Rubin (Eds.), *Conflict, cooperation, and justice* (pp. 133-173). Jossey-Bass.

Lewicki, R. J., & Bunker, B. B. (1996). Developing and maintaining trust in work relationships. In R. M. Kramer & T. R. Tyler (Eds.), *Trust in organizations: Frontiers of theory and research* (pp. 114-139). Sage Publications.

Lewis, K. (2004). Knowledge and performance in knowledge-worker teams: A longitudinal study of transactive memory systems. *Management Science*, *50*(11), 1519-1533. *https://doi.org/10.1287/mnsc.1040.0257*

Li, D., Meng, L., & Ma, Q. (2017). Who deserves my trust? Cue-elicited feedback negativity tracks reputation learning in repeated social interactions. *Frontiers in Human Neuroscience*, *11*, Article 307. *https://doi.org/10.3389/fnhum.2017.00307*

Liang, T.-P., Liu, C.-C., & Wu, C.-H. (2008, December 14-17). Can social exchange theory explain individual knowledge-sharing behavior? A meta-analysis. In *Proceedings of the International Conference on Information Systems (ICIS 2008)*. AIS eLibrary. *https://aisel.aisnet.org/icis2008/171*

Liao, S. H., Fei, W. C., & Chen, C. C. (2007). Knowledge sharing, absorptive capacity, and innovation capability: An empirical study of Taiwan's knowledge-intensive industries. *Journal of Information Science*, *33*(3), 340-359. *https://doi.org/10.1177/0165551506070739*

Lilian, S. C. (2014). Virtual teams: Opportunities and challenges for e-leaders. *Procedia - Social and Behavioral Sciences*, *110*, 1251-1261. *https://doi.org/10.1016/j.sbspro.2013.12.972*

Lin, M. J. J., Hung, S. W., & Chen, C. J. (2009). Fostering the determinants of knowledge sharing in professional virtual communities. *Computers in Human Behavior*, *25*(4), 929-939. *https://doi.org/10.1016/j.chb.2009.03.008*

Lin, N. (1999). Building a network theory of social capital. *Connections*, *22*(1), 28-51.

Lin, N. (2001). *Social capital: A theory of social structure and action*. Cambridge University Press.

Lin, T. C., Lai, M. C., & Yang, S. W. (2016). Factors influencing physicians' knowledge sharing on web medical forums. *Health Informatics Journal*, *22*(3), 594-607. *https://doi.org/10.1177/1460458215576229*

Lincoln, Y. S., Lynham, S. A., & Guba, E. G. (2011). Paradigmatic controversies, contradictions, and emerging confluences, revisited. In N. K. Denzin & Y. S. Lincoln (Eds.), *The SAGE handbook of qualitative research* (4th ed., pp. 97-128). SAGE Publications.

Lipnack, J., & Stamps, J. (2008). *Virtual teams: People working across boundaries with technology* (2nd ed.). Wiley.

Littlejohn, S. W., & Foss, K. A. (2009). Nonverbal communication theories. In S. W. Littlejohn & K. A. Foss (Eds.), *Encyclopedia of communication theory* (pp. 391-395). SAGE Publications.

Littlejohn, S. W., & Foss, K. A. (2012). Relational development. In S. W. Littlejohn & K. A. Foss (Eds.), *Encyclopedia of communication theory* (pp. 836-837). SAGE Publications. *https://doi.org/10.4135/9781412959384*

Liu, C. H. (2013). The processes of social capital and employee creativity: Empirical evidence from intraorganizational networks. *The International Journal of Human Resource Management*, *24*(21), 3886-3902. *https://doi.org/10.1080/09585192.2013.781519*

Liu, Z., Cui, W., Zhou, J., Wang, Y., Ghani, U., & Zhai, X. (2021). Investigating the influence of tacit knowledge transformation approach on students' learning ability. *Frontiers in Psychology*, *12*, Article 647729. *https://doi.org/10.3389/fpsyg.2021.647729*

Lloyd-Jones, B. (2021). Developing competencies for emotional, instrumental, and informational student support during the COVID-19 pandemic: A human relations/human resource development approach. *Advances in Developing Human Resources*, *23*(1), 41-54. *https://doi.org/10.1177/1523422320973287*

Lojeski, K. S., Reilly, R. R., & Dominick, P. G. (2006). The role of virtual distance in innovation and success. In *Proceedings of the 39th Annual Hawaii International Conference on System Sciences* (pp. 1-10). *https://doi.org/10.1109/HICSS.2006.484*

Long, J. A. (2019). *interactions: Comprehensive, user-friendly toolkit for probing interactions* (Version 1.1.0) [R package]. *https://cran.r-project.org/package=interactions*

Long, M., Rohde, H., & Rubio-Fernandez, P. (2020). The pressure to communicate efficiently continues to shape language use later in life. *Scientific Reports*, *10*(1), Article 8645. *https://doi.org/10.1038/s41598-020-64475-6*

Luz, S., Drach-Zahavy, A., & Shadmi, E. (2021). A personal network approach to the study of nurse champions of innovation and their innovation projects' spread. *Journal of Advanced Nursing*, *77*(2), 775-786. *https://doi.org/10.1111/jan.14620*

MacKenzie, S. B., Podsakoff, P. M., & Podsakoff, N. P. (2011). Construct measurement and validation procedures in MIS and behavioral research: Integrating new and existing techniques. MIS Quarterly, 35(2), 293–334. *https://doi.org/10.2307/23044045*

Magni, M., Ahuja, M. K., & Maruping, L. M. (2018). Distant but fair: Intra-team justice climate and performance in dispersed teams. *Journal of Management Information Systems*, *35*(4), 1031-1059. *https://doi.org/10.1080/07421222.2018.1522909*

Magni, M., Proserpio, L., Hoegl, M., & Provera, B. (2013). Managing the unexpected across space: Improvisation, dispersion, and performance in NPD teams. *Journal of Product Innovation Management*, *30*(5), 1009-1026. *https://doi.org/10.1111/jpim.12043*

Mahajan, A., Bishop, J. W., & Scott, D. (2012). Does trust in top management mediate top management communication, employee involvement and organizational commitment relationships? *Journal of Managerial Issues*, *24*(2), 173-190.

Mahomed, F., Oba, P., & Sony, M. (2022). Exploring employee well-being during the COVID-19 remote work: Evidence from South Africa. *European Journal of Training and Development*, *47*(10), 91-111. *https://doi.org/10.1108/EJTD-06-2022-0061*

Mahvar, T., Mohammadi, E., & Abbasi, M. (2020). Interpersonal communication among critical care nurses: An ethnographic study. *Journal of Caring Sciences*, *9*(1), 57-64. *https://doi.org/10.34172/jcs.2020.009*

Majchrzak, A., More, P. H. B., & Faraj, S. (2012). Transcending knowledge differences in cross-functional teams. *Organization Science*, *23*(4), 951-970. *https://doi.org/10.1287/orsc.1110.0677*

Makarius, E. E., & Larson, B. Z. (2017). Changing the perspective of virtual work: Building virtual intelligence at the individual level. *Academy of Management Perspectives*, *31*(2), 159-178. *https://doi.org/10.5465/amp.2014.0120*

Mäkikangas, A. (2018). Job crafting profiles and work engagement: A person-centered approach. *Journal of Vocational Behavior*, *106*, 101-111. *https://doi.org/10.1016/j.jvb.2018.01.001*

Mäkikangas, A., Juutinen, S., Mäkiniemi, J.-P., Sjöblom, K., & Oksanen, A. (2022). Work engagement and its antecedents in remote work: A person-centered view. *Work & Stress*, *36*(4), 392-416. *https://doi.org/10.1080/02678373.2022.2080777*

Malhotra, A., & Majchrzak, A. (2014). Enhancing performance of geographically distributed teams through targeted use of information and communication technologies. *Human Relations*, *67*(4), 389-411. *https://doi.org/10.1177/0018726713495284*

Malhotra, A., Majchrzak, A., & Rosen, B. (2007). Leading virtual teams. *Academy of Management Perspectives*, *21*(1), 66-70.

Malhotra, N. K., & Dash, S. (2011). *Marketing research: An applied orientation* (6th ed., Pearson Education Special Indian ed.). Pearson Education.

Malone, T. W., & Crowston, K. (1994). The interdisciplinary study of coordination. *ACM Computing Surveys*, *26*(1), 87-119. *https://doi.org/10.1145/174666.174668*

Marin, A., & Hampton, K. N. (2007). Simplifying the personal network name generator: Alternatives to traditional multiple and single name generators. *Field Methods*, *19*(2), 163-193. *https://doi.org/10.1177/1525822X06298588*

Marques-Quinteiro, P., Uitdewilligen, S., Costa, P., & Passos, A. M. (2022). Learning through time: The role of team reflexivity and virtuality in decision-making teams. *The Learning Organization*, *29*(1), 69-82. *https://doi.org/10.1108/TLO-09-2020-0157*

Marsden, P. V. (1987). Core discussion networks of Americans. *American Sociological Review*, *52*(1), 122-131. *https://doi.org/10.2307/2095397*

Marsden, P. V., & Baum, D. (2019). Contributions of the General Social Survey to egocentric network research. *Social Networks*, *59*, 1-8. *https://doi.org/10.1016/j.socnet.2019.05.003*

Martin, A. J., & Dowson, M. (2009). Interpersonal relationships, motivation, engagement, and achievement: Yields for theory, current issues, and educational practice. *Review of Educational Research*, *79*(1), 327-365. *https://doi.org/10.3102/0034654308325583*

Martinez-Amador, J. (2015). *Remote worker characteristics: The positive relationship of intrinsic motivation in remote worker productivity* [Master's thesis, Case Western Reserve University]. Scholarly Commons @ Case Western Reserve University.

Martins, L. L., Gilson, L. L., & Maynard, M. T. (2004). Virtual teams: What do we know and where do we go from here? *Journal of Management*, *30*(6), 805-835. *https://doi.org/10.1016/j.jm.2004.05.002*

Masood, M., & Afsar, B. (2017). Transformational leadership and innovative work behavior among nursing staff. *Nursing Inquiry*, *24*(4), e12188. *https://doi.org/10.1111/nin.12188*

Maurer, M., Bach, N., & Oertel, S. (2022). Forced to go virtual : Working-from-home arrangements and their effect on team communication during COVID-19 lockdown. *German Journal of Human Resource Management*, *36*(3), 238-269. *https://doi.org/10.1177/23970022221083698*

Maxwell, S. E. (2004). The persistence of underpowered studies in psychological research: Causes, consequences, and remedies. *Psychological Methods*, *9*(2), 147-163. *https://doi.org/10.1037/1082-989x.9.2.147*

Mayer, C. M., Sivatheerthan, T., Mütze-Niewöhner, S., & Nitsch, V. (2023). Sharing leadership behaviors in virtual teams: Effects of shared leadership behaviors on team member satisfaction and productivity. *Team Performance Management*, *29*(1/2), 90-112. *https://doi.org/10.1108/TPM-07-2022-0054*

Mayer, R. C., & Gavin, M. B. (2005). Trust in management and performance: Who minds the shop while the employees watch the boss? *Academy of Management Journal*, *48*(5), 874-888. *https://doi.org/10.5465/amj.2005.18803928*

Mayer, R. C., Davis, J. H., & Schoorman, F. D. (1995). An integrative model of organizational trust. *Academy of Management Review*, *20*(3), 709-734. *https://doi.org/10.2307/258792*

Mayfield, M., & Mayfield, J. (2021). Sound and safe: The role of leader motivating language and follower self-leadership in feelings of psychological safety. *Administrative Sciences*, *11*(2), 51. *https://doi.org/10.3390/admsci11020051*

Maynard, M. T., Mathieu, J. E., Rapp, T. L., & Gilson, L. L. (2012). Something(s) old and something(s) new: Modeling drivers of global virtual team effectiveness. *Journal of Organizational Behavior*, *33*(3), 342-365. *https://doi.org/10.1002/job.1772*

Maznevski, M. L., & Chudoba, K. M. (2000). Bridging space over time: Global virtual team dynamics and effectiveness. *Organization Science*, *11*(5), 473-492. *https://doi.org/10.1287/orsc.11.5.473.15200*

Mazzei, A., Ravazzani, S., Butera, A., Conti, S., & Fisichella, C. (2023). The affective commitment of newcomers in hybrid work contexts: A study on enhancing and inhibiting factors and the mediating role of newcomer adjustment. *Frontiers in Psychology*, *13*, 987976. *https://doi.org/10.3389/fpsyg.2022.987976*

McAllister, D. J. (1995). Affect- and cognition-based trust as foundations for interpersonal cooperation in organizations. *Academy of Management Journal*, *38*(1), 24-59. *https://doi.org/10.2307/256727*

McCallister, L., & Fischer, C. S. (1978). A procedure for surveying personal networks. *Sociological Methods & Research*, *7*(2), 131-148.

McCarthy, A., McGrath, L., Frost, D., O'Sullivan, M., Whelan, E., & Mulrooney, A. (2023). *2023 remote working in Ireland survey - Summary findings report*. University of Galway; Western Development Commission. *https://westerndevelopment.ie/publications/2023-remote-working-in-ireland-survey/*

McCarty, C., Killworth, P. D., & Rennell, J. (2007). Impact of methods for reducing respondent burden on personal network structural measures. *Social Networks*, *29*(2), 300-315. *https://doi.org/10.1016/j.socnet.2006.12.005*

McCloskey, D. W., & Igbaria, M. (2003). Does "out of sight" mean "out of mind"? An empirical investigation of the career advancement prospects of telecommuters. *Information & Management*, *40*(2), 131-145. *https://doi.org/10.1016/s0378-7206(02)00076-x*

McInerney, C. (2002). Knowledge management and the dynamic nature of knowledge. *Journal of the American Society for Information Science and Technology*, *53*(12), 1009-1018. *https://doi.org/10.1002/asi.10109*

Mehrabian, A. (1971). *Silent messages: Implicit communication of emotions and attitudes*. Wadsworth Publishing.

Men, C., & Jia, R. (2021). Knowledge-oriented leadership, team learning and team creativity: The roles of task interdependence and task complexity. *Leadership & Organization Development Journal*, *42*(6), 882-898. *https://doi.org/10.1108/LODJ-11-2020-0506*

Merluzzi, J., & Burt, R. S. (2013). How many names are enough? Identifying network effects with the least set of listed contacts. *Social Networks*, *35*(1), 211-222. *https://doi.org/10.1016/j.socnet.2013.01.002*

Mesmer-Magnus, J. R., DeChurch, L. A., Jimenez-Rodriguez, M., Wildman, J. L., & Shuffler, M. L. (2011). A meta-analytic investigation of virtuality and information sharing in teams. *Organizational Behavior and Human Decision Processes*, *115*(2), 214-225. *https://doi.org/10.1016/j.obhdp.2011.03.002*

Messmann, G., & Mulder, R. H. (2012). Development of a measurement instrument for innovative work behaviour as a dynamic and context-bound construct. *Human Resource Development International*, *15*(1), 43-59. *https://doi.org/10.1080/13678868.2011.646894*

Messmann, G., Mulder, R. H., & Palonen, T. (2018). Vocational education teachers' personal network at school as a resource for innovative work behaviour. *Journal of Workplace Learning*, *30*(3), 174-185. *https://doi.org/10.1108/JWL-08-2017-0069*

Methot, J. R., Lepine, J. A., Podsakoff, N. P., & Christian, J. S. (2016). Are workplace friendships a mixed blessing? Exploring tradeoffs of multiplex relationships and their associations with job performance. *Personnel Psychology*, *69*(2), 311-355. *https://doi.org/10.1111/peps.12109*

Mihalca, L., Irimias, T., & Brendea, G. (2021). Teleworking during the COVID-19 pandemic: Determining factors of perceived work productivity, job performance, and satisfaction. *Amfiteatru Economic*, *23*(58), 620-636. *https://doi.org/10.24818/EA/2021/58/620*

Mihalca, L., Ratiu, L., Mengelkamp, C., Brendea, G., & Metz, D. (2024). The role of self-regulatory abilities in predicting performance while teleworking: A cross-sectional and panel study during the COVID-19 pandemic. *Human Resource Development Quarterly*, *2*, 477-500. *https://doi.org/10.1002/hrdq.21523*

Milardo, R. M. (1988). Families and social networks: An overview of theory and methodology. In R. M. Milardo (Ed.), *Families and social networks* (pp. 13-47). Sage.

Mishra, N., & Bharti, T. (2024). Exploring the nexus of social support, work-life balance and life satisfaction in hybrid work scenario in learning organizations. *The Learning Organization*, *31*(1), 27-47. *https://doi.org/10.1108/TLO-08-2022-0099*

Mkansi, M., & Acheampong, E. A. (2012). Research philosophy debates and classifications: Students' dilemma. *Electronic Journal of Business Research Methods*, *10*(2), 132-140.

Molina, J. L., Maya-Jariego, I., McCarty, C., Lubbers, M. J., & Ernst, J. (2020). The embeddedness of social capital in personal networks. *Network Science*, *8*(2), 189-203. *https://doi.org/10.1017/nws.2019.30*

Molm, L. D., Takahashi, N., & Peterson, G. (2000). Risk and trust in social exchange: An experimental test of a classical proposition. *American Journal of Sociology*, *105*(5), 1396-1427. *https://doi.org/10.1086/210434*

Montani, F., Battistelli, A., & Odoardi, C. (2017). Proactive goal generation and innovative work behavior: The moderating role of affective commitment, production ownership, and leader support for innovation. *Journal of Creative Behavior*, *51*(2), 107-127. *https://doi.org/10.1002/jocb.89*

Montani, F., Odoardi, C., & Battistelli, A. (2014). Individual and contextual determinants of innovative work behaviour: Proactive goal generation matters. *Journal of Occupational and Organizational Psychology*, *87*(4), 645-670. *https://doi.org/10.1111/joop.12066*

Moeschler, J. (2009). Pragmatics, propositional and non-propositional effects: Can a theory of utterance interpretation account for emotions in verbal communication? *Social Science Information*, *48*(3), 447-464. *https://doi.org/10.1177/0539018409106200*

Mohammed, N., & Kamalanabhan, T. J. (2019a). Interpersonal trust and employee knowledge sharing behavior: Creative performance as the outcome. *VINE Journal of Information and Knowledge Management Systems*, *50*(1), 94-116. *https://doi.org/10.1108/VJIKMS-04-2019-0057*

Mohammed, N., & Kamalanabhan, T. J. (2019b). Tacit knowledge seeking from teammates: Unravelling the role of social capital. *International Journal of Organizational Analysis*, *28*(3), 765-790. *https://doi.org/10.1108/IJOA-07-2019-1845*

Moran, P. (2005). Structural vs. relational embeddedness: Social capital and managerial performance. *Strategic Management Journal*, *26*(12), 1129-1151. *https://doi.org/10.1002/smj.486*

Morgan, G., & Smircich, L. (1980). The case for qualitative research. *Academy of Management Review*, *5*(4), 491-500. https://doi.org/10.5465/amr.1980.4288947

Morrison, E. W. (2002). Newcomers' relationships: The role of social network ties during socialization. *Academy of Management Journal*, *45*(6), 1149-1160.

Morrison, E. W. (2011). Employee voice behavior: Integration and directions for future research. *Academy of Management Annals*, *5*(1), 373-412. https://doi.org/10.1080/19416520.2011.574506

Morrison, E. W. (2014). Employee voice and silence. *Annual Review of Organizational Psychology and Organizational Behavior*, *1*, 173-197. https://doi.org/10.1146/annurev-orgpsych-031413-091328

Morrison, E. W., & Phelps, C. C. (1999). Taking charge at work: Extrarole efforts to initiate workplace change. *Academy of Management Journal*, *42*(4), 403-419. https://doi.org/10.2307/257011

Morrison-Smith, S., & Ruiz, J. (2020). Challenges and barriers in virtual teams: A literature review. *SN Applied Sciences*, *2*(1096). https://doi.org/10.1007/s42452-020-2801-5

Mortensen, M., & Hinds, P. J. (2001). Conflict and shared identity in geographically distributed teams. *International Journal of Conflict Management*, *12*(3), 212-238. https://doi.org/10.1108/eb022856

Moser, J. R., & Ashforth, B. E. (2022). My network, my self: A social network approach to work-based identity. *Research in Organizational Behavior*, *42*, 100155. https://doi.org/10.1016/j.riob.2022.100155

Müller, R., Wegge, J., Hattrup, K., & Hertel, G. (2022). How can we avoid information overload and techno-frustration as a virtual team? The effect of shared mental models of information and communication technology on information overload and techno-frustration. *Computers in Human Behavior*, *138*, 107438. *https://doi.org/10.1016/j.chb.2022.107438*

Mumford, M. D., Scott, G. M., Gaddis, B., & Strange, J. M. (2002). Leading creative people: Orchestrating expertise and relationships. *The Leadership Quarterly*, *13*(6), 705-750. *https://doi.org/10.1016/S1048-9843(02)00158-3*

Munn, Z., Peters, M. D. J., Stern, C., Tufanaru, C., McArthur, A., & Aromataris, E. (2018). Systematic review or scoping review? Guidance for authors when choosing between a systematic or scoping review approach. *BMC Medical Research Methodology*, *18*, 143. *https://doi.org/10.1186/s12874-018-0611-x*

Murphy, W. M., & Kram, K. E. (2010). Understanding non-work relationships in developmental networks. *Career Development International*, *15*(7), 637-663. *https://doi.org/10.1108/13620431011094069*

Naghavi, M. S., Jofreh, M. G., Vaezi, R., & Ghorbanizadeh, V. (2019). Empowerment of the professional ageing workforce: A review and development of a model. *European Journal of International Management*, *13*(1), 1-24. *https://doi.org/10.1504/EJIM.2019.10014199*

Nah, S., & Saxton, G. D. (2012). Modeling the adoption and use of social media by nonprofit organizations. *New Media & Society*, *15*(2), 294-313. *https://doi.org/10.1177/1461444812452411*

Nahapiet, J., & Ghoshal, S. (1998). Social capital, intellectual capital, and the organizational advantage. *Academy of Management Review*, *23*(2), 242-266. *https://doi.org/10.5465/amr.1998.533225*

Nakash, M., & Bouhnik, D. (2023). The effects of COVID-19 on information management in remote and hybrid work environments. *Journal of the Association for Information Science and Technology*, *74*(9), 1067-1080. *https://doi.org/10.1002/asi.2480*

Naqshbandi, M. M., Tabche, I., & Farouk, S. (2024). The future of work: Work engagement and job performance in the hybrid workplace. *The Learning Organization*, *31*(1), 5-26. *https://doi.org/10.1108/TLO-08-2022-0097*

Nemțeanu, M. S., Dabija, D. C., & Stanca, L. (2021). The influence of teleworking on performance and employees' counterproductive behaviour. *Amfiteatru Economic, 23*(58), 601–619. *https://doi.org/10.24818/EA/2021/58/601*

Nicholson, N. (1984). A theory of work role transitions. *Administrative Science Quarterly*, *29*(2), 172-191. *https://doi.org/10.2307/2393172*

Nielsen, K., Nielsen, M. B., Ogbonnaya, C., Känsälä, M., Saari, E., & Isaksson, K. (2017). Workplace resources to improve both employee well-being and performance: A systematic review and meta-analysis. *Work & Stress*, *31*(2), 101-120. *https://doi.org/10.1080/02678373.2017.1304463*

Niesen, W., Van Hootegem, A., Vander Elst, T., Battistelli, A., & De Witte, H. (2017). Job insecurity and innovative work behaviour: A psychological contract perspective. *Psychologica Belgica*, *57*(4), 174-189. *https://doi.org/10.5334/pb.381*

Nilles, J. M. (1994). *Traffic reduction by telecommuting*. Center for Effective Organizations, University of Southern California.

Li, N., & Yan, J. (2009). The effects of trust climate on individual performance. *Frontiers of Business Research in China*, *3*(1), 27-49. *https://doi.org/10.1007/s11782-009-0002-6*

Noe, R. A., Tews, M. J., & Marand, A. D. (2013). Individual differences and informal learning in the workplace. *Journal of Vocational Behavior*, *83*(3), 327-335. *https://doi.org/10.1016/j.jvb.2013.06.009*

Nold, H., & Michel, L. (2016). The performance triangle: A model for corporate agility. *Leadership & Organization Development Journal*, *37*(3), 341-356. *https://doi.org/10.1108/LODJ-07-2014-0123*

Nonaka, I. (1994). A dynamic theory of organizational knowledge creation. *Organization Science*, *5*(1), 14-37. *https://doi.org/10.1287/orsc.5.1.14*

Nonaka, I., & Takeuchi, H. (1995). *The knowledge-creating company: How Japanese companies create the dynamics of innovation*. Oxford University Press.

Nonaka, I., Toyama, R., & Konno, N. (2000). SECI, Ba and leadership: A unified model of dynamic knowledge creation. *Long Range Planning*, *33*(1), 5-34. *https://doi.org/10.1016/S0024-6301(99)00115-6*

Nunnally, J. C., & Bernstein, I. H. (1994). *Psychometric theory* (3rd ed.). McGraw-Hill.

Ogolsky, B. G., & Monk, J. K. (2019). Maintaining the literature on relationship maintenance. In B. G. Ogolsky & J. K. Monk (Eds.), *Relationship maintenance: Theory, process, and context* (pp. 3-12). Cambridge University Press. *https://doi.org/10.1017/9781108304320.001*

Oh, H., Chung, M. H., & Labianca, G. (2004). Group social capital and group effectiveness: The role of informal socializing ties. *Academy of Management Journal*, *47*(6), 860-875. *https://doi.org/10.5465/20159627*

O'Leary, M. B., & Cummings, J. N. (2007). The spatial, temporal, and configurational characteristics of geographic dispersion in teams. *MIS Quarterly*, *31*(3), 433-452. *https://doi.org/10.2307/25148802*

Oldham, G. R., & Cummings, A. (1996). Employee creativity: Personal and contextual factors at work. Academy of Management Journal, 39(3), 607–634. *https://doi.org/10.2307/256657*

Oldham, G. R., & Hackman, J. R. (1980). *Work redesign*. Addison-Wesley.

Olsen, K. M., Sverdrup, T., Nesheim, T., & Kalleberg, A. L. (2023). How do young employees perceive stress and job engagement while working from home? Evidence from a telecom operator during COVID-19. *Employee Relations*, *45*(3), 762-775. *https://doi.org/10.1108/ER-05-2022-0230*

Olson, G. M., & Olson, J. S. (2000). Distance matters. *Human-Computer Interaction*, *15*(2-3), 139-178. *https://doi.org/10.1207/s15327051hci1523_4*

Oppong Peprah, E. (2024). Hybrid workplace: Current status, positives, negatives, challenges, and team learning. *The Learning Organization*, *31*(1), 88-103. *https://doi.org/10.1108/TLO-11-2022-0150*

Orhan, M. A. (2014). Extending the individual level of virtuality: Implications of task virtuality in virtual and traditional settings. *Administrative Sciences*, *4*(4), 400-412. *https://doi.org/10.3390/admsci4040400*

Orhan, M. A., & Altili, E. (2017). When tasks get virtual: How task virtuality affects work behavior and innovative capabilities. *Journal of Management and Innovation*, *3*(2), 1-26.

Orhan, M. A., Rijsman, J. B., & van Dijk, G. M. (2016). Invisible, therefore isolated: Comparative effects of team virtuality with task virtuality on workplace isolation and work outcomes. *Journal of Work and Organizational Psychology*, *32*(2), 109-122. *http://dx.doi.org/10.1016/j.rpto.2016.02.002*

Orr, J. (1990). Sharing knowledge, celebrating identity: Community memory in a service culture. In D. Middleton & D. Edwards (Eds.), *Collective remembering* (pp. 169-189). SAGE Publications.

Ortiz, B., Donate, M. J., & Guadamillas, F. (2018). Inter-organizational social capital as an antecedent of a firm's knowledge identification capability and external knowledge acquisition. *Journal of Knowledge Management*, *22*(6), 1332-1357. *https://doi.org/10.1108/jkm-04-2017-0131*

Óskarsdóttir, H. G., Oddsson, G. V., Sturluson, J. Þ., & Sæmundsson, R. J. (2022). Towards a holistic framework of knowledge worker productivity. *Administrative Sciences*, *12*(2), Article 50. *https://doi.org/10.3390/admsci12020050*

Ozer, M., & Zhang, G. (2022). Interpersonal relationships and creativity at work: A network building perspective. *Journal of Product Innovation Management*, *39*(3), 312-333. *https://doi.org/10.1111/jpim.12575*

Ozili, P. K. (2023). The acceptable R-square in empirical modelling for social science research. In C. A. Saliya (Ed.), *Social research methodology and publishing results: A guide to non-native English speakers* (pp. 134-143). IGI Global. *https://doi.org/10.4018/978-1-6684-6859-3.ch009*

Palazzolo, E. T., Serb, D. A., She, Y., Su, C., & Contractor, N. S. (2006). Coevolution of communication and knowledge networks in transactive memory systems: Using computational models for theoretical development. *Communication Theory*, *16*(2), 223-250. *https://doi.org/10.1111/j.1468-2885.2006.00269.x*

Parjanen, S. M., Saunila, M., Kallio, A., & Harmaakorpi, V. (2020). An effective employee-driven innovation (EDI) manual process supporting innovativeness. *European Journal of Innovation Management*, *24*(4), 1315-1334. *https://doi.org/10.1108/EJIM-12-2019-0358*

Park, J. W., Park, S., & Cho, Y. J. (2023). More isn't always better: Exploring the curvilinear effects of telework. *International Public Management Journal*, *26*(5), 744-763. *https://doi.org/10.1080/10967494.2023.2214133*

Parker, S. K., Bindl, U. K., & Strauss, K. (2010). Making things happen: A model of proactive motivation. *Journal of Management*, *36*(4), 827-856. *https://doi.org/10.1177/0149206310363732*

Parker, S. K., & Ohly, S. (2008). Designing motivating work. In R. Kanfer, G. Chen, & R. D. Pritchard (Eds.), *Work motivation: Past, present, and future* (pp. 233-384). Routledge.

Parker, S. K., Williams, H. M., & Turner, N. (2006). Modeling the antecedents of proactive behavior at work. *Journal of Applied Psychology*, *91*(3), 636-652. *https://doi.org/10.1037/0021-9010.91.3.636*

Parra-Requena, G., Ruiz-Ortega, M. J., & García-Villaverde, P. M. (2022). Innovativeness and performance: The joint effect of relational trust and combinative capability. *European Journal of Innovation Management*, *25*(1), 191-213. *https://doi.org/10.1108/EJIM-04-2020-0117*

Pataraia, N., Margaryan, A., Falconer, I., Littlejohn, A., & Falconer, J. (2014). Discovering academics' key learning connections: An ego-centric network approach to analysing learning about teaching. *Journal of Workplace Learning*, *26*(1), 56-72. *https://doi.org/10.1108/JWL-03-2013-0012*

Patterson, M. G., West, M. A., Shackleton, V. J., Dawson, J. F., Lawthom, R., Maitlis, S., Robinson, D. L., & Wallace, A. M. (2005). Validating the organizational climate measure: Links to managerial practices, productivity and innovation. *Journal of Organizational Behavior*, *26*(4), 379-408. *https://doi.org/10.1002/job.312*

Peltokorpi, V. (2015). Corporate language proficiency and reverse knowledge transfer in multinational corporations: Interactive effects of communication media richness and commitment to headquarters. *Journal of International Management*, *21*(1), 49-62. *https://doi.org/10.1016/j.intman.2014.11.005*

Pérez-Sabater, C. (2021). Moments of sharing, language style and resources for solidarity on social media: A comparative analysis. *Journal of Pragmatics*, *180*, 266-282. *https://doi.org/10.1016/j.pragma.2021.04.035*

Perry, B. L., Pescosolido, B. A., & Borgatti, S. P. (2018). *Egocentric network analysis: Foundations, methods, and models*. Cambridge University Press.

Perry, S. J., Lorinkova, N. M., Hunter, E. M., Hubbard, A., & McMahon, J. T. (2016). When does virtuality really "work"? Examining the role of work-family and virtuality in social loafing. *Journal of Management*, *42*(2), 449-479. *https://doi.org/10.1177/0149206313475814*

Perry-Smith, J. E., & Mannucci, P. V. (2017). From creativity to innovation: The social network drivers of the four phases of the idea journey. *Academy of Management Review*, *42*(1), 53-79. *https://doi.org/10.5465/amr.2014.0462*

Peters, M. D. J., Godfrey, C., Khalil, H., McInerney, P., Parker, D., & Soares, C. B. (2015). Guidance for conducting systematic scoping reviews. *International Journal of Evidence-Based Healthcare*, *13*(3), 141-146. *https://doi.org/10.1097/XEB.0000000000000050*

Peters, M. D. J., Marnie, C., Tricco, A. C., Pollock, D., Munn, Z., Alexander, L., McInerney, P., Godfrey, C. M., & Khalil, H. (2020). Updated methodological guidance for the conduct of scoping reviews. *JBI Evidence Synthesis*, *18*(10), 2119-2126. *https://doi.org/10.11124/JBIES-20-00167*

Peterson, R. A., & Brown, S. P. (2005). On the use of beta coefficients in meta-analysis. *Journal of Applied Psychology*, *90*(1), 175-181. *https://doi.org/10.1037/0021-9010.90.1.175*

Petter, S., Barber, C. S., & Barber, D. (2020). Gaming the system: The effects of social capital as a resource for virtual team members. *Information & Management*, *57*(6), Article 103239. *https://doi.org/10.1016/j.im.2019.103239*

Pfeffer, J. (1998). *The human equation: Building profits by putting people first*. Harvard Business School Press.

Phelps, C., Heidl, R., & Wadhwa, A. (2012). Knowledge, networks, and knowledge networks: A review and research agenda. *Journal of Management*, *38*(4), 1115-1166. *https://doi.org/10.1177/0149206311432640*

Phillips, D. C., & Burbules, N. C. (2000). *Postpositivism and educational research*. Rowman & Littlefield Publishers.

Pipe, T. B., Buchda, V. L., Launder, S., Hudak, B., Hulvey, L., Karns, K. E., & Pendergast, D. (2012). Building personal and professional resources of resilience and agility in the healthcare workplace. *Stress and Health*, *28*(1), 11-22. *https://doi.org/10.1002/smi.1396*

Ployhart, R. E., & Vandenberg, R. J. (2010). Longitudinal research:The theory, design, and analysis of change. *Journal of Management*, *36*(1), 94-120. *https://doi.org/10.1177/0149206309352110*

Ployhart, R. E., & Ward, A.-K. (2011). The "quick start guide" for conducting and publishing longitudinal research. *Journal of Business and Psychology, 26*(4), 413–422. *https://doi.org/10.1007/s10869-011-9209-6*

Podolny, J. M., & Baron, J. N. (1997). Resources and relationships: Social networks and mobility in the workplace. *American Sociological Review*, *62*(5), 673-693. *https://doi.org/10.2307/2657375*

Podsakoff, P. M., MacKenzie, S. B., Lee, J. Y., & Podsakoff, N. P. (2003). Common method biases in behavioral research: A critical review of the literature and recommended remedies. *Journal of Applied Psychology*, *88*(5), 879-903. *https://doi.org/10.1037/0021-9010.88.5.879*

Podsakoff, P. M., MacKenzie, S. B., & Podsakoff, N. P. (2012). Sources of method bias in social science research and recommendations on how to control it. *Annual Review of Psychology*, *63*, 539-569. *https://doi.org/10.1146/annurev-psych-120710-100452*

Polanyi, M. (1967). *The tacit dimension*. Anchor Books.

Porter, S. R. (2004). Raising response rates: What works? *New Directions for Institutional Research*, *2004*(121), 5-21. *https://doi.org/10.1002/ir.97*

Preacher, K. J., Curran, P. J., & Bauer, D. J. (2006). Computational tools for probing interactions in multiple linear regression, multilevel modeling, and latent curve analysis. *Journal of Educational and Behavioral Statistics*, *31*(4), 437-448. *https://doi.org/10.3102/10769986031004437*

Pudjiarti, E. S., & Hutomo, P. T. P. (2020). Innovative work behaviour: An integrative investigation of person-job fit, person-organization fit, and person-group fit. *Business: Theory and Practice*, *21*(1), 39-47. *https://doi.org/10.3846/btp.2020.9487*

Putnam, R. D. (2000). *Bowling alone: The collapse and revival of American community*. Simon & Schuster.

Pyöriä, P. (2011). Managing telework: Risks, fears and rules. *Management Research Review*, *34*(4), 386-399. *https://doi.org/10.1108/01409171111117843*

Qiu, F., & Dauth, T. (2022). Virtual work intensity, job satisfaction, and the mediating role of work–family balance: A study of employees in Germany and China. *German Journal of Human Resource Management*. *https://doi.org/10.1177/2397002221998227*

Qureshi, I., Fang, Y., Ramsey, E., McCole, P., Ibbotson, P., & Compeau, D. (2018). IT-mediated social interactions and knowledge sharing: Role of competence-based trust and background heterogeneity. *Information Systems Journal*, *28*(5), 929-955. *https://doi.org/10.1111/isj.12181*

Radaelli, G., Lettieri, E., Mura, M., & Spiller, N. (2014). Knowledge sharing and innovative work behaviour in healthcare: A micro-level investigation of direct and indirect effects. *Creativity and Innovation Management*, *23*(4), 400-414. *https://doi.org/10.1111/caim.12084*

Rafferty, A. E., & Griffin, M. A. (2006). Perceptions of organizational change: A stress and coping perspective. *Journal of Applied Psychology*, *91*(5), 1154-1162. *https://doi.org/10.1037/0021-9010.91.5.1154*

Raghuram, S., Hill, N. S., Gibbs, J. L., & Maruping, L. M. (2019). Virtual work: Bridging research clusters. *Academy of Management Annals*, *13*(1), 308-341. *https://doi.org/10.5465/annals.2017.0020*

Rahman, M. S., Mannan, M., Hossain, M. A., Zaman, M. H., & Hasan, H. (2018). Tacit knowledge-sharing behavior among the academic staff: Trust, self-efficacy, motivation and Big Five personality traits embedded model. *International Journal of Educational Management*, *32*(5), 761-782. *https://doi.org/10.1108/IJEM-08-2017-0193*

Ramirez, A., & Zhang, S. (2007). When online meets offline: The effect of modality switching on relational communication. *Communication Monographs*, *74*(3), 287-310. *https://doi.org/10.1080/03637750701543493*

Rahrovani, Y., & Pinsonneault, A. (2020). Innovative IT use and innovating with IT: A study of the motivational antecedents of two different types of innovative behaviors. *Journal of the Association for Information Systems*, 21(4), Article 5. *https://doi.org/10.17705/1jais.00627*

Reagans, R., & McEvily, B. (2003). Network structure and knowledge transfer: The effects of cohesion and range. *Administrative Science Quarterly*, *48*(2), 240-267.

Rebelo, G., Almeida, A., & Pedra, J. (2024). Telework and work intensity: Insights from an exploratory study in Portugal during the COVID-19 pandemic. *Administrative Sciences*, *14*(1), Article 14. *https://doi.org/10.3390/admsci14010014*

Reich, S. M., & Reich, J. A. (2006). Cultural competence in interdisciplinary collaborations: A method for respecting diversity in research partnerships. *American Journal of Community Psychology*, *38*(1-2), 51-62. *https://doi.org/10.1007/s10464-006-9064-1*

Reins, L. M., Arslan, R. C., & Gerlach, T. M. (2021). Assessing ego-centered social networks in formr: A tutorial. *Advances in Methods and Practices in Psychological Science*, *4*(1), Article 2515245920985467. *https://doi.org/10.1177/2515245920985467*

Renkema, M., Meijerink, J., & Bondarouk, T. (2021). Routes for employee-driven innovation: How HRM supports the emergence of innovation in a formalized context. *The International Journal of Human Resource Management*, *32*(18), 3922-3956. *https://doi.org/10.1080/09585192.2021.1913625*

Rico, R., & Cohen, S. G. (2005). Effects of task interdependence and type of communication on performance. *Journal of Managerial Psychology*, *20*(3-4), 261-274. *https://doi.org/10.1108/02683940510589046*

Rico, R., Bachrach, D. G., Sánchez-Manzanares, M., & Collins, B. J. (2011). The interactive effects of person-focused citizenship behaviour, task interdependence, and virtuality on team performance. *European Journal of Work and Organizational Psychology*, *20*(5), 700-726. *https://doi.org/10.1080/1359432X.2010.495206*

Rindfleisch, A., Malter, A. J., Ganesan, S., & Moorman, C. (2008). Cross-sectional versus longitudinal survey research: Concepts, findings and guidelines. *Journal of Marketing Research*, *45*(3), 261-279. *https://doi.org/10.1509/jmkr.45.3.261*

Rizmaldi, M. A., & Jayadi, R. (2022). How remote working can affect employee performance using Scrum in software development companies. *Journal of Theoretical and Applied Information Technology*, *100*(24), 4799-4809.

Robak, E. (2022). Knowledge exchange as a factor shaping employee relations in remote work. *Proceedings of the European Conference on Knowledge Management (ECKM)*, *23*(2), 975-982. *https://doi.org/10.34190/eckm.23.2.500*

Robert, L. P., Jr., & You, S. (2018). Are you satisfied yet? Shared leadership, individual trust, autonomy, and satisfaction in virtual teams. *Journal of the Association for Information Science and Technology*, *69*(4), 503-513. *https://doi.org/10.1002/asi.23961*

Rodan, S., & Galunic, C. (2004). More than network structure: How knowledge heterogeneity influences managerial performance and innovativeness. *Strategic Management Journal*, *25*(6), 541-562. *https://doi.org/10.1002/smj.398*

Rosenberg, N. (1982). Learning by using. In *Inside the black box: Technology and economics* (pp. 120-140). Cambridge University Press.

Rousseau, D. M. (2006). Is there such a thing as "evidence-based management"? *Academy of Management Review*, *31*(4), 1089-1091.

Rousseau, D. M., Sitkin, S. B., Burt, R. S., & Camerer, C. (1998). Not so different after all: A cross-discipline view of trust. *Academy of Management Review*, *23*(3), 393-404. *https://doi.org/10.5465/AMR.1998.926617*

Ruliana, P., Kurniawan, A. W., & Suroso, A. (2018). The role of communication climate in improving work performance. *MIMBAR: Jurnal Sosial dan Pembangunan*, *34*(1), 237-245. *https://doi.org/10.29313/mimbar.v34i1.3145*

Rupčić, N. (2024). Working and learning in a hybrid workplace: Challenges and opportunities. *The Learning Organization*, *31*(2), 276-283. *https://doi.org/10.1108/tlo-02-2024-303*

Ryan, R. M., & Deci, E. L. (2000). Self-determination theory and the facilitation of intrinsic motivation, social development, and well-being. *American Psychologist*, *55*(1), 68-78. *https://doi.org/10.1037/0003-066X.55.1.68*

Sacco, D. F., & Ismail, M. M. (2014). Social belongingness satisfaction as a function of interaction medium: Face-to-face interactions facilitate greater social belonging and interaction enjoyment compared to instant messaging. *Computers in Human Behavior*, *36*, 359-364. *https://doi.org/10.1016/j.chb.2014.04.004*

Sahay, S., & Goldthwaite, C. (2024). Participatory practices during organizational change: Rethinking participation and resistance. *Management Communication Quarterly*, *38*(2), 279-306. *https://doi.org/10.1177/08933189231187883*

Salomon, R., & Martin, X. (2008). Learning, knowledge transfer, and technology implementation performance: A study of time-to-build in the global semiconductor industry. *Management Science*, *54*(7), 1266-1280. *https://doi.org/10.1287/mnsc.1080.0866*

Sanchez, D. G., Parra, N. G., Özden, Ç., Rijkers, B., Viollaz, M., & Winkler, H. (2021). Who on earth can work from home? *The World Bank Research Observer*, *36*(1), 67-100. *https://doi.org/10.1093/wbro/lkab002*

Santiago-Torner, C., Tarrats-Pons, E., & Corral-Marfil, J. A. (2025). Effects of intensity of teleworking and creative demands on the cynicism dimension of job burnout. *Employee Responsibilities and Rights Journal*, *37*(2), 201-223. *https://doi.org/10.1007/s10672-023-09464-3*

Sanz-Blas, S., Buzova, D., & Pérez-Ruiz, P. (2021). Building relational worth in an online social community through virtual structural embeddedness and relational embeddedness. *Technological Forecasting and Social Change*, *162*, Article 120350. *https://doi.org/10.1016/j.techfore.2020.120350*

Sarker, S., Ahuja, M., Sarker, S., & Hove-Kirkeby, S. (2011). The role of communication and trust in global virtual teams: A social network perspective. *Journal of Management Information Systems*, *28*(1), 273-310. *https://doi.org/10.2753/MIS0742-1222280109*

Sarker, S., Ahuja, M., Sarker, S., & Kirkeby, S. (2011). Path to "stardom" in globally distributed hybrid teams: An examination of a knowledge-centered perspective using social network analysis. *Decision Sciences*, *42*(2), 339-370. *https://doi.org/10.1111/j.1540-5915.2011.00314.x*

Sarker, S., & Schneider, C. (2009). Seeing remote team members as leaders: A study of US-Scandinavian teams. *IEEE Transactions on Professional Communication*, *52*(1), 75-94. *https://doi.org/10.1109/TPC.2008.2007871*

Saunders, C. S., & Ahuja, M. K. (2006). Are all distributed teams the same? Differentiating between temporary and ongoing distributed teams. In P. Hinds & S. Kiesler (Eds.), *Distributed work* (pp. 662-700). MIT Press.

Saunders, M. N. K., Lewis, P., & Thornhill, A. (2019). *Research methods for business students* (8th ed.). Pearson.

Schiller, S. Z., & Cui, J. (2010). Communication openness in the workplace: The effects of medium (F2F and IM) and culture (U.S. and China). *Journal of Global Information Technology Management*, *13*(2), 37-75. *https://doi.org/10.1080/1097198x.2010.10856514*

Schmitz, H., Bauer, J. F., & Niehaus, M. (2023). Working anytime and anywhere-even when feeling ill? A cross-sectional study on presenteeism in remote work. *Safety and Health at Work*, *14*(4), 375-383. *https://doi.org/10.1016/j.shaw.2023.11.001*

Schoorman, F. D., Mayer, R. C., & Davis, J. H. (2007). An integrative model of organizational trust: Past, present, and future. *Academy of Management Review*, *32*(2), 344-354. *https://doi.org/10.5465/amr.2007.24348410*

Schreurs, B., Van den Beemt, A., Moolenaar, N. M., & De Laat, M. (2019). Networked individualism and learning in organizations: An ego-network perspective on informal learning ties. *Journal of Workplace Learning*, *31*(2), 95-115. *https://doi.org/10.1108/JWL-05-2018-0070*

Schweitzer, L., & Duxbury, L. (2010). Conceptualizing and measuring the virtuality of teams. *Information Systems Journal*, *20*(3), 267-295. *https://doi.org/10.1111/j.1365-2575.2009.00326.x*

Scott, S. G., & Bruce, R. A. (1994). Determinants of innovative behavior: A path model of individual innovation in the workplace. *Academy of Management Journal*, *37*(3), 580-607. *https://doi.org/10.2307/256701*

Segarra-Ciprés, M., Escrig-Tena, A., & García-Juan, B. (2019). Employees' proactive behavior and innovation performance: Examining the moderating role of informal and formal controls. *European Journal of Innovation Management*, *22*(5), 866-888. *https://doi.org/10.1108/EJIM-02-2019-0041*

Shih, H. A., & Susanto, E. (2017). Perceived identifiability, shared responsibility, and innovative work behavior. *The International Journal of Human Resource Management*, *28*(22), 3109-3127. *https://doi.org/10.1080/09585192.2016.1143860*

Shi, W., & Weber, M. (2020). The impact of entrepreneurs' prior experience and communication networks on perceived knowledge access. *Journal of Knowledge Management*, *25*(3), 565-587. *https://doi.org/10.1108/jkm-05-2020-0365*

Short, J., Williams, E., & Christie, B. (1976). Theoretical approaches to differences between media. In *The social psychology of telecommunications* (pp. 61-76). John Wiley & Sons.

Sia, S. K., & Appu, A. V. (2015). Work autonomy and workplace creativity: Moderating role of task complexity. *Global Business Review*, *16*(5), 772-784. *https://doi.org/10.1177/0972150915591435*

Sinnemann, M. F., & Weiss, M. M. (2025). Team virtuality and innovation: A meta-analysis of the moderating role of team design. *Journal of Organizational Behavior*, *46*(6), 867-888. *https://doi.org/10.1002/job.2889*

Sitkin, S. B., & Roth, N. L. (1993). Explaining the limited effectiveness of legalistic "remedies" for trust/distrust. *Organization Science*, *4*(3), 367-392. *https://doi.org/10.1287/orsc.4.3.367*

Smedley, J. (2009). Modelling personal knowledge management. *OR Insight*, *22*(4), 221-233. *https://doi.org/10.1057/ori.2009.11*

Snape, D., & Spencer, L. (2003). The foundations of qualitative research. In J. Ritchie & J. Lewis (Eds.), *Qualitative research practice: A guide for social science students and researchers* (pp. 2-23). Sage Publications Ltd.

Snijders, T. A. B., & Bosker, R. J. (2012). *Multilevel analysis: An introduction to basic and advanced multilevel modeling* (2nd ed.). Sage Publications Ltd.

Solomon, D. H., Knobloch, L. K., Theiss, J. A., & McLaren, R. M. (2016). Relational turbulence theory: Explaining variation in subjective experiences and communication within romantic

relationships. *Human Communication Research*, *42*(4), 507-532. *https://doi.org/10.1111/hcre.12091*

Soltis, S. M., Brass, D. J., & Lepak, D. P. (2018). Social resource management: Integrating social network theory and human resource management. *Academy of Management Annals*, *12*(2), 537-573. *https://doi.org/10.5465/annals.2016.0094*

Soroka-Potrzebna, H. (2022). Barriers of knowledge management in virtual project teams: A TISM model. *Procedia Computer Science*, *207*, 800-809. *https://doi.org/10.1016/j.procs.2022.09.135*

Sparr, J. L., Knipfer, K., & Willems, F. (2017). How leaders can get the most out of formal training: The significance of feedback-seeking and reflection as informal learning behaviors. *Human Resource Development Quarterly*, *28*(1), 29-54. *https://doi.org/10.1002/hrdq.21263*

Spector, P. E. (1994). Using self-report questionnaires in OB research: A comment on the use of a controversial method. *Journal of Organizational Behavior, 15*(5), 385-392. *https://doi.org/10.1002/job.4030150503*

Spector, P. E. (2006). Truth or urban legend? *Organizational Research Methods*, *9*(2), 221-232. *https://doi.org/10.1177/1094428105284955*

Spreitzer, G. M., Sutcliffe, K. M., Dutton, J. E., Sonenshein, S., & Grant, A. M. (2005). A socially embedded model of thriving at work. *Organization Science*, *16*(5), 537-549. *https://doi.org/10.1287/orsc.1050.0153*

Sproull, L., & Kiesler, S. (1986). Reducing social context cues: Electronic mail in organizational communication. *Management Science*, *32*(11), 1492-1512. *https://doi.org/10.1287/mnsc.32.11.1492*

Stafford, L. (2011). Measuring relationship maintenance behaviors: Critique and development of the revised relationship maintenance behavior scale. *Journal of Social and Personal Relationships*, *28*(2), 278-303. *https://doi.org/10.1177/0265407510378125*

Stafford, L., Dainton, M., & Haas, S. (2000). Measuring routine and strategic relational maintenance: Scale revision, sex versus gender roles, and the prediction of relational characteristics. *Communication Monographs*, *67*(3), 306-323. *https://doi.org/10.1080/03637750009376512*

Steizel, S., & Rimbau-Gilabert, E. (2013). Upward influence tactics through technology-mediated communication tools. *Computers in Human Behavior*, *29*(2), 462-472. *https://doi.org/10.1016/j.chb.2012.04.024*

Stoffers, J., van der Heijden, B. I. J. M., & Schrijver, I. (2020). Towards a sustainable model of innovative work behaviors' enhancement: The mediating role of employability. *Sustainability*, *12*(1), Article 159. *https://doi.org/10.3390/su12010159*

Strauss, K., Griffin, M. A., & Rafferty, A. E. (2015). Building and sustaining proactive behaviors: The role of adaptivity and job satisfaction. *Journal of Business and Psychology*, *30*(1), 63-72. *https://doi.org/10.1007/s10869-013-9334-5*

Stray, V., & Moe, N. B. (2020). Understanding coordination in global software engineering: A mixed-methods study on the use of meetings and Slack. *Journal of Systems and Software*, *170*, Article 110717. *https://doi.org/10.1016/j.jss.2020.110717*

Stoian, C. A., *et al.* (2022). Telework systematic model design for the future of work. *Sustainability, 14*(12), 7146. *https://doi.org/10.3390/su14127146*

Suh, A., Shin, K.-S., Ahuja, M., & Kim, M. S. (2011). The influence of virtuality on social networks within and across work groups: A multilevel approach. *Journal of Management Information Systems*, *28*(1), 351-386. *https://doi.org/10.2753/MIS0742-1222280111*

Sullivan, J. J. (1988). Three roles of language in motivation theory. *Academy of Management Review*, *13*(1), 104-115. *https://doi.org/10.5465/amr.1988.4306798*

Sun, M., Kraus, T., Pauli, R., & Garus, C. C. (2025). Changing sense of place in hybrid work environments: A systematic review of place identity and employee well-being. *Wellbeing, Space and Society*, *8*, Article 100236. *https://doi.org/10.1016/j.wss.2025.100236*

Suseno, Y., Standing, C., Gengatharen, D., & Nguyen, D. (2020). Innovative work behaviour in the public sector: The roles of task characteristics, social support, and proactivity. *Australian Journal of Public Administration*, *79*(1), 41-59. *https://doi.org/10.1111/1467-8500.12378*

Sutcliffe, A. J., Dunbar, R. I. M., Binder, J., & Arrow, H. (2012). Relationships and the social brain: Integrating psychological and evolutionary perspectives. *British Journal of Psychology*, *103*(2), 149-168. *https://doi.org/10.1111/j.2044-8295.2011.02061.x*

Sybing, R. (2019). Making connections: Student-teacher rapport in higher education classrooms. *Journal of the Scholarship of Teaching and Learning*, *19*(5), 18-35. *https://doi.org/10.14434/josotl.v19i5.26578*

Tasselli, S., & Kilduff, M. (2021). Network agency. *Academy of Management Annals*, *15*(1), 68-110. *https://doi.org/10.5465/annals.2019.0037*

Tajfel, H. (Ed.). (1982). *Social identity and intergroup relations*. Cambridge University Press.

Taskin, L., & Bridoux, F. (2010). Telework: A challenge to knowledge transfer in organizations. *The International Journal of Human Resource Management*, *21*(13), 2503-2520. *https://doi.org/10.1080/09585192.2010.516600*

Thatcher, S. M. B., & Zhu, X. (2006). Changing identities in a changing workplace: Identification, identity enactment, self-verification, and telecommuting. *Academy of Management Review*, *31*(4), 1076-1088. *https://doi.org/10.5465/amr.2006.22528174*

Theiss, J. A. (2019). Uncertainty perspectives on relationship maintenance. In B. G. Ogolsky & J. K. Monk (Eds.), *Relationship maintenance: Theory, process, and context* (pp. 69-85). Cambridge University Press. *https://doi.org/10.1017/9781108304320.005*

Theurer, C. P., Tumasjan, A., & Welpe, I. M. (2018). Contextual work design and employee innovative work behavior: When does autonomy matter? *PLoS ONE*, *13*(9), Article e0204089. *https://doi.org/10.1371/journal.pone.0204089*

Thibaut, J. W., & Kelley, H. H. (1959). *The social psychology of groups*. Wiley.

Thomas, J., & Harden, A. (2008). Methods for the thematic synthesis of qualitative research in systematic reviews. *BMC Medical Research Methodology*, *8*, 45. *https://doi.org/10.1186/1471-2288-8-45*

Thomas, J., & McDonagh, D. (2013). Shared language: Towards more effective communication. *Australasian Medical Journal*, *6*(1), 46-54. *https://doi.org/10.4066/AMJ.2013.1578*

Thompson, J. D. (1967). *Organizations in action: Social science bases of administrative theory*. McGraw-Hill.

Tidwell, L. C., & Walther, J. B. (2002). Computer-mediated communication effects on self-disclosure, impressions, and interpersonal evaluations. *Human Communication Research*, *28*(3), 317-348. *https://doi.org/10.1111/j.1468-2958.2002.tb00811.x*

Tierney, P., Farmer, S. M., & Graen, G. B. (1999). An examination of leadership and employee creativity: The relevance of traits and relationships. *Personnel Psychology*, *52*(3), 591-620. *https://doi.org/10.1111/j.1744-6570.1999.tb00173.x*

Tornau, K., & Frese, M. (2013). Construct clean-up in proactivity research: A meta-analysis on the nomological net of work-related proactivity concepts and their incremental validities. *Applied Psychology*, *62*(1), 44-96. *https://doi.org/10.1111/j.1464-0597.2012.00514.x*

Tranfield, D., Denyer, D., & Smart, P. (2003). Towards a methodology for developing evidence-informed management knowledge by means of systematic review. *British Journal of Management*, *14*(3), 207-222. *https://doi.org/10.1111/1467-8551.00375*

Treem, J. W., & Leonardi, P. M. (2013). Social media use in organizations: Exploring the affordances of visibility, editability, persistence, and association. *Annals of the International Communication Association*, *36*(1), 143-189. *https://doi.org/10.1080/23808985.2013.11679130*

Treviño, L. K., Lengel, R. H., & Daft, R. L. (1987). Media symbolism, media richness, and media choice in organizations. *Communication Research*, *14*(5), 553-574.

Tricco, A. C., Lillie, E., Zarin, W., O'Brien, K. K., Colquhoun, H., Levac, D., Moher, D., Peters, M. D. J., Horsley, T., Weeks, L., Hempel, S., Akl, E. A., Chang, C., McGowan, J., Stewart, L., Hartling, L., Aldcroft, A., Wilson, M. G., Garritty, C., & Straus, S. E. (2016). A scoping

review on the conduct and reporting of scoping reviews. *BMC Medical Research Methodology*, *16*, Article 15. *https://doi.org/10.1186/s12874-016-0116-4*

Tricco, A. C., Lillie, E., Zarin, W., O'Brien, K. K., Colquhoun, H., Levac, D., Moher, D., Peters, M. D. J., Horsley, T., Weeks, L., Hempel, S., Akl, E. A., Chang, C., McGowan, J., Stewart, L., Hartling, L., Aldcroft, A., Wilson, M. G., Garritty, C., & Straus, S. E. (2018). PRISMA extension for scoping reviews (PRISMA-ScR): Checklist and explanation. *Annals of Internal Medicine*, *169*(7), 467-473. *https://doi.org/10.7326/M18-0850*

Tröster, C. (2025). How hybrid work shapes communication ties: The role of concern about relationship loss and organizational identification. *Journal of Management Studies*. Advance online publication. *https://doi.org/10.1111/joms.13277*

Tsai, K. H., & Zheng, L. L. (2021). Bridging employee curiosity and service creativity: A new lens. *Journal of Service Theory and Practice*, *31*(5), 821-844. *https://doi.org/10.1108/jstp-11-2020-0262*

Tsai, M. T., & Lee, K. W. (2006). A study of knowledge internalization: From the perspective of learning cycle theory. *Journal of Knowledge Management*, *10*(3), 57-71. *https://doi.org/10.1108/13673270610670858*

Tsai, W. (2001). Knowledge transfer in intraorganizational networks: Effects of network position and absorptive capacity on business unit innovation and performance. *Academy of Management Journal*, *44*(5), 996-1004. *https://doi.org/10.2307/3069443*

Tsoukas, H., & Vladimirou, E. (2001). What is organizational knowledge? *Journal of Management Studies*, *38*(7), 973-993.

Tugade, M. M., & Fredrickson, B. L. (2004). Resilient individuals use positive emotions to bounce back from negative

emotional experiences. *Journal of Personality and Social Psychology*, *86*(2), 320-333. *https://doi.org/10.1037/0022-3514.86.2.320*

Tummers, L. G., Kruyen, P. M., Vijverberg, D., & Voesenek, T. J. (2015). Connecting HRM and change management: The importance of proactivity and vitality. *Journal of Organizational Change Management*, *28*(4), 627-640. *https://doi.org/10.1108/JOCM-11-2013-0220*

Unsworth, K. L., & Parker, S. (2003). Proactivity and innovation: Promoting a new workforce for the new workplace. In D. Holman, T. D. Wall, C. W. Clegg, P. Sparrow, & A. Howard (Eds.), *The new workplace: A guide to the human impact of modern working practices* (pp. 175–196). John Wiley & Sons.

Uzzi, B. (1997). Social structure and competition in interfirm networks: The paradox of embeddedness. Administrative Science Quarterly, 42(1), 35–67. *https://doi.org/10.2307/2393808*

Vacca, R. (2018). Multilevel models for personal networks. *Italian Journal of Applied Statistics*, *30*(1), 59-97.

Vacca, R. (2020). Structure in personal networks: Constructing and comparing typologies. *Network Science*, *8*(2), 142-167. *https://doi.org/10.1017/nws.2019.29*

Valencia, M. M. A. (2022). Principles, scope, and limitations of methodological triangulation. *Enfermería*, *40*(2). *https://doi.org/10.17533/udea.iee.v40n2e03*

Valenzuela, S., Park, N., & Kee, K. F. (2009). Is there social capital in a social network site? Facebook use and college students' life satisfaction, trust, and participation. *Journal of*

Computer-Mediated Communication, 14(4), 875-901. *https://doi.org/10.1111/j.1083-6101.2009.01474.x*

van den Hooff, B., & de Leeuw van Weenen, F. (2004). Committed to share: Commitment and CMC use as antecedents of knowledge sharing. *Knowledge and Process Management*, *11*(1), 13-24. *https://doi.org/10.1002/kpm.187*

van den Hooff, B., de Leeuw van Weenen, F., Soekijad, M., & Huysman, M. (2010). The value of online networks of practice: The role of embeddedness and media use. *Journal of Information Technology*, *25*(2), 205-215. *https://doi.org/10.1057/jit.2010.11*

van der Heijden, G. A. H., Schepers, J. J. L., Nijssen, E. J., & Ordanini, A. (2013). Don't just fix it, make it better! Using frontline service employees to improve recovery performance. *Journal of the Academy of Marketing Science*, *41*(5), 515-530. *https://doi.org/10.1007/s11747-012-0324-3*

van der Meulen, N., van Baalen, P., van Heck, E., & Mülder, S. (2019). No teleworker is an island: The impact of temporal and spatial separation along with media use on knowledge sharing networks. *Journal of Information Technology*, *34*(3), 243-262. *https://doi.org/10.1177/0268396218816531*

van der Rijt, J., van den Bossche, P., & Segers, M. S. R. (2013). Understanding informal feedback seeking in the workplace: The impact of the position in the organizational hierarchy. *European Journal of Training and Development*, *37*(1), 72-85. *https://doi.org/10.1108/03090591311293293*

Van der Vegt, G. S., & Janssen, O. (2003). Joint impact of interdependence and group diversity on innovation. *Journal of Management*, *29*(5), 729-751. *https://doi.org/10.1016/S0149-2063(03)00033-3*

van der Voet, J., & Steijn, B. (2021). Team innovation through collaboration: How visionary leadership spurs innovation via team cohesion. *Public Management Review*, *23*(9), 1275-1294. *https://doi.org/10.1080/14719037.2020.1743344*

van der Werff, L., & Buckley, F. (2017). Trust development during socialization. *Journal of Management*, *43*(3), 742-770. *https://doi.org/10.1177/0149206314566736*

Van Dijcke, D., Gunsilius, F., & Wright, A. (2024). *Return to office and the tenure distribution*. University of Chicago Harris School of Public Policy Working Paper.

van Griethuijsen, R. A. L. F., van Eijck, M. W., Haste, H., den Brok, P. J., Skinner, N. C., Mansour, N., Gencer, A. S., & BouJaoude, S. (2015). Global patterns in students' views of science and interest in science. *Research in Science Education*, *45*(4), 581-603. *https://doi.org/10.1007/s11165-014-9438-6*

Van Quaquebeke, N., Salem, M., van Dijke, M., & Wenzel, R. (2022). Conducting organizational survey and experimental research online: From convenient to ambitious in study designs, recruiting, and data quality. *Organizational Psychology Review*, *12*(2), 177-208. *https://doi.org/10.1177/20413866221097571*

Van Wart, M., Roman, A., Wang, X., & Liu, C. (2019). Operationalizing the definition of e-leadership: Identifying the elements of e-leadership. *International Review of Administrative Sciences*, *85*(1), 80-97. *https://doi.org/10.1177/0020852316681446*

Van Yperen, N. W., & Wörtler, B. (2017). Blended working and the employability of older workers, retirement timing, and bridge employment. *Work, Aging and Retirement*, *3*(1), 102-108. *https://doi.org/10.1093/workar/waw036*

Van Zoonen, W. and Sivunen, A. E. (2022) 'The impact of remote work and mediated communication frequency on isolation and psychological distress', *European Journal of Work and Organizational Psychology*, 31(4), pp. 610–621. *doi: 10.1080/1359432X.2021.2002299.*

van Zoonen, W., Sivunen, A. E., & Blomqvist, K. (2024). Out of sight, out of trust? An analysis of the mediating role of communication frequency and quality in the relationship between workplace isolation and trust. *European Management Journal*, *42*(4), 515-526. *https://doi.org/10.1016/j.emj.2023.04.006*

Van Zyl, J. and Hofmeyr, K. (2021) 'Leadership behaviour that facilitates shared leadership emergence in internationally dispersed non-formal teams', South African Journal of Business Management, 52(1), pp. 1–13. *https://10.4102/sajbm.v52i1.2695.*

Vartiainen, M., & Vanharanta, O. (2024). True nature of hybrid work. *Frontiers in Organizational Psychology*, *1*, Article 1.

Veerareddy, A., Fang, H., Safari, N., Xu, P., & Krueger, F. (2025). Social network size, empathy, and white matter: A diffusion tensor imaging (DTI) study. *Cognitive, Affective, & Behavioral Neuroscience*, *25*(2), 471-487. *https://doi.org/10.3758/s13415-024-01225-5*

Vega, R. P., Anderson, A. J., & Kaplan, S. A. (2015). A within-person examination of the effects of telework. *Journal of Business and Psychology*, *30*(2), 313-323. *https://doi.org/10.1007/s10869-014-9351-y*

Vinueza-Cabezas, A., Simbaña-Rivera, K., Gómez-Barreno, L., Mestanza-Ramón, C., Córdova-Castro, R. M., Bermeo-Suárez, D., & Ortiz-Prado, E. (2022). A comparison of working conditions and workers' perceptions among on-site, telework, and hybrid workers in Ecuador during the COVID-19 pandemic. *International Journal of Environmental Research and Public Health*, *19*(21), 14337. *https://doi.org/10.3390/ijerph192114337*

Virick, M., DaSilva, N., & Arrington, K. (2010). Moderators of the curvilinear relation between extent of telecommuting and job and life satisfaction: The role of performance outcome orientation and worker type. *Human Relations*, *63*(1), 137-154. *https://doi.org/10.1177/0018726709349198*

Waizenegger, L., McKenna, B., Cai, W., & Bendz, T. (2020). An affordance perspective of team collaboration and enforced working from home during COVID-19. *European Journal of Information Systems*, *29*(4), 429-442. *https://doi.org/10.1080/0960085X.2020.1800417*

Walden, J., & Zeng, C. (2024). Work in transition: Exploring pandemic-displaced employees' communication. *Journal of Communication Management*, *28*(3), 423-441. *https://doi.org/10.1108/jcom-08-2022-0096*

Walther, J. B. (1992). Interpersonal effects in computer-mediated interaction: A relational perspective. *Communication Research*, *19*(1), 52-90. *https://doi.org/10.1177/009365092019001004*

Walther, J. B. (1996). Computer-mediated communication: Impersonal, interpersonal, and hyperpersonal interaction. *Communication Research*, *23*(1), 3-43. *https://doi.org/10.1177/009365096023001001*

Walther, J. B., & Parks, M. R. (2002). Cues filtered out, cues filtered in: Computer-mediated communication and relationships. In M. L. Knapp & J. A. Daly (Eds.), *Handbook of interpersonal communication* (3rd ed., pp. 529-563). SAGE Publications.

Wang, A. C. (2022). Employee proactive goal regulation and job performance: The role modeling and interacting effects of leader proactive goal regulation. *Human Relations*, *75*(2), 373-400. *https://doi.org/10.1177/0018726720984838*

Wang, B., Liu, Y., Qian, J., & Parker, S. K. (2021). Achieving effective remote working during the COVID-19 pandemic: A work design perspective. *Applied Psychology*, *70*(1), 16-59. *https://doi.org/10.1111/apps.12290*

Wang, H. J., Demerouti, E., & Le Blanc, P. M. (2017). Transformational leadership, adaptability, and job crafting: The moderating role of organizational identification. *Journal of Vocational Behavior*, *100*, 185-195. *https://doi.org/10.1016/j.jvb.2017.03.009*

Wang, L., Chen, X. P., & Yin, J. (2024). Leading via virtual communication: A longitudinal field experiment on work team creativity in an extreme context. *Asia Pacific Journal of Management*, *41*(1), 195-231. *https://doi.org/10.1007/s10490-022-09846-5*

Wang, S., & Noe, R. A. (2010). Knowledge sharing: A review and directions for future research. *Human Resource Management Review*, *20*(2), 115-131. *https://doi.org/10.1016/j.h*

Wang, X., & Cheng, Z. (2020). Cross-sectional studies: Strengths, weaknesses, and recommendations. *Chest*, *158*(1, Suppl), S65-S71. *https://doi.org/10.1016/j.chest.2020.03.012*

Wang, X., Wang, Z., & Zhang, M. (2024). Knowledge Workers, Innovation Linkages and Knowledge Absorption: An Interactive Mechanism Study. *Journal of the Knowledge Economy*. *https://doi.org/10.1007/s13132-023-01709-8*

Wasko, M. M., & Faraj, S. (2005). Why should I share? Examining social capital and knowledge contribution in electronic networks of practice. *MIS Quarterly*, *29*(1), 35-57. *https://doi.org/10.2307/25148667*

Weber, M. S., & Kim, H. (2015). Virtuality, technology use, and engagement within organizations. *Journal of Applied Communication Research*, *43*(4), 385-407. *https://doi.org/10.1080/00909882.2015.1083604*

Webster, J., & Watson, R. T. (2002). Analyzing the past to prepare for the future: Writing a literature review. *MIS Quarterly*, *26*(2), xiii-xxiii. *https://doi.org*

Wegner, D. M., Erber, R., & Raymond, P. (1991). Transactive memory in close relationships. *Journal of Personality and Social Psychology*, *61*(6), 923-929. *https://doi.org/10.1037/0022-3514.61.6.923*

Wellman, B., & Wortley, S. (1990). Different strokes from different folks: Community ties and social support. *American Journal of Sociology, 96*(3), 558–588. *https://doi.org/10.1086/229572*

Wellman, B. (1979). The community question: The intimate networks of East Yorkers. *American Journal of Sociology*, *84*(5), 1201-1231. *https://doi.org/10.1086/226876*

Wenger, E., Trayner, B., & de Laat, M. (2011). *Promoting and assessing value creation in communities and networks: A conceptual framework*. Ruud de Moor Centrum.

Wheatley, D., Chung, H., & Cain, L. (2023). Navigating choppy water: Flexibility ripple effects in the COVID-19 pandemic and the future of remote and hybrid working. *Work, Employment and Society*. Advance online publication. *https://doi.org/10.1177/09500170231195230*

Widmann, A., Messmann, G., & Mulder, R. H. (2016). The impact of team learning behaviors on team innovative work behavior: A systematic review. *Human Resource Development Review*, *15*(4), 429-458. *https://doi.org/10.1177/1534484316673713*

Widmann, A., & Mulder, R. H. (2018). Team learning behaviours and innovative work behaviour in work teams. *European Journal of Innovation Management*, *21*(3), 501-520. *https://doi.org/10.1108/EJIM-12-2017-0194*

Wiesenfeld, B. M., Raghuram, S., & Garud, R. (2001). Organizational identification among virtual workers: The role of need for affiliation and perceived work-based social support. *Journal of Management*, *27*(6), 701-712. *https://doi.org/10.1177/014920630102700605*

Wilson, J. M., O'Leary, M. B., Metiu, A., & Jett, Q. R. (2008). Perceived proximity in virtual work: Explaining the paradox of far-but-close. *Organization Studies*, *29*(7), 979-1002. *https://doi.org/10.1177/0170840607083105*

Windeler, J. B., Harrison, A. W., & Sundrup, R. (2024). Under the radar or into the spotlight: How does social presence affect minorities in virtual groups? *Data Base for Advances in Information Systems*, *55*(2), 98-119. *https://doi.org/10.1145/3663682.3663688*

Wolf, E. J., Harrington, K. M., Clark, S. L., & Miller, M. W. (2013). Sample size requirements for structural equation models: An evaluation of power, bias, and solution propriety. *Educational and Psychological Measurement*, *73*(6), 913-934. *https://doi.org/10.1177/0013164413495237*

Wolff, H. G., & Spurk, D. (2020). Developing and validating a short networking behavior scale (SNBS) from Wolff and Moser's (2006) measure. *Journal of Career Assessment*, *28*(2), 277-302. *https://doi.org/10.1177/1069072719844924*

World Economic Forum. (2025, August). *Return to office, flexibility, and remote work*. *https://www.weforum.org/stories/2025/08/return-to-office-flexibility-remote-work*

Wörtler, B., Van Yperen, N. W., & Barelds, D. P. H. (2021). Do blended working arrangements enhance organizational attractiveness and organizational citizenship behaviour intentions? An individual difference perspective. *European Journal of Work and Organizational Psychology*, *30*(4), 581-599. *https://doi.org/10.1080/1359432X.2020.1844663*

Woudstra, L., Van Den Hooff, B., & Schouten, A. P. (2012). Dimensions of quality and accessibility: Selection of human information sources from a social capital perspective. *Information Processing & Management*, *48*(4), 618-630. *https://doi.org/10.1016/j.ipm.2012.02.002*

Wrzesniewski, A., & Dutton, J. E. (2001). Crafting a job: Revisioning employees as active crafters of their work. *Academy of Management Review*, *26*(2), 179-201. *https://doi.org/10.5465/amr.2001.4378011*

Wu, Y. J., Antone, B., DeChurch, L. A., & Contractor, N. S. (2023). Information sharing in a hybrid workplace: Understanding the role of ease-of-use perceptions of communication technologies in advice-seeking relationship maintenance. *Journal of Computer-Mediated Communication*, *28*(4). *https://doi.org/10.1093/jcmc/zmad025*

Wut, T. M., Lee, S. W., & Xu, J. (2022). Work from home challenges of the pandemic era in Hong Kong: A stimulus-organism-response perspective. *International Journal of Environmental Research and Public Health*, *19*(6), 3420. *https://doi.org/10.3390/ijerph19063420*

Xu, K., & Liao, T. (2020). Explicating cues: A typology for understanding emerging media technologies. *Journal of Computer-Mediated Communication*, *25*(1), 32-43. *https://doi.org/10.1093/jcmc/zmz023*

Xu, S., Li, W., & Zhang, W. (2021). The dynamics of social capital: Examining the reciprocity between network features and social support. *Journal of Computer-Mediated Communication*, *26*(6), 362-383. *https://doi.org/10.1093/jcmc/zmab014*

Yang, L., Holtz, D., Jaffe, S., Suri, S., Sinha, S., Weston, J., Joyce, C., Shah, N., Sherman, K., Hecht, B., & Teevan, J. (2022). The effects of remote work on collaboration among information workers. *Nature Human Behaviour*, *6*(1), 43-54. *https://doi.org/10.1038/s41562-021-01196-4*

Yang, Y. J., & Lu, L. (2023). Influence mechanism and impacting boundary of workplace isolation on employees' negative behaviors. *Frontiers in Public Health*, *11*, Article 1077739. *https://doi.org/10.3389/fpubh.2023.1077739*

Ye, F. (2003). Strategic partnerships in transformational outsourcing as a distinctive source of IT value: A social capital perspective. In *Proceedings of the 24th International Conference on Information Systems* (pp. 225-234).

Yin, R. K. (2018). *Case study research and applications: Design and methods* (6th ed.). Sage Publications.

Yow, W. Q., & Lim, T. Z. M. (2019). Sharing the same languages helps us work better together. *Palgrave Communications*, *5*(1), Article 36. *https://doi.org/10.1057/s41599-019-0365-z*

Yozi, K., & Mbokota, G. (2024). Adaptive leadership competencies for hybrid work teams in the South African banking sector. *South African Journal of Business Management*, *55*(1), 1-14. *https://doi.org/10.4102/sajbm.v55i1.4060*

Zarowsky, Z., & Rashid, T. (2023). Resilience and wellbeing strategies for pandemic fatigue in times of COVID-19. *International Journal of Applied Positive Psychology.* *https://doi.org/10.1007/s41042-022-00078-y*

Zhang, E. M. (2010). Understanding the acceptance of mobile SMS advertising among young Chinese consumers. *Psychology & Marketing*, *27*(6), 461-469. *https://doi.org/10.1002/mar.20339*

Zhang, L., Lou, J., Fu, Y., & Ding, T. (2024). Impacts of management approaches on conflict resolution satisfaction: Conflict strength matters. *KSCE Journal of Civil Engineering*, *28*(6), 2091-2104. *https://doi.org/10.1007/s12205-024-0724-1*

Zhao, E. Y., & Glynn, M. A. (2022). Optimal distinctiveness: On being the same and different. *Organization Theory*, *3*(1), Article 26317877221079340. *https://doi.org/10.1177/26317877221079340*

Zheng, S., Li, N., Chen, Z., & Zhang, X. (2024). Understanding the positive and negative effects of team virtuality: A theoretical review and research agenda. *Human Resource Management Review*, *34*(2), Article 101013. *https://doi.org/10.1016/j.hrmr.2024.101013*

Zheng, W. (2010). A social capital perspective of innovation from individuals to nations: Where is empirical literature directing us? *International Journal of Management Reviews*, *12*(2), 151-183. *https://doi.org/10.1111/j.1468-2370.2009.00262.x*

Zhou, J., & George, J. M. (2001). When job dissatisfaction leads to creativity: Encouraging the expression of voice. *Academy of Management Journal*, *44*(4), 682-696. *https://doi.org/10.5465/3069410*

Zhou, X., Rasool, S. F., & Ma, D. (2020). The relationship between workplace violence and innovative work behavior: The mediating roles of employee wellbeing. *Healthcare*, *8*(3), Article 332. *https://doi.org/10.3390/healthcare8030332*

Zhou, X. (2021). Toward the positive consequences of teacher-student rapport for students' academic engagement in the practical instruction classrooms. *Frontiers in Psychology*, *12*, Article 759785. *https://doi.org/10.3389/fpsyg.2021.759785*

Zia, M. Q., Bashir, M. A., Mangi, R. A., & Shamsi, A. F. (2021). A person-situation perspective of informal learning: The role of supervisor feedback environment. *European Journal of Training and Development*, *45*(2), 136-155. *https://doi.org/10.1108/EJTD-09-2020-0142*

Ziegler, R., & Schlett, C. (2016). An attitude strength and self-perception framework regarding the bi-directional relationship of job satisfaction with extra-role and in-role behavior: The doubly moderating role of work centrality. *Frontiers in Psychology*, *7*, Article 235. *https://doi.org/10.3389/fpsyg.2016.00235*

APPENDIX A Scoping Review Tables and Figures

A1 Search Query Inventory and Screening Summary

Table A.1 Search Query Inventory and Screening Summary

Phase 1

Database	File #	Search String	IV	DV	Date Range	No. of Articles
Scopus	1	ALL ("informal network" OR "ego-centric" OR "ego network" OR "ego centric" OR "personal network" OR "Developmental network") AND ("social capital") AND ("EDI" OR "DUI mode 2b" OR "employee driven Innovation" OR "Proactive" OR "change" OR "Innovative work behavior" OR "innovative behavior" OR "innovative performance" OR "job crafting") AND ("employee") AND PUBYEAR > 1999 AND PUBYEAR < 2025 AND NOT ("business to business" OR "group-level") AND NOT ("human capital") AND NOT ("post - secondary") AND NOT ("schools'") AND NOT ("students'") AND NOT ("MBA") AND NOT ("career proactivity") AND NOT ("urban environment") AND NOT ("emerging markets") AND NOT ("societies") AND NOT ("local government") AND NOT ("social responsibility") AND NOT ("government support") AND NOT ("youth") AND NOT ("children") AND NOT ("local innovation") AND NOT ("fire") AND NOT ("onboarding") AND NOT ("municipal") AND NOT ("crowdfunding") AND NOT ("regional culture") AND NOT ("community") AND NOT ("followership") AND NOT ("news") AND NOT ("social media") AND NOT ("SME performance") AND NOT ("web-based marketing") AND NOT ("psychotherapy") AND NOT ("regional cluster") AND NOT ("Ties Between New Ventures and Corporate Venture Capitalists") AND NOT ("psychological capital") AND NOT ("Organisational ethics") AND (LIMIT-TO (SRCTYPE , "j") OR LIMIT-TO (SRCTYPE , "p")) AND (LIMIT-TO (PUBSTAGE ,	Social networks / SCAP	EDI	1999-2025	1710

		"aip") OR LIMIT-TO (PUBSTAGE , "final")) AND (LIMIT-TO (LANGUAGE , "English"))			
Scopus	2	ALL ("team" OR "unit" OR "department" OR " group") AND ("social capital") AND ("EDI" OR "DUI mode 2b" OR "employee driven Innovation" OR "Innovativeness" OR "Proactive" OR "change" OR "Innovative work behavior" OR "innovative behavior" OR "innovative performance" OR "job crafting") AND ("employee") AND PUBYEAR > 1999 AND PUBYEAR < 2025 AND NOT ("business to business" OR "group-level") AND NOT ("human capital") AND NOT ("post - secondary") AND NOT ("schools'") AND NOT ("students'") AND NOT ("MBA") AND NOT ("career proactivity") AND NOT ("urban environment") AND NOT ("emerging markets") AND NOT ("societies") AND NOT ("local government") AND NOT ("social responsibility") AND NOT ("government support") AND NOT ("youth") AND NOT ("children") AND NOT ("local innovation") AND NOT ("fire") AND NOT ("onboarding") AND NOT ("municipal") AND NOT ("crowdfunding") AND NOT ("regional culture") AND NOT ("community") AND NOT ("followership") AND NOT ("news") AND NOT ("social media") AND NOT ("SME performance") AND NOT ("web-based marketing") AND NOT ("psychotherapy") AND NOT ("regional cluster") AND NOT ("Ties Between New Ventures and Corporate Venture Capitalists") AND NOT ("psychological capital") AND NOT ("Organisational ethics") AND (LIMIT-TO (SRCTYPE , "j") OR LIMIT-TO (SRCTYPE , "p")) AND (LIMIT-TO (PUBSTAGE , "aip") OR LIMIT-TO (PUBSTAGE , "final")) AND (LIMIT-TO (LANGUAGE , "English"))	SCAP: Team, unit / group	EDI	1999-2025
Scopus	3	ALL (("cognitive social capital" OR "shared language" OR "shared norms" OR "shared values") AND ("social capital")) AND ("EDI" OR "DUI mode 2b" OR "employee driven Innovation" OR "Innovativeness" OR "Proactive" OR "change" OR "Innovative work behavior" OR "innovative behavior" OR "innovative performance" OR "job crafting") AND ("employee") AND PUBYEAR > 1999 AND PUBYEAR < 2025 AND NOT ("business to business" OR "group-level") AND NOT ("human	Cognitive SCAP	EDI	1999-2025

		capital") AND NOT ("post - secondary") AND NOT ("schools'") AND NOT ("students'") AND NOT ("MBA") AND NOT ("career proactivity") AND NOT ("urban environment") AND NOT ("emerging markets") AND NOT ("societies") AND NOT ("local government") AND NOT ("social responsibility") AND NOT ("government support") AND NOT ("youth") AND NOT ("children") AND NOT ("local innovation") AND NOT ("fire") AND NOT ("onboarding") AND NOT ("municipal") AND NOT ("crowdfunding") AND NOT ("regional culture") AND NOT ("community") AND NOT ("followership") AND NOT ("news") AND NOT ("social media") AND NOT ("SME performance") AND NOT ("web-based marketing") AND NOT ("psychotherapy") AND NOT ("regional cluster") AND NOT ("Ties Between New Ventures and Corporate Venture Capitalists") AND NOT ("psychological capital") AND NOT ("Organisational ethics") AND (LIMIT-TO (SRCTYPE , "j") OR LIMIT-TO (SRCTYPE , "p")) AND (LIMIT-TO (PUBSTAGE , "aip") OR LIMIT-TO (PUBSTAGE , "final")) AND (LIMIT-TO (LANGUAGE , "English"))			
Scopus	4	ALL (("trust" OR "closeness" OR "interpersonal trust" OR "Benevolence-based trust" OR "Competence-based trust" OR "Integrity-based trust") AND ("Social capital")) AND ("EDI" OR "DUI mode 2b" OR "employee driven Innovation" OR "Innovativeness" OR "Proactive" OR "change" OR "Innovative work behavior" OR "innovative behavior" OR "innovative performance" OR "job crafting") AND ("employee") AND PUBYEAR > 1999 AND PUBYEAR < 2025 AND NOT ("business to business" OR "group-level") AND NOT ("human capital") AND NOT ("post - secondary") AND NOT ("schools'") AND NOT ("students'") AND NOT ("MBA") AND NOT ("career proactivity") AND NOT ("urban environment") AND NOT ("emerging markets") AND NOT ("societies") AND NOT ("local government") AND NOT ("social responsibility") AND NOT ("government support") AND NOT ("youth") AND NOT ("children") AND NOT ("local innovation") AND NOT ("fire") AND NOT ("onboarding") AND NOT (	Relational SCAP	EDI	1999-2025

		"municipal") AND NOT ("crowdfunding") AND NOT ("regional culture") AND NOT ("community") AND NOT ("followership") AND NOT ("news") AND NOT ("social media") AND NOT ("SME performance") AND NOT ("web-based marketing") AND NOT ("psychotherapy") AND NOT ("regional cluster") AND NOT ("Ties Between New Ventures and Corporate Venture Capitalists") AND NOT ("psychological capital") AND NOT ("Organisational ethics") AND (LIMIT-TO (SRCTYPE , "j") OR LIMIT-TO (SRCTYPE , "p")) AND (LIMIT-TO (PUBSTAGE , "aip") OR LIMIT-TO (PUBSTAGE , "final")) AND (LIMIT-TO (LANGUAGE , "English"))			
Scopus	5	ALL (("structural") AND ("social capital") AND ("social interaction" OR "diversity" OR "proportion of ties")) AND ("EDI" OR "DUI mode 2b" OR "employee driven Innovation" OR "Proactive" OR "change" OR "Innovative work behavior" OR "innovative behavior" OR "innovative performance" OR "job crafting") AND ("employee") AND PUBYEAR > 1999 AND PUBYEAR < 2025 AND NOT ("business to business" OR "group-level") AND NOT ("human capital") AND NOT ("post - secondary") AND NOT ("schools'") AND NOT ("students'") AND NOT ("MBA") AND NOT ("career proactivity") AND NOT ("urban environment") AND NOT ("emerging markets") AND NOT ("societies") AND NOT ("local government") AND NOT ("social responsibility") AND NOT ("government support") AND NOT ("youth") AND NOT ("children") AND NOT ("local innovation") AND NOT ("fire") AND NOT ("onboarding") AND NOT ("municipal") AND NOT ("crowdfunding") AND NOT ("regional culture") AND NOT ("community") AND NOT ("followership") AND NOT ("news") AND NOT ("social media") AND NOT ("SME performance") AND NOT ("web-based marketing") AND NOT ("psychotherapy") AND NOT ("regional cluster") AND NOT ("Ties Between New Ventures and Corporate Venture Capitalists") AND NOT ("psychological capital") AND NOT ("Organisational ethics") AND (LIMIT-TO (SRCTYPE , "j") OR LIMIT-TO (SRCTYPE , "p")) AND (LIMIT-TO (PUBSTAGE , "aip") OR	Structural SCAP	EDI	1999-2025

		LIMIT-TO (PUBSTAGE , "final")) AND (LIMIT-TO (LANGUAGE , "English"))			
Scopus	6	ALL ("informal network" OR "ego-centric" OR "ego network" OR "ego centric" OR "personal network" OR "Developmental network") AND ("social capital") AND ("Eudaimonic" OR "well-being" OR "well being" OR "psychological well being" OR "employee well being " OR "subjective well being") AND ("employee") AND PUBYEAR > 1999 AND PUBYEAR < 2025 AND NOT ("business to business" OR "group-level") AND NOT ("human capital") AND NOT ("post - secondary") AND NOT ("schools'") AND NOT ("students'") AND NOT ("MBA") AND NOT ("career proactivity") AND NOT ("urban environment") AND NOT ("emerging markets") AND NOT ("societies") AND NOT ("local government") AND NOT ("social responsibility") AND NOT ("government support") AND NOT ("youth") AND NOT ("children") AND NOT ("local innovation") AND NOT ("fire") AND NOT ("onboarding") AND NOT ("municipal") AND NOT ("crowdfunding") AND NOT ("regional culture") AND NOT ("community") AND NOT ("followership") AND NOT ("news") AND NOT ("social media") AND NOT ("SME performance") AND NOT ("web-based marketing") AND NOT ("psychotherapy") AND NOT ("regional cluster") AND NOT ("Ties Between New Ventures and Corporate Venture Capitalists") AND NOT ("psychological capital") AND NOT ("Organisational ethics") AND (LIMIT-TO (SRCTYPE , "j") OR LIMIT-TO (SRCTYPE , "p")) AND (LIMIT-TO (PUBSTAGE , "aip") OR LIMIT-TO (PUBSTAGE , "final")) AND (LIMIT-TO (LANGUAGE , "English"))	Social networks / SCAP	WB	1999-2025
Scopus	7	ALL ("team" OR "unit" OR "department" OR " group") AND ("social capital") AND ("Eudaimonic" OR "well-being" OR "well being" OR "psychological well being" OR "employee well being " OR "subjective well being") AND ("employee") AND PUBYEAR > 1999 AND PUBYEAR < 2025 AND NOT ("business to business" OR "group-level") AND NOT ("human	SCAP: Team, unit / group	WB	1999-2025

		capital") AND NOT ("post - secondary") AND NOT ("schools'") AND NOT ("students'") AND NOT ("MBA") AND NOT ("career proactivity") AND NOT ("urban environment") AND NOT ("emerging markets") AND NOT ("societies") AND NOT ("local government") AND NOT ("social responsibility") AND NOT ("government support") AND NOT ("youth") AND NOT ("children") AND NOT ("local innovation") AND NOT ("fire") AND NOT ("onboarding") AND NOT ("municipal") AND NOT ("crowdfunding") AND NOT ("regional culture") AND NOT ("community") AND NOT ("followership") AND NOT ("news") AND NOT ("social media") AND NOT ("SME performance") AND NOT ("web-based marketing") AND NOT ("psychotherapy") AND NOT ("regional cluster") AND NOT ("Ties Between New Ventures and Corporate Venture Capitalists") AND NOT ("psychological capital") AND NOT ("Organisational ethics") AND (LIMIT-TO (SRCTYPE , "j") OR LIMIT-TO (SRCTYPE , "p")) AND (LIMIT-TO (PUBSTAGE , "aip") OR LIMIT-TO (PUBSTAGE , "final")) AND (LIMIT-TO (LANGUAGE , "English"))			
Scopus	8	ALL (("cognitive social capital" OR "shared language" OR "shared norms" OR "shared values") AND ("social capital")) AND ("Eudaimonic" OR "well-being" OR "well being" OR "psychological well being" OR "employee well being " OR "subjective well being") AND ("employee") AND PUBYEAR > 1999 AND PUBYEAR < 2025 AND NOT ("business to business" OR "group-level") AND NOT ("human capital") AND NOT ("post - secondary") AND NOT ("schools'") AND NOT ("students'") AND NOT ("MBA") AND NOT ("career proactivity") AND NOT ("urban environment") AND NOT ("emerging markets") AND NOT ("societies") AND NOT ("local government") AND NOT ("social responsibility") AND NOT ("government support") AND NOT ("youth") AND NOT ("children") AND NOT ("local innovation") AND NOT ("fire") AND NOT ("onboarding") AND NOT ("municipal") AND NOT ("crowdfunding") AND NOT ("regional culture") AND NOT ("community") AND NOT ("followership") AND NOT ("news")	Cognitive SCAP	WB	1999-2025

		AND NOT ("social media") AND NOT ("SME performance") AND NOT ("web-based marketing") AND NOT ("psychotherapy") AND NOT ("regional cluster") AND NOT ("Ties Between New Ventures and Corporate Venture Capitalists") AND NOT ("psychological capital") AND NOT ("Organisational ethics") AND (LIMIT-TO (SRCTYPE , "j") OR LIMIT-TO (SRCTYPE , "p")) AND (LIMIT-TO (PUBSTAGE , "aip") OR LIMIT-TO (PUBSTAGE , "final")) AND (LIMIT-TO (LANGUAGE , "English"))			
Scopus	9	ALL (("trust" OR "closeness" OR "interpersonal trust" OR "Benevolence-based trust" OR "Competence-based trust" OR "Integrity-based trust") AND ("Social capital")) AND ("Eudaimonic" OR "well-being" OR "well being" OR "psychological well being" OR "employee well being " OR "subjective well being") AND ("employee") AND PUBYEAR > 1999 AND PUBYEAR < 2025 AND NOT ("business to business" OR "group-level") AND NOT ("human capital") AND NOT ("post - secondary") AND NOT ("schools'") AND NOT ("students'") AND NOT ("MBA") AND NOT ("career proactivity") AND NOT ("urban environment") AND NOT ("emerging markets") AND NOT ("societies") AND NOT ("local government") AND NOT ("social responsibility") AND NOT ("government support") AND NOT ("youth") AND NOT ("children") AND NOT ("local innovation") AND NOT ("fire") AND NOT ("onboarding") AND NOT ("municipal") AND NOT ("crowdfunding") AND NOT ("regional culture") AND NOT ("community") AND NOT ("followership") AND NOT ("news") AND NOT ("social media") AND NOT ("SME performance") AND NOT ("web-based marketing") AND NOT ("psychotherapy") AND NOT ("regional cluster") AND NOT ("Ties Between New Ventures and Corporate Venture Capitalists") AND NOT ("psychological capital") AND NOT ("Organisational ethics") AND (LIMIT-TO (SRCTYPE , "j") OR LIMIT-TO (SRCTYPE , "p")) AND (LIMIT-TO (PUBSTAGE , "aip") OR LIMIT-TO (PUBSTAGE , "final")) AND (LIMIT-TO (LANGUAGE , "English"))	Rel SCAP	WB	1999-2025

Scopus	10	ALL (("structural") AND ("social capital") AND ("social interaction" OR "diversity" OR "proportion of ties")) AND ("Eudaimonic" OR "well-being" OR "well being" OR "psychological well being" OR "employee well being " OR "subjective well being") AND ("employee") AND PUBYEAR > 1999 AND PUBYEAR < 2025 AND NOT ("business to business" OR "group-level") AND NOT ("human capital") AND NOT ("post - secondary") AND NOT ("schools'") AND NOT ("students'") AND NOT ("MBA") AND NOT ("career proactivity") AND NOT ("urban environment") AND NOT ("emerging markets") AND NOT ("societies") AND NOT ("local government") AND NOT ("social responsibility") AND NOT ("government support") AND NOT ("youth") AND NOT ("children") AND NOT ("local innovation") AND NOT ("fire") AND NOT ("onboarding") AND NOT ("municipal") AND NOT ("crowdfunding") AND NOT ("regional culture") AND NOT ("community") AND NOT ("followership") AND NOT ("news") AND NOT ("social media") AND NOT ("SME performance") AND NOT ("web-based marketing") AND NOT ("psychotherapy") AND NOT ("regional cluster") AND NOT ("Ties Between New Ventures and Corporate Venture Capitalists") AND NOT ("psychological capital") AND NOT ("Organisational ethics") AND (LIMIT-TO (SRCTYPE , "j") OR LIMIT-TO (SRCTYPE , "p")) AND (LIMIT-TO (PUBSTAGE , "aip") OR LIMIT-TO (PUBSTAGE , "final")) AND (LIMIT-TO (LANGUAGE , "English"))	Structural SCAP	WB	1999-2025
Scopus	11	ALL ("informal network" OR "ego-centric" OR "ego network" OR "ego centric" OR "personal network" OR "Developmental network") AND ("social capital") AND ("Knowledge seeking" OR "knowledge sourcing" OR "knowledge collecting" OR "knowledge aquisition" OR "informal learning" OR "informal workplace learning") AND ("employee") AND PUBYEAR > 1999 AND PUBYEAR < 2025 AND NOT ("business to business" OR "group-level") AND NOT ("human capital") AND NOT ("post - secondary") AND NOT ("schools'") AND NOT (	EGO - SCAP	KS	1999-2025

		"students'") AND NOT ("MBA") AND NOT ("career proactivity") AND NOT ("urban environment") AND NOT ("emerging markets") AND NOT ("societies") AND NOT ("local government") AND NOT ("social responsibility") AND NOT ("government support") AND NOT ("youth") AND NOT ("children") AND NOT ("local innovation") AND NOT ("fire") AND NOT ("onboarding") AND NOT ("municipal") AND NOT ("crowdfunding") AND NOT ("regional culture") AND NOT ("community") AND NOT ("followership") AND NOT ("news") AND NOT ("social media") AND NOT ("SME performance") AND NOT ("web-based marketing") AND NOT ("psychotherapy") AND NOT ("regional cluster") AND NOT ("Ties Between New Ventures and Corporate Venture Capitalists") AND NOT ("psychological capital") AND NOT ("Organisational ethics") AND (LIMIT-TO (SRCTYPE , "j") OR LIMIT-TO (SRCTYPE , "p")) AND (LIMIT-TO (PUBSTAGE , "aip") OR LIMIT-TO (PUBSTAGE , "final")) AND (LIMIT-TO (LANGUAGE , "English"))			
Scopus	12	ALL ("team" OR "unit" OR "department" OR " group") AND ("social capital") AND ("Knowledge seeking" OR "knowledge sourcing" OR "knowledge collecting" OR "knowledge aquisition" OR "informal learning" OR "informal workplace learning") AND ("employee") AND PUBYEAR > 1999 AND PUBYEAR < 2025 AND NOT ("business to business" OR "group-level") AND NOT ("human capital") AND NOT ("post - secondary") AND NOT ("schools'") AND NOT ("students'") AND NOT ("MBA") AND NOT ("career proactivity") AND NOT ("urban environment") AND NOT ("emerging markets") AND NOT ("societies") AND NOT ("local government") AND NOT ("social responsibility") AND NOT ("government support") AND NOT ("youth") AND NOT ("children") AND NOT ("local innovation") AND NOT ("fire") AND NOT ("onboarding") AND NOT ("municipal") AND NOT ("crowdfunding") AND NOT ("regional culture") AND NOT ("community") AND NOT ("followership") AND NOT ("news") AND NOT ("social media") AND NOT ("SME performance") AND NOT ("web-based marketing") AND	Team, unit group	KS	1999-2025

		NOT ("psychotherapy") AND NOT ("regional cluster") AND NOT ("Ties Between New Ventures and Corporate Venture Capitalists") AND NOT ("psychological capital") AND NOT ("Organisational ethics") AND (LIMIT-TO (SRCTYPE , "j") OR LIMIT-TO (SRCTYPE , "p")) AND (LIMIT-TO (PUBSTAGE , "aip") OR LIMIT-TO (PUBSTAGE , "final")) AND (LIMIT-TO (LANGUAGE , "English"))			
Scopus	13	ALL (("cognitive social capital" OR "shared language" OR "shared norms" OR "shared values") AND ("social capital")) AND ("Knowledge seeking" OR "knowledge sourcing" OR "knowledge collecting" OR "knowledge acquisition" OR "informal learning" OR "informal workplace learning") AND ("employee") AND PUBYEAR > 1999 AND PUBYEAR < 2025 AND NOT ("business to business" OR "group-level") AND NOT ("human capital") AND NOT ("post - secondary") AND NOT ("schools'") AND NOT ("students'") AND NOT ("MBA") AND NOT ("career proactivity") AND NOT ("urban environment") AND NOT ("emerging markets") AND NOT ("societies") AND NOT ("local government") AND NOT ("social responsibility") AND NOT ("government support") AND NOT ("youth") AND NOT ("children") AND NOT ("local innovation") AND NOT ("fire") AND NOT ("onboarding") AND NOT ("municipal") AND NOT ("crowdfunding") AND NOT ("regional culture") AND NOT ("community") AND NOT ("followership") AND NOT ("news") AND NOT ("social media") AND NOT ("SME performance") AND NOT ("web-based marketing") AND NOT ("psychotherapy") AND NOT ("regional cluster") AND NOT ("Ties Between New Ventures and Corporate Venture Capitalists") AND NOT ("psychological capital") AND NOT ("Organisational ethics") AND (LIMIT-TO (SRCTYPE , "j") OR LIMIT-TO (SRCTYPE , "p")) AND (LIMIT-TO (PUBSTAGE , "aip") OR LIMIT-TO (PUBSTAGE , "final")) AND (LIMIT-TO (LANGUAGE , "English"))	Cognitive SCAP	KS	1999-2025
Scopus	14	ALL (("trust" OR "closeness" OR "interpersonal trust" OR "Benevolence-based trust" OR "Competence-based trust" OR "Integrity-based trust") AND ("Social capital")) AND (	Relational SCAP	KS	1999-2025

		"Knowledge seeking" OR "knowledge sourcing" OR "knowledge collecting" OR "knowledge acquisition" OR "informal learning" OR "informal workplace learning") AND ("employee") AND PUBYEAR > 1999 AND PUBYEAR < 2025 AND NOT ("business to business" OR "group-level") AND NOT ("human capital") AND NOT ("post - secondary") AND NOT ("schools'") AND NOT ("students'") AND NOT ("MBA") AND NOT ("career proactivity") AND NOT ("urban environment") AND NOT ("emerging markets") AND NOT ("societies") AND NOT ("local government") AND NOT ("social responsibility") AND NOT ("government support") AND NOT ("youth") AND NOT ("children") AND NOT ("local innovation") AND NOT ("fire") AND NOT ("onboarding") AND NOT ("municipal") AND NOT ("crowdfunding") AND NOT ("regional culture") AND NOT ("community") AND NOT ("followership") AND NOT ("news") AND NOT ("social media") AND NOT ("SME performance") AND NOT ("web-based marketing") AND NOT ("psychotherapy") AND NOT ("regional cluster") AND NOT ("Ties Between New Ventures and Corporate Venture Capitalists") AND NOT ("psychological capital") AND NOT ("Organisational ethics") AND (LIMIT-TO (SRCTYPE , "j") OR LIMIT-TO (SRCTYPE , "p")) AND (LIMIT-TO (PUBSTAGE , "aip") OR LIMIT-TO (PUBSTAGE , "final")) AND (LIMIT-TO (LANGUAGE , "English"))			
Scopus	15	ALL (("structural") AND ("social capital") AND ("social interaction" OR "diversity" OR "proportion of ties")) AND ("Knowledge seeking" OR "knowledge sourcing" OR "knowledge collecting" OR "knowledge acquisition" OR "informal learning" OR "informal workplace learning") AND ("employee") AND PUBYEAR > 1999 AND PUBYEAR < 2025 AND NOT ("business to business" OR "group-level") AND NOT ("human capital") AND NOT ("post - secondary") AND NOT ("schools'") AND NOT ("students'") AND NOT ("MBA") AND NOT ("career proactivity") AND NOT ("urban environment") AND NOT ("emerging markets") AND NOT ("societies") AND NOT ("local government") AND NOT ("social	Structural SCAP	KS	1999-2025

		responsibility") AND NOT ("government support") AND NOT ("youth") AND NOT ("children") AND NOT ("local innovation") AND NOT ("fire") AND NOT ("onboarding") AND NOT ("municipal") AND NOT ("crowdfunding") AND NOT ("regional culture") AND NOT ("community") AND NOT ("followership") AND NOT ("news") AND NOT ("social media") AND NOT ("SME performance") AND NOT ("web-based marketing") AND NOT ("psychotherapy") AND NOT ("regional cluster") AND NOT ("Ties Between New Ventures and Corporate Venture Capitalists") AND NOT ("psychological capital") AND NOT ("Organisational ethics") AND (LIMIT-TO (SRCTYPE , "j") OR LIMIT-TO (SRCTYPE , "p")) AND (LIMIT-TO (PUBSTAGE , "aip") OR LIMIT-TO (PUBSTAGE , "final")) AND (LIMIT-TO (LANGUAGE , "English"))				
Scopus	16	ALL (("Knowledge seeking" OR "knowledge sourcing" OR "knowledge collecting" OR "knowledge aquisition" OR "informal learning" OR "informal workplace learning") AND ("EDI" OR "DUI mode 2b" OR "employee driven Innovation" OR "Proactive" OR "change" OR "Innovative work behavior" OR "innovative behavior" OR "innovative performance" OR "job crafting"))AND ("employee") AND PUBYEAR > 1999 AND PUBYEAR < 2025 AND NOT ("business to business" OR "group-level") AND NOT ("human capital") AND NOT ("post - secondary") AND NOT ("schools'") AND NOT ("students'") AND NOT ("MBA") AND NOT ("career proactivity") AND NOT ("urban environment") AND NOT ("emerging markets") AND NOT ("societies") AND NOT ("local government") AND NOT ("social responsibility") AND NOT ("government support") AND NOT ("youth") AND NOT ("children") AND NOT ("local innovation") AND NOT ("fire") AND NOT ("onboarding") AND NOT ("municipal") AND NOT ("crowdfunding") AND NOT ("regional culture") AND NOT ("community") AND NOT ("followership") AND NOT ("news") AND NOT ("social media") AND NOT ("SME performance") AND NOT ("web-based marketing") AND	KM	EDI	1999-2025	176

		NOT ("psychotherapy") AND NOT ("regional cluster") AND NOT ("Ties Between New Ventures and Corporate Venture Capitalists") AND NOT ("psychological capital") AND NOT ("Organisational ethics") AND (LIMIT-TO (SRCTYPE , "j") OR LIMIT-TO (SRCTYPE , "p")) AND (LIMIT-TO (PUBSTAGE , "aip") OR LIMIT-TO (PUBSTAGE , "final")) AND (LIMIT-TO (LANGUAGE , "English"))	
DCU Library and Internet	N/A	Independent searching	177
		TOTAL ARTICLES	**2063**
		TOTAL (Duplicates & Irrelevant)	**1836**
		Total Articles for Review	**227**

Phase 2: Remote-enabled working - Arrangement and Conditions

Database	File #	Search String	IV	DV	Date Range	No. of Articles
Scopus	17	ALL ("Hybrid Professionals" OR "Hybrid Worker") AND ("employee" OR "individual") AND ("organization") AND PUBYEAR > 1999 AND PUBYEAR < 2025 AND (LIMIT-TO (SRCTYPE , "j") OR LIMIT-TO (SRCTYPE , "p")) AND (LIMIT-TO (PUBSTAGE , "aip") OR LIMIT-TO (PUBSTAGE , "final")) AND (LIMIT-TO (SUBJAREA , "PSYC") OR LIMIT-TO (SUBJAREA , "SOCI") OR LIMIT-TO (SUBJAREA , "BUSI")) AND (LIMIT-TO (LANGUAGE , "English"))	Hybrid worker	….	1999-2025	173
Scopus	18	ALL (("Task virtuality" OR "Team virtuality") AND ("informal network" OR "ego-centric" OR "ego network" OR "ego centric" OR "personal network" OR "Developmental network" OR "team" OR "unit" OR "department" OR " group") AND ("social capital")) AND PUBYEAR > 1999 AND PUBYEAR < 2025 AND (LIMIT-TO (LANGUAGE , "English"))	Task Virtualty	Social networks / Social Capital	1999-2025	76
Scopus	19	ALL (("Task virtuality" OR "Team virtuality") AND ("EDI" OR "DUI mode 2b" OR "employee driven Innovation" OR "Proactive" OR "change" OR "Innovative work behavior" OR "innovative behavior" OR "innovative performance" OR "job crafting")) AND PUBYEAR > 2000 AND PUBYEAR < 2025 AND (LIMIT-TO (LANGUAGE , "English"))	Task Virtualty	EDI	1999-2025	295
Scopus	20	ALL (("Task virtuality" OR "Team virtuality") AND ("Eudaimonic" OR "well-being" OR "well being" OR "psychological well being" OR "employee well being " OR "subjective well being")) AND PUBYEAR > 2000 AND PUBYEAR < 2025 AND (LIMIT-TO (LANGUAGE , "English"))	Task Virtualty	WB	1999-2025	111
Scopus	21	ALL (("Task virtuality" OR "Team virtuality") AND ("Knowledge seeking" OR "knowledge sourcing" OR "knowledge	Task Virtualty	KM	1999-2025	49

		collecting" OR "knowledge acquisition" OR "informal learning" OR "informal workplace learning")) AND PUBYEAR > 2000 AND PUBYEAR < 2025 AND (LIMIT-TO (LANGUAGE , "English"))				
Scopus	22	ALL (("teleworker" OR "virtual team" OR "global virtual team" OR "remote work") AND ("EDI" OR "DUI mode 2b" OR "employee driven Innovation" OR "Proactive" OR "change" OR "Innovative work behavior" OR "innovative behavior" OR "innovative performance" OR "job crafting")) AND ("employee") AND ("organization") AND PUBYEAR > 1999 AND PUBYEAR < 2025 AND NOT ("business to business" OR "group-level") AND NOT ("human capital") AND NOT ("post - secondary") AND NOT ("schools'") AND NOT ("students'") AND NOT ("MBA") AND NOT ("career proactivity") AND NOT ("urban environment") AND NOT ("emerging markets") AND NOT ("societies") AND NOT ("local government") AND NOT ("social responsibility") AND NOT ("government support") AND NOT ("youth") AND NOT ("children") AND NOT ("local innovation") AND NOT ("fire") AND NOT ("onboarding") AND NOT ("municipal") AND NOT ("crowdfunding") AND NOT ("regional culture") AND NOT ("community") AND NOT ("followership") AND NOT ("news") AND NOT ("social media") AND NOT ("SME performance") AND NOT ("web-based marketing") AND NOT ("psychotherapy") AND NOT ("regional cluster") AND NOT ("Ties Between New Ventures and Corporate Venture Capitalists") AND NOT ("psychological capital") AND NOT ("Organisational ethics") AND (LIMIT-TO (SRCTYPE , "j") OR LIMIT-TO (SRCTYPE , "p")) AND (LIMIT-TO (PUBSTAGE , "aip") OR LIMIT-TO (PUBSTAGE , "final")) AND (LIMIT-TO (LANGUAGE , "English"))	Remote	EDI	1999-2025	437
Scopus	23	ALL (("teleworker" OR "virtual team" OR "global virtual team" OR "remote work") AND ("Eudaimonic" OR "well-being" OR "well being" OR "psychological well being" OR "employee well being " OR "subjective well being")) AND ("employee") AND ("organization") AND PUBYEAR > 1999 AND PUBYEAR < 2025 AND NOT ("business to business" OR "group-level") AND NOT (	Remote	WB	1999-2025	182

		"human capital") AND NOT ("post - secondary") AND NOT ("schools'") AND NOT ("students'") AND NOT ("MBA") AND NOT ("career proactivity") AND NOT ("urban environment") AND NOT ("emerging markets") AND NOT ("societies") AND NOT ("local government") AND NOT ("social responsibility") AND NOT ("government support") AND NOT ("youth") AND NOT ("children") AND NOT ("local innovation") AND NOT ("fire") AND NOT ("onboarding") AND NOT ("municipal") AND NOT ("crowdfunding") AND NOT ("regional culture") AND NOT ("community") AND NOT ("followership") AND NOT ("news") AND NOT ("social media") AND NOT ("SME performance") AND NOT ("web-based marketing") AND NOT ("psychotherapy") AND NOT ("regional cluster") AND NOT ("Ties Between New Ventures and Corporate Venture Capitalists") AND NOT ("psychological capital") AND NOT ("Organisational ethics") AND (LIMIT-TO (SRCTYPE , "j") OR LIMIT-TO (SRCTYPE , "p")) AND (LIMIT-TO (PUBSTAGE , "aip") OR LIMIT-TO (PUBSTAGE , "final")) AND (LIMIT-TO (LANGUAGE , "English"))				
Scopus	24	ALL (("teleworker" OR "virtual team" OR "global virtual team" OR "remote work") AND ("Knowledge seeking" OR "knowledge sourcing" OR "knowledge collecting" OR "knowledge acquisition" OR "informal learning" OR "informal workplace learning")) AND ("employee") AND ("organization") AND PUBYEAR > 1999 AND PUBYEAR < 2025 AND NOT ("business to business" OR "group-level") AND NOT ("human capital") AND NOT ("post - secondary") AND NOT ("schools'") AND NOT ("students'") AND NOT ("MBA") AND NOT ("career proactivity") AND NOT ("urban environment") AND NOT ("emerging markets") AND NOT ("societies") AND NOT ("local government") AND NOT ("social responsibility") AND NOT ("government support") AND NOT ("youth") AND NOT ("children") AND NOT ("local innovation") AND NOT ("fire") AND NOT ("onboarding") AND NOT ("municipal") AND NOT ("crowdfunding") AND NOT ("regional culture") AND NOT ("community") AND NOT ("followership") AND NOT ("news")	Remote	KM	1999-2025	31

		AND NOT ("social media") AND NOT ("SME performance") AND NOT ("web-based marketing") AND NOT ("psychotherapy") AND NOT ("regional cluster") AND NOT ("Ties Between New Ventures and Corporate Venture Capitalists") AND NOT ("psychological capital") AND NOT ("Organisational ethics") AND (LIMIT-TO (SRCTYPE , "j") OR LIMIT-TO (SRCTYPE , "p")) AND (LIMIT-TO (PUBSTAGE , "aip") OR LIMIT-TO (PUBSTAGE , "final")) AND (LIMIT-TO (LANGUAGE , "English"))				
Scopus	25	ALL ("Hybrid Professionals" OR "Hybrid Worker") AND ("employee") AND ("organization") AND PUBYEAR > 2020 AND PUBYEAR < 2025 AND (LIMIT-TO (SRCTYPE , "j") OR LIMIT-TO (SRCTYPE , "p")) AND (LIMIT-TO (LANGUAGE , "English"))	Hybrid	…	2020-2025	79
DCU Library and Internet		Independent searching				87
		TOTAL ARTICLES				**1520**
		TOTAL (Duplicates & Irrelevant)				**1305**
		Total Articles for Review				**215**

A.2 Inclusion Criteria for Study Selection

Table A.2 Inclusion Criteria for Study Selection

INCLUSION	
Category	Description
Domains of Relevance	Articles were deemed eligible for inclusion if they addressed one or more of the following domains within remote-enabled work contexts. (1) Employee-Driven Innovation (EDI) These studies examined innovation or change initiated by employees. This includes doing-using-interacting (DUI) innovation processes, and behavioural, cognitive, and outcome-related constructs that reflect or enable EDI particularly when tied to proactive, self-directed efforts to improve work practices. Examples include: ● **Behavioural constructs:** Job crafting, taking charge, innovative work behaviour (IWB), contextual performance, adaptive performance, work engagement, job performance, extra-role behaviour, and organisational citizenship behaviour (OCB). ● **Cognitive constructs:** Psychological empowerment, intrinsic motivation, autonomy, affective commitment, and prosocial motivation. Studies examining enabling conditions, such as well-being, flexibility, psychological safety, and supportive leadership or communication, were also included due to their established indirect role in facilitating proactive, change-oriented employee behaviours. (2) Knowledge Processes and Behaviours These studies investigated how individuals acquire, share, or exchange knowledge. Eligible studies addressed: ● Behaviours: knowledge sharing, sourcing, seeking, collecting, donating, hoarding, hiding, or transferring. ● Interpersonal exchange: peer advice, mentoring, informal exchange, or collaboration. ● Related constructs: tacit knowledge, feedback seeking, experiential learning, information seeking, and learning from failure. Studies were included if these processes were linked to innovation, learning, or proactive performance, and were examined in terms of how knowledge processes enabled or constrained these outcomes. Both individual- and group-level studies were deemed to be eligible. (3) Social Networks and Social Capital (SN/SCAP) These studies explored how social networks or social capital influenced employee behaviour, learning, innovation, or knowledge processes. Inclusion required attention to one or more of the following: Structural dimensions: network density, centrality, brokerage. ● Relational dimensions: trust, advice ties, reciprocity.

	• Cognitive dimensions: shared understanding, social norms. Studies had to explain how these social structures or relational dynamics functioned as enablers or constraints for individuals, in terms of resource exchange, or innovation. Ego network or sociometric studies exploring how individuals in a group relate to one another were included when they assessed the effects of interpersonal relationships or social resources in relation to innovation-related outcomes. Studies not explicitly focused on remote-enabled contexts were eligible if they offered clear theoretical or empirical insights. These had to demonstrate how (a) social networks/social capital or (b) knowledge processes influence or constrain EDI. Mere reporting that innovation occurred was insufficient; studies had to explain the individual - level mechanisms or dynamics through which these factors influenced employee-driven innovation.
Communication and Contextual Conditions in Remote-Enabled Work	Studies focused on employee experiences in remote-enabled contexts - such as remote, hybrid, or technology-mediated settings, where work arrangements functioned as primary working conditions or shaped the social and communicative environment. Studies were also eligible if they investigated how communication tools, interpersonal communication behaviours, or communication contexts influenced relational dynamics and employee experiences. Those that explored broader principles of interpersonal communication and relational connectivity were included if they addressed their impact on interpersonal dynamics within remote-enabled work environments. Studies were included if they met one or more of the following criteria: • Examined the role of digital communication tools (e.g., email, chat, video conferencing, messaging apps, or collaborative platforms) in shaping interaction quality, team dynamics, or knowledge sharing. • Analysed communication-related contextual factors such as virtuality, spatial or temporal distance, proximity, social cues, media richness, or modality. • Were informed by or contributed to communication theories, such as media richness, social presence, or media synchronicity, which explain how communication media affect the quality, effectiveness, and nature of interpersonal interaction - especially in mediated or technology-based contexts. • Investigated interpersonal communication experiences (e.g., psychological closeness, physical isolation) and behaviours (e.g., self-disclosure, active listening, empathy, feedback, emotional intelligence, conflict resolution, or communication competence), when related to at least one of the three domains of relevance. Studies examining how interpersonal communication or communication modality enabled or constrained innovation, knowledge processes, or social capital were prioritised for inclusion.
Theoretical / Seminal Works	Studies were included if they contributed significant theoretical insights relevant to the research aims, even if they were not explicitly focused on remote or hybrid work. Seminal papers in Knowledge Management (KM), Social Networks/Social Capital (SN/SCAP), or Employee-Driven Innovation /DUI may be included under this

	criterion, provided they offer key conceptual foundations. Similarly, studies - whether theoretical or empirical - that deepen understanding of remote-enabled work are also considered, if they contribute meaningfully to core constructs or contextual factors.
Source Publication Quality	Eligible sources included peer-reviewed journal articles, professional or applied journals, and specialty publications. Articles from emerging or niche venues were included if they demonstrated editorial rigor, were indexed in recognised academic databases (e.g., DOAJ, Google Scholar), and aligned with the review's thematic scope. Conference papers were eligible only if they were full-length, double-blind peer-reviewed, and published in proceedings indexed in reputable academic databases (e.g., Scopus, Web of Science, ACM Digital Library). Book chapters, academic handbooks, and practitioner publications were included if they met the same standards of methodological rigor and thematic relevance. This approach allowed the review to capture regionally focused or practice-oriented research that may not appear in mainstream outlets.
Methodology	These studies employed recognised empirical research methods, such as qualitative, quantitative, mixed-methods, experimental, or quasi-experimental designs. Systematic, narrative, and meta-analytic reviews were also eligible. Conceptual or theoretical works were included if they presented a well-defined, literature-informed model, framework, or typology relevant to remote-enabled contexts.
Date range	Publications between 1999 and 2025 were included to capture the evolution of telework and the emergence of contemporary hybrid work trends. While 1999 marks the beginning of relevant empirical research on internet-mediated collaboration, foundational theories - such as Media richness theory (Daft & Lengel, 1986) - that inform remote-enabled work contexts were also considered for inclusion, regardless of publication date.
Target Population / context	Participants in studies were either employees or teams operating within formal organisational settings, or individuals who both work in remote-enabled environments, such as remote, hybrid, virtual, or technology-mediated settings, and engage in employee-initiated or proactive behaviours, such as innovation, knowledge processes (e.g., sharing, seeking, or creation), or social network development.
Language and Accessibility	Only English-language publications were included. Only full-text articles available through institutional access or public sources were included.

A.2 Exclusion Criteria for Study Selection

Table A.3 Exclusion Criteria for Study Selection

EXCLUSION CRITERIA	
Category	Description
Topical Irrelevance	Studies that did not focus on remote-enabled, hybrid, or technology-mediated work environments, or that failed to address individual- or group-level employee behaviours related to knowledge processes, social capital/networks, or employee-driven innovation , were explicitly excluded from the review.
Innovation Lens Misalignment	Studies were excluded if they conceptualised innovation solely from a top-down, technological, or product development perspective without examining employee agency, bottom-up innovation, or proactive work behaviours.
Inappropriate Study Populations	Studies were excluded if they involved non-employee populations (e.g., customers, youth) or were conducted in non-organisational settings with limited workplace relevance. Exceptions were made for simulations or student samples when designed to mirror workplace dynamics.
Insufficient Theoretical Contribution	Papers lacking clear theoretical grounding or failing to meaningfully contribute to understanding how knowledge-related behaviours, social networks, or social capital influence employees' experiences, agency, or innovation were excluded.
Methodological Weakness	Studies exhibiting poor methodological quality, e.g., anecdotal evidence, unclear data sources, insufficient methodological detail, or lack of sampling information were excluded. Theoretical papers not grounded in recognised frameworks were also excluded.

EXCLUSION CRITERIA	
Category	Description
Non-Peer-Reviewed Sources	Editorials, opinion pieces, blogs, white papers, trade publications, or other grey literature not subject to peer review or lacking academic rigor were excluded (e.g., absence of citations or methodological transparency).
Language and Accessibility	Articles not published in English or those without accessible full text were excluded.
Duplicates	Duplicate or near-duplicate publications were removed to avoid redundancy.

A.4 Sample of the Data Extraction illustrating study-level metadata and thematic categorisation codes

Table A.4 Sample of the Data Extraction: Study-level metadata and thematic categorisation

Author(s)	Year	Title	Country	Methodology	Sample Size	Aims/ Objectives	Key Findings	EDI	KM	Remote Context	Social Networks
Abbasi et al.	2014	Measuring social capital through network analysis	Australia, USA	Quantitative (Social Network Analysis)	10,255	To examine how social capital affects academic performance	PDI and PTDI were strong predictors of h-index, citation count	No	Yes	No	Yes
Afsar et al.	2018	Do nurses display innovative work behaviour?	Thailand	Quantitative (SEM)	441 nurses, 73 doctors	To assess P-O fit and empowerment on innovative work behaviour	P-O fit predicts IWB, moderated by knowledge sharing	Yes	Yes	No	Yes
Akgün et al.	2017	Knowledge sharing barriers in software teams	Turkey	Qualitative (Multiple Case Study)	18 managers	To explore knowledge sharing barriers and solutions	Barriers identified: knowledge-, individual-, and org-related	No	Yes	No	Yes
Balle et al.	2019	Knowledge sharing in a science and tech park	Brazil	Qualitative (fsQCA)	51 managers	To uncover mechanisms for inter-org. knowledge sharing	Social/documental mechanisms effective; older orgs abstain	No	Yes	No	Yes
Bilal et al.	2019	Shared leadership and taking charge behaviour	Pakistan	Quantitative (Regression, Mediation)	282 faculty	To examine how shared leadership impacts proactive behaviour	Shared leadership promotes taking charge via psychological safety	Yes	Yes	Yes	Yes

Note: This table provides a sample of the data extraction table. The full table, including all metadata and coded variables, is available upon request.

A.5 Glossary of Terms with Thematic Classification Relating to Remote-Enabled Work Environments

Table A.5 Glossary of Terms with Thematic Classification

Term	Definition	Citation	Source of Extraction	Theme (s)
Blended Working	Combines on-site and off-site working in an optimal way to improve workers' and organisations' outcomes.	Van Yperen & Wörtler, 2017a	Wörtler et al., 2021	1
Cognitive Dispersion	How team members psychologically experience distance/proximity.	Wilson et al., 2008	Magni et al., 2013	3
Configurational Dispersion	The arrangement of team members across physical sites (e.g., how many different buildings, cities, and countries).	O'Leary & Cummings, 2007	Magni et al., 2013	3
Degree of Remoteness	The proportion of time an employee works remotely versus in-person in the office.	Martinez-Amador, 2016	Wu et al., 2023	1
Dispersed Teams	A collective of individuals who are distributed across different geographic locations and rely primarily on ICTs to communicate and collaborate.	Magni et al., 2018	Magni et al., 2018	2, 3
Dispersion	Different forms of distance between participants in virtual work arrangements, including spatial and temporal distribution.	Raghuram et al., 2019	Raghuram et al., 2019	3
Distributed work	The degree to which employees are organised with co-workers dispersed over time zones and geographies.	Chudoba et al., 2005	Jackowska & Lauring, 2021	3
E-communication	The ability of a leader to communicate through ICTs in a clear, well-organised way that eliminates mistakes and prevents misunderstandings.	Van Wart et al., 2019	Yozi & Mbokota, 2024	2
Electronic Networks of Practice	Forums focused on problems of practice that enable individuals to exchange advice and ideas with others based on common interests.	McLure Wasko & Faraj, 2005	Ardichvili, 2008	2
Flexible Work	Autonomy to decide when to perform the work independent of their typical working hours.	Kattenbach et al., 2010; Gerards et al., 2018	Naqshbandi et al., 2024	1

Geographically distributed teams	Groups of people who work interdependently across space, time and organisation boundaries using technology to communicate and collaborate.	Kirkman et al., 2002	Malhotra & Majchrzak, 2014	2, 3
Global Virtual Teams (GVTs)	Geographically dispersed work groups separated by time and space, with cultural and linguistic diversity and reliant on computer-mediated technology.	Chamakiotis et al., 2013	Lauring et al., 2022	2, 3
Hybrid work	A division of working hours between on-site and remote settings, allowing flexibility in location and schedule.	Beno, 2022	Bissani et al., 2024	1
Hybrid Work	Any type of work arrangement where a worker operates flexibly and sustainably in terms of time and place using digital technologies.	Vartiainen & Vanharanta, 2024	Vartiainen & Vanharanta, 2024	1, 2
Hybrid work	Combining in-person and remote work into a single work sphere.	Kane et al., 2021	Mazzei et al., 2023	1
Hybrid Work Enabled by Digital Technologies	A work environment where employees split their time between traditional office and remote locations, enabled by digital technologies.	Iqbal et al., 2021	Bula et al., 2024	1, 2
Hybrid Work Mode	People worked in a hybrid mode in which they could decide how to divide their time working from home and in the office.	Wang et al., 2021	Wang et al., 2021	1
Hybrid working	A schedule where employees work partly from home and partly in the office.	Bloom et al., 2024	Bloom et al., 2024	1
Hybrid Workplace	Working arrangements combining traditional on-site and remote work.	Iqbal et al., 2021	Naqshbandi et al., 2024	1
Location dimension	The ongoing switching between constrained and non-constrained working times.	Lauring & Jonasson, 2025	Lauring & Jonasson, 2025	1
Mediated Communication	Frequency of using ICTs such as email, phone, online conferencing, etc., for interacting with colleagues.	Hoch & Kozlowski, 2014; Kacmar et al., 2003	van Zoonen & Sivunen, 2022	2

Reliance on ICT	The extensive and exclusive use of ICT to manage individual interdependencies and information flows in order to achieve the team's common goal.	Malhotra & Majchrzak, 2014	Malhotra & Majchrzak, 2014	2
Remote Work	A form of work that employees perform outside the physical premises of the organisation by utilising communication technology.	Jämsen et al., 2022	Cidade et al., 2022	1, 2
Remote work	A type of flexible working arrangement that allows an employee to work from remote location outside of corporate offices.	Cichobłaziński, 2023	Cichobłaziński, 2023	1
Remote Work	Work fully or partly carried out on an alternative worksite other than the default place of work.	ILO, 2021	Olsen et al., 2023	1
Remote work	Work performed by an employee away from their primary office (i.e. outside of the employee's organisation worksite).	Allen et al., 2015	Mahomed et al., 2022	1
Remote Work	Work performed wholly or partially from a location other than the office using remote communication tools.	Sanchez et al., 2021; Pyöriä, 2011	Robak, 2022	1, 2
Remote working	The possibility of performing the working activity at a distance, maintaining the same working schedule and tasks, using suitable computer tools and portable personal computers connected to the corporate services.	Fregnan et al., 2022	Mazzei et al., 2023	1, 2
Remote working	A regime whereby employees work from their homes or other locations while connected to their workplace through information technology (IT).	Beno, 2022	Bissani, 2024	1, 2
Remote Working	A work flexibility plan in which employees complete duties from an approved location other than the usual office (p. 4799).	Rizmaldi & Jayadi, 2022	Rizmaldi & Jayadi, 2022	1
Remote working	A flexible work arrangement whereby workers work in locations, remote from their central offices or production facilities, where the worker has no personal contact with co-workers, but can communicate with them using technology.	Di Martino & Wirth, 1990	Wang et al., 2021	1, 2

Remote Working	Working away from the office either from home or from other locations.	Lal et al., 2021; Dwivedi et al., 2020	Dzandu et al., 2023	1
Team Virtuality and High Dispersion	Team members are geographically dispersed, interact mainly virtually, and differ in culture and time zones.	Eisenberg et al., 2019; Hoch & Dulebohn, 2017	Van Zyl & Hofmeyr, 2021	2, 3
Telework	A modality of work in which the employee works outside the employer's workplace, in various locations such as satellite offices or at home, using ICTs.	Vinueza-Cabezas et al., 2022	Vinueza-Cabezas et al., 2022	1, 2
Telework	A work arrangement in which an employee regularly performs officially assigned duties at home or at other work sites geographically convenient to the residence of the employee.	U.S. Office of Personnel Management, 2010	Vega et al., 2015	1
Telework	A work practice that involves members of an organisation substituting a portion of their typical work hours to work away from a central workplace, typically from home, using technology.	Allen et al., 2015	Heiden et al., 2020	1, 2
Telework	Any type of work arrangement where workers work remotely, away from an employer's premises or fixed location, using digital technologies.	Eurofound & ILO, 2017	Vartiainen & Vanharanta, 2024	1, 2
Telework	Form of organizing work using IT, performed away from employer premises.	European Framework Agreement, 2002	Stoian et al., 2022	1, 2
Telework	Telework refers to a professional activity that is performed remotely from the location where the result of the work has to be delivered and that requires the use of ICTs.	Taskin & Bridoux, 2010	Taskin & Bridoux, 2010	1, 2
Telework	The autonomy to decide where to perform their work.	Spivack & Milosevic, 2018	Naqshbandi et al., 2024	1
Telework	Work arrangement involving working from home using communication technology.	Allen et al., 2015	Park et al., 2023	1, 2

Telework	Work that takes place outside of the conventional workplace and where communication with others is achieved through telecommunications.	Bailey & Kurland, 2002; Nilles, 1994	Kossen & van der Berg, 2022	1, 2
Telework	Working away from the normal place of work and working from home or a satellite office or hotel.	Malik, 2018	Jaiswal & Arun, 2024	1
Telework	Working outside the conventional workplace and communicating with it via telecommunications or computer-based technology.	Nilles, 1994; Bailey & Kurland, 2002	Bailey & Kurland, 2002	1, 2
Telework	A work arrangement that allows employees to execute tasks from home during some portion of the week using ICTs.	Bailey & Kurland, 2002	Delanoeije & Verbruggen, 2020	1, 2
Teleworking	Work performed remotely which relies on new information and communication technologies.	Vayre et al., 2022	Vayre et al., 2022	1, 2
Teleworking	A work arrangement in which employees perform their work away from the organisation's central locations with ICTs.	Allen et al., 2015	Mihalca et al., 2021	1, 2
Teleworking	A work setting where workers have the option of working from home rather than commuting.	Jamal et al., 2021a	Jamal et al., 2024	1
Teleworking	Considered a structural resource improving employees' ability to meet demands.	Beckel & Fisher, 2022	Santiago-Torner et al., 2025	1
Teleworking	Work performed outside the traditional office space.	Mayo et al., 2016; Delanoeije et al., 2019	Nemțeanu et al., 2021	1
Temporal Dispersion (TD)	The variation in working hours throughout members of a team.	Colazo & Fang, 2010	Colazo, 2014	3
Virtual teams	Geographically distributed, rely on ICTs, function independently of organisational boundaries, and are connected across locations and time zones to achieve team goals.	Lilian, 2014	Lal et al., 2023	2, 3
Virtual work	A job arrangement that allows employees to work from dispersed locations using modern ICT.	Ale Ebrahim et al., 2009; Lipnack & Stamps, 2008; Raghuram et al., 2019	Qiu & Dauth, 2022	2, 3

Virtual work arrangements	Accomplishing work from scattered locations via computer/internet-mediated communication without in-person interactions.	Kirkman & Mathieu, 2005; Makarius & Larson, 2017	Choudhary & Mishra, 2023	2, 3
Virtual Work Intensity	A higher-order construct comprising geographic dispersion, electronic dependence, dynamic structure, and national diversity.	Cohen & Gibson, 2003; Martins et al., 2004	Gibson & Gibbs, 2006	2, 3
Virtuality	A team's relative reliance on computer-mediated vs. face-to-face communication to coordinate and execute team processes.	Gibson & Gibbs, 2006; Kirkman & Mathieu, 2005	Chen et al., 2020	2, 3
Virtuality	Multi-faceted higher-order construct encompassing a team's dimensions that signify degrees of dispersion or discontinuity.	Gibson & Gibbs, 2006	Hacker et al., 2019	3

Notes: Thematic classifications are coded as follows: Work Modality / Structural Arrangement (1); Communication and Technology Use (2); Dispersion and Separation (3). This table includes key definitions and conceptual terms extracted from the literature, categorised according to thematic relevance (e.g., remote work, communication, team dispersion). Citations reflect both original definitions and sources from which they were extracted.

APPENDIX B: Research Documentation and Instruments

Note: Study 1 used Survey Wave 1; Study 3 used Survey Waves 1 and 2; and Study 2 used a shortened, amalgamated version of Waves 1 and 2.

B1. SURVEY 1

Research title: Social relationships at work: An investigation into employees' well-being and innovative performance in the context of hybrid working.

Longitudinal research study
DCU Business School
Administered by Natasha McDowell, PhD researcher

Dear participant,

This research seeks to understand how a hybrid worker's well-being and innovative performance can be supported by their social network, and how this may be impacted by hybrid working. It asks participants about their social network to understand where hybrid workers source knowledge and support. It also tracks how hybrid workers' social networks change over the course of a year.

To participate in this study, you must be a hybrid worker. This means that you are working away from your central office at least one day a week at the beginning of this study. You must also have held the same position for a minimum of six months.

The study requires participants to complete a total of eight short surveys over the course of one year. Two short online surveys (i.e., parts one and two) will be sent to participants every three months. At each three-month time interval, participants will receive "part two" of the survey exactly twenty-one days after they have completed "part one."

Survey Part 1

This survey will ask you to provide information about the individuals that make up your social network. You will be asked to comment on the quality of these relationships, and the types of knowledge and support you receive from your network. You will also be asked some general

questions about you, and your role within your organisation. The survey will take approximately 15 minutes to complete.

Please be assured that your contribution will be treated in strict confidence. There are also no wrong or right answers to the questions in this study. Werequest that you answer these questions as honestly as possible so that your contribution will support positive developments in hybrid working policy. Insights gained from this study will also enable your organisation to develop interventions that support hybrid working from both a learning perspective, and in terms of promoting hybrid workers' well-being and innovative performance.

Thank you very much in advance for your participation.

Privacy Notice: I (Natasha McDowell), the PhD researcher at DCU, will be the data controller who is responsible for processing the data that you provide.

- This research is to support the development of a doctoral thesis.
- Personal information will only be used for administration purposes.
- This study will use aggregate data only. Individual responses will be combined with other participants' responses to create summary statistics.
- Your individual responses will be kept completely confidential.
- Your employer will not be able to gain access to your individual response at any time.
- Your anonymity will be protected with numeric identifiers / codes. Your name is not required at any time.
- All information that you provide will be stored under password protection.
- The data will be used to address the PhD research objectives and for publication in academic journals.
- Any personal data that you provide will be destroyed upon completion of this research project in 2024.
- Your individual responses will be fully anonymised prior to data analysis.
- This research study is voluntary. You have the right to withdraw at any point during the study, for any reason, and without any prejudice. Data collection will cease from the point of your withdrawal from the study. Data collected prior to your withdrawal from the study may still be used to address the PhD research objectives and for publication purposes in academic journals.

"Confidentiality of information can only be protected within the limitations of the law - i.e., it is possible for data to be subject to subpoena, freedom of information claims or mandated reporting by some professions".

1. Please contact the principal investigator (Natasha McDowell) natasha.mcdowell2@mail.dcu.ie if you wish to discuss this research, need support, you need to obtain an alternative means of completing this survey.
2. If participants have concerns about this study and wish to contact an independent person, please contact: The Secretary, Dublin City University Research Ethics Committee, c/o Research and Innovation Support, Dublin City University, Dublin 9. Tel 01-7008000, e-mail rec@dcu.ie.

By clicking the "YES" button below, you acknowledge that your participation in the study is voluntary, you are over 18 years of age, and that you may terminate your participation in the study at any time and for any reason.

–NO - I do not wish to participate ○

– YES - I wish to participate. ○

Name: _____

Signature: _____

Informed Consent: Please read the following statements and confirm your informed consent by selecting the Yes or No button at the bottom of the page.

- *I have read the Plain Language Statement (or had it read to me)*
- *I understand the information provided*
- *I understand the information provided in relation to data protection*
- *I have had an opportunity to ask questions and discuss this study*
- *I have received satisfactory answers to all my questions*

- *I understand that I may withdraw from the Research Study at any point.*
- *I understand that my personal data is for administration purposes only*
- *I have read and understand the arrangements to be made to protect confidentiality of data including that confidentiality of data is subject to legal limitations.*

- NO - I do not consent. Cancel this survey. ○

– YES - I consent, begin the survey. ○

Name: _____

Signature: _____

Firstly, we will ask you to create a generic reference code to protect your anonymity. This code will also allow DCU to anonymously place your survey responses together.
This will be the ***last 4 digits*** *of your* ***telephone number*** *followed by the* ***day of your birth***.
E.g., Tel: 012.345.**6789**, DOB (day/month/year): **01**/03/77 ---> Reference Code: 678901
Can you please enter your unique code in the box below?
My reference code is: _____

In this section, we would like to learn about your current **social network**. We are especially interested in the people that provide you with advice, information, and emotional support when you conduct your work activities. Therefore, we will ask you to list all the people in your social network that you draw upon right now for these resources.

A member of your **social network** can be anyone (e.g., work colleague, mentor, role model, friend, acquaintance, family member etc.). This social network study requires that you identify at least one contact, up to a maximum of six people.

The information that you provide will be stored securely and treated confidentially.
It will only be used for scientific purposes.
It will not be shared with your employer.

1: Please list the people that may provide you with one or more of the following resources when you are performing your daily job activities:

- Emotional support, (i.e., affection, acceptance etc.).
- Tangible assistance on your work tasks.
- Advice and guidance based on their professional experience.
- Technical knowledge regarding your work tasks.
- Sponsorship, exposure, and protection at work.
- An example for how to behave at work.

Please list each person (one name per box) as follows: FIRST NAME, 1st initial of LAST NAME, e.g., "Janet McDowell" is Janet M.

Note: This approach will enable us to protect the anonymity of the people that you list, whilst enabling you to answer the questions about them. It will also allow us to track developments in your social network over the course of this study.

A minimum of one individual is required.
Please try to add at least 5 people.
You can leave the remaining fields blank.

Name 1:
Name 2:
Name 3:
Name 4:
Name 5:
Name 6:

2: How long have you known the individual(s)?

	Years	Months
Name 1:		
Name 2:		
Name 3:		
Name 4:		
Name 5:		
Name 6:		

The next set of questions will solicit characteristics about the individuals in your social network and the types of resources that each person provides to you. You can select more than one person. You may also leave all the boxes blank.

3: Can you please identify the individual(s) who are internal to your organization?

*** Internal: A person who works for the same organization as you do.*

	These people work at my company ...

Name 1:	☐
Name 2:	☐
Name 3:	☐
Name 4:	☐
Name 5:	☐
Name 6:	☐

4: Please identify the individual(s), if any, who provide you with **tricks of the trade** and / or the benefit of their **practical know-how and experience**.

Name 1:	☐
Name 2:	☐
Name 3:	☐
Name 4:	☐
Name 5:	☐
Name 6:	☐

5: Please identify the individual(s), if any, who **support your emotional well-being** at work, e.g., if you needed someone to talk to or someone to comfort or encourage you.

Name 1:	☐
Name 2:	☐
Name 3:	☐
Name 4:	☐
Name 5:	☐
Name 6:	☐

6: Do you consider any of these people to be a **role model**, e.g., if you needed an example from which to model your own behaviour at work?

Name 1:	☐
Name 2:	☐
Name 3:	☐
Name 4:	☐
Name 5:	☐
Name 6:	☐

7: Please identify the individual(s), if any, who provide you with **mentoring support**, e.g., if you needed someone to help you to set goals, identify resources, and help you deal with workplace challenges.

Name 1:	☐
Name 2:	☐

Name 3:	☐
Name 4:	☐
Name 5:	☐
Name 6:	☐

8: Who, if any, provides you with **tangible aid, assistance**, or **service** with a problem or challenge at work, e.g., helps you deal with a heavy workload and/or assists you to accomplish your work tasks?

Name 1:	☐
Name 2:	☐
Name 3:	☐
Name 4:	☐
Name 5:	☐
Name 6:	☐

9: Who (if any) do you go to for **technical information** relating to your work? These people give you information that could otherwise be found within books, documents, reports, software, manuals, memos, etc.

Name 1:	☐
Name 2:	☐
Name 3:	☐
Name 4:	☐
Name 5:	☐
Name 6:	☐

10: How close do you feel to each of the people in your social network?

	s	Somewhat distant	Neither close or distant	Somewhat close	Very close
Name 1:	☐	☐	☐	☐	☐
Name 2:	☐	☐	☐	☐	☐
Name 3:	☐	☐	☐	☐	☐
Name 4:	☐	☐	☐	☐	☐
Name 5:	☐	☐	☐	☐	☐
Name 6:	☐	☐	☐	☐	☐

11: Can you please identify the people who you consider to be a personal friend?

Name 1:	☐
Name 2:	☐
Name 3:	☐
Name 4:	☐
Name 5:	☐
Name 6:	☐

12: For your INTERNAL relationship(s), can you please indicate the position level of each person relative to yours within your organisation?

	Lower level e.g., subordinate	Same Level e.g., colleague	One level higher e.g., supervisor, first line manager	Two or more levels higher e.g., middle manager, senior manager, director etc
Name 1:	☐	☐	☐	☐
Name 2:	☐	☐	☐	☐
Name 3:	☐	☐	☐	☐
Name 4:	☐	☐	☐	☐
Name 5:	☐	☐	☐	☐
Name 6:	☐	☐	☐	☐

The following statements will allow me to evaluate the level of shared understanding that you have with individuals within your social network.

Please select your level of agreement to each statement with regard to each person in your social network. Again, there are no right or wrong answers. Your honest account is vital for research insights to be drawn.

Strongly disagree	**Disagree**	**Somewhat disagree**	**Neutral**	**Somewhat agree**	**Agree**	**Strongly agree**
1	2	3	4	5	6	7

13: "We are able to communicate on the same wavelength."

Name 1:	1	2	3	4	5	6	7
Name 2:	1	2	3	4	5	6	7

Name 3:	1	2	3	4	5	6	7
Name 4:	1	2	3	4	5	6	7
Name 5:	1	2	3	4	5	6	7
Name 6:	1	2	3	4	5	6	7

14: "We use similar terminology and jargon while communicating with each other."

Name 1:	1	2	3	4	5	6	7
Name 2:	1	2	3	4	5	6	7
Name 3:	1	2	3	4	5	6	7
Name 4:	1	2	3	4	5	6	7
Name 5:	1	2	3	4	5	6	7
Name 6:	1	2	3	4	5	6	7

15: "We understand what each other means when we talk."

Name 1:	1	2	3	4	5	6	7
Name 2:	1	2	3	4	5	6	7
Name 3:	1	2	3	4	5	6	7
Name 4:	1	2	3	4	5	6	7
Name 5:	1	2	3	4	5	6	7
Name 6:	1	2	3	4	5	6	7

The following set of questions will allow me to characterise the relationships that you have with each of the individuals in your social network.

Please select the level that best represents **your feelings** towards each person in the context of your job and work activities.

There are no right or wrong answers to these questions. Your honest account is vital for research insights to be drawn.

Completely NOT Willing	**Unwilling**	**Somewhat unwilling**	**Neither willing or unwilling**	**Somewhat willing**	**Willing**	**Completely willing**
1	2	3	4	5	6	7

16: How willing are you to rely on their work-related judgements?

Name 1:	1	2	3	4	5	6	7

Name 2:	1	2	3	4	5	6	7
Name 3:	1	2	3	4	5	6	7
Name 4:	1	2	3	4	5	6	7
Name 5:	1	2	3	4	5	6	7
Name 6:	1	2	3	4	5	6	7

17: How willing are you to rely on their task-related skills and abilities?

Name 1:	1	2	3	4	5	6	7
Name 2:	1	2	3	4	5	6	7
Name 3:	1	2	3	4	5	6	7
Name 4:	1	2	3	4	5	6	7
Name 5:	1	2	3	4	5	6	7
Name 6:	1	2	3	4	5	6	7

18: How willing are you to depend on the individual(s) to handle an important issue on your behalf?

Name 1:	1	2	3	4	5	6	7
Name 2:	1	2	3	4	5	6	7
Name 3:	1	2	3	4	5	6	7
Name 4:	1	2	3	4	5	6	7
Name 5:	1	2	3	4	5	6	7
Name 6:	1	2	3	4	5	6	7

19: How willing are you to rely on the individual(s) to represent your work accurately to others?

Name 1:	1	2	3	4	5	6	7
Name 2:	1	2	3	4	5	6	7
Name 3:	1	2	3	4	5	6	7
Name 4:	1	2	3	4	5	6	7
Name 5:	1	2	3	4	5	6	7
Name 6:	1	2	3	4	5	6	7

20: How willing are you to depend on the individual(s) to back you up in difficult situations?

Name 1:	1	2	3	4	5	6	7
Name 2:	1	2	3	4	5	6	7
Name 3:	1	2	3	4	5	6	7
Name 4:	1	2	3	4	5	6	7
Name 5:	1	2	3	4	5	6	7
Name 6:	1	2	3	4	5	6	7

21: How willing are you to share your personal feelings with each of these individual(s)?

Name 1:	1	2	3	4	5	6	7
Name 2:	1	2	3	4	5	6	7
Name 3:	1	2	3	4	5	6	7
Name 4:	1	2	3	4	5	6	7
Name 5:	1	2	3	4	5	6	7
Name 6:	1	2	3	4	5	6	7

22: How willing are you to confide in these individuals about personal issues that are affecting your work?

Name 1:	1	2	3	4	5	6	7
Name 2:	1	2	3	4	5	6	7
Name 3:	1	2	3	4	5	6	7
Name 4:	1	2	3	4	5	6	7
Name 5:	1	2	3	4	5	6	7
Name 6:	1	2	3	4	5	6	7

23: How willing are you to discuss honestly how you feel about your work, even negative feelings, and frustrations?

Name 1:	1	2	3	4	5	6	7
Name 2:	1	2	3	4	5	6	7
Name 3:	1	2	3	4	5	6	7
Name 4:	1	2	3	4	5	6	7
Name 5:	1	2	3	4	5	6	7
Name 6:	1	2	3	4	5	6	7

24: How willing are you to discuss work-related problems or difficulties that could potentially be used to disadvantage you?

Name 1:	1	2	3	4	5	6	7
Name 2:	1	2	3	4	5	6	7
Name 3:	1	2	3	4	5	6	7
Name 4:	1	2	3	4	5	6	7
Name 5:	1	2	3	4	5	6	7
Name 6:	1	2	3	4	5	6	7

25: How willing are you to share your personal beliefs with the individual(s) below?

Name 1:	1	2	3	4	5	6	7
Name 2:	1	2	3	4	5	6	7

Name 3:	1	2	3	4	5	6	7
Name 4:	1	2	3	4	5	6	7
Name 5:	1	2	3	4	5	6	7
Name 6:	1	2	3	4	5	6	7

The following questions will also help us to track changes in how you interact with members of your social network.

Please select the level that best represents your interaction with each individual.

Never	**Rarely** *Once or twice in the past six months*	**Occasionally** *Monthly*	**Sometimes** *A few times each month*	**Often** *Weekly*	**Very often** *A few times each week*	**Daily**
1	2	3	4	5	6	7

26 How frequently do the individual(s) initiate work - related interaction with you?

Name 1:	1	2	3	4	5	6	7
Name 2:	1	2	3	4	5	6	7
Name 3:	1	2	3	4	5	6	7
Name 4:	1	2	3	4	5	6	7
Name 5:	1	2	3	4	5	6	7
Name 6:	1	2	3	4	5	6	7

27: How frequently do you initiate work - related interaction with the individual(s)?

Name 1:	1	2	3	4	5	6	7
Name 2:	1	2	3	4	5	6	7
Name 3:	1	2	3	4	5	6	7
Name 4:	1	2	3	4	5	6	7
Name 5:	1	2	3	4	5	6	7
Name 6:	1	2	3	4	5	6	7

28: How frequently do you interact with the individual(s) while working?

Name 1:	1	2	3	4	5	6	7
Name 2:	1	2	3	4	5	6	7
Name 3:	1	2	3	4	5	6	7
Name 4:	1	2	3	4	5	6	7
Name 5:	1	2	3	4	5	6	7
Name 6:	1	2	3	4	5	6	7

29: How frequently do you interact with the individual(s) informally, or socially, while you are at work?

Name 1:	1	2	3	4	5	6	7
Name 2:	1	2	3	4	5	6	7
Name 3:	1	2	3	4	5	6	7
Name 4:	1	2	3	4	5	6	7
Name 5:	1	2	3	4	5	6	7
Name 6:	1	2	3	4	5	6	7

This is the last stage of the survey. It asks you to provide information about yourself and your remote working arrangement.

30: Which category best describes your situation?

Full time: off-site field employee	○
Full-time: on-site at central office	○
Full time: remote working from home	○
Mix: central office and field work	○
Mix: central office and work from home	○
Mix: central office, off-site / field, and remote working	○
Other, please describe ...	○

31: How many days per week do you currently work in the office? How many days do you work in the same physical location with your colleagues?

Zero days per week	○
Less than once a week	○
One day a week	○
Two days per week	○
Three days per week	○
Four days per week	○
Five days per week	○
More than five days per week	○

32: How much time do you spend working remotely each week?

Less than once a week	○
One day a week	○

Two days per week	○
Three days per week	○
Four days per week	○
Five days a week	○

33: What day(s) do you normally visit your central office?

Note: This question can potentially be removed if all participants are required to attend work every day of the week.

Monday	○
Tuesday	○
Wednesday	○
Thursday	○
Friday	○

34: On average, how many hours do you work per week? (slider)

35: Can you please indicate your job status within this organisation?

○	Temporary / Contractual
○	Part-time
○	Full-time

36: When you are meeting with others, how do you tend to communicate with them?

Please allocate a percentage level to each form of interpersonal communication below.

1. Face to Face / In person	__%
2. Written communication via technology e.g., email, instant messaging, intranet etc.	__%
3. Audio Communication e.g., telephone, Voice Over Internet Protocol (VOIP), conferencing service etc.	__%
4. Avatar communication - using a 2D or 3D graphic to communicate and interact with others in an online forum.	__%
5. Video communication via web-conferencing tools e.g. Zoom, Skype, Google Meet, GoTo meetings etc.	__%
Total (Automatically calculated)	**100%**

37: Please indicate the percentage of face-to-face, physically co-located (not virtual) interaction that you have with people belonging to each of the following stakeholder categories.

% Of Face-to-Face Interaction (0-100%)

	% Level
a. Team / unit members	
b. Colleagues, peers, co-workers other than team members	
c. Clients, customers	
d. Suppliers, business partners	
e. Other members of my working environment (not mentioned above)	

38: When you perform your daily work-related tasks, how much are you dependent on the interaction and input from individuals belonging to each of the stakeholder category(ies) below?

Note: The % sum of categories may not exceed 100.

(0% = Not at all / never dependent - 100% = Extremely dependent)

	% of dependence
a. Team / unit members	
b. Colleagues, peers, co-workers other than team members	
c. Clients, customers	
d. Suppliers, business partners	
e. Other members of my working environment (not mentioned above)	
TOTAL	100

39: How many years have you worked…

	Years	Months
For your organisation		
In your current job		

40: Please indicate the global geographical region where ...

You live	**Select:** Asia, Africa, North America / Western Europe, South America, Europe (central and eastern), Mediterranean
You work	**Select:** Asia, Africa, North America / Western Europe, South America, Europe (central and eastern), Mediterranean

41: Please indicate the local geographical region where ...

You live	**Select:** Dublin, Connaught, Rest of Leinster (outside Dublin), Ulster, Munster, Outside Ireland
You work	**Select:** Dublin, Connaught, Rest of Leinster (outside Dublin), Ulster, Munster, Outside Ireland

42: Can you please provide your age?

Answer: _____(number)

43: Can you please indicate your gender?

Male	o
Female	o
Other, please specify _____	o
Prefer not to say	o

44: Can you please indicate your level of education?

Primary	o
Leaving certificate / Secondary school	o
Advanced certificate / higher diploma	o
Undergraduate degree	o
Master's degree	o
PhD and above	o
Other _____	o

45: Can you please indicate your level in your organisation?

Administrative / Entry level	o
Team leader	o
Supervisor / First line manager	o
Middle manager / Department head	o
Top / Senior management	o
Other _____	o
Prefer not to say	o

Q46: My job falls under the following functional area
(Please select one option from the drop-down menu. Examples are provided for guidance.)

Drop-down options: Marketing • Human Resources • Operations • Finance • Research • Management • Rural Development • Education • Crops • Food • Animal Science • Advisory Services

Closing Statement:
We have now completed the first part of this questionnaire!
Thank you very much for taking the time to provide your valuable input.
The second part of this questionnaire will be sent to you in three weeks (21 days).
If you would like to receive a summary report of your confidential responses, please send an email to Natasha McDowell natasha.mcdowell2@mail.dcu.ie along with your confidential reference code (i.e., the ***last 4 digits*** *of your* ***telephone number*** *followed by the* ***day of your birth).***

B2. SURVEY 2

Research title: Social relationships at work: An investigation into employees' well-being and innovative performance in the context of hybrid working.

Longitudinal research study

DCU Business School

Administered by Natasha McDowell, PhD researcher

Dear participant,

Thank you for your earlier participation. This marks the second part of the survey. To recap, this research seeks to understand how a hybrid worker's well-being and innovative performance can be supported by their social network and how this may be impacted by hybrid working.

This survey will ask you questions about your learning and performance behaviour at work. Your perception about your job and your working environment will also be solicited. This survey will take approximately 8 minutes to complete.

Please be assured that your contribution will be treated in strict confidence. There are no wrong or right answers to the questions in this study. Werequest that you answer these questions as honestly

as possible so that your contribution will support positive developments in hybrid working policy. Insights gained from this study will also enable your organisation to develop interventions that support their hybrid workers from a learning perspective, but also in terms of promoting their well-being and innovative performance.

Thank you very much again for your participation.

Privacy Notice: I (Natasha McDowell), the PhD researcher at DCU, will be the data controller who is responsible for processing the data that you provide.

- This research is to support the development of a doctoral thesis.
- Personal information will only be used for administration purposes.
- This study will use aggregate data only. Individual responses will be combined with other participants' responses to create summary statistics.
- Your individual responses will be kept completely confidential.
- Your employer will not be able to gain access to your individual response at any time.
- Your anonymity will be protected with numeric identifiers / codes. Your name is not required at any time.
- All information that you provide will be stored under password protection.
- The data will be used to address the PhD research objectives and for publication in academic journals.
- Any personal data that you provide will be destroyed upon completion of this research project in 2024.
- Your individual responses will be fully anonymised prior to data analysis.
- This research study is voluntary. You have the right to withdraw at any point during the study, for any reason, and without any prejudice. Data collection will cease from the point of your withdrawal from the study. Data collected prior to your withdrawal from the study may still be used to address the PhD research objectives and for publication purposes in academic journals.

"Confidentiality of information can only be protected within the limitations of the law - i.e., it is possible for data to be subject to subpoena, freedom of information claims or mandated reporting by some professions".

3. Please contact the principal investigator (Natasha McDowell) natasha.mcdowell2@mail.dcu.ie if you wish to discuss this research, need support, you need to obtain an alternative means of completing this survey.
4. If participants have concerns about this study and wish to contact an independent person, please contact: The Secretary, Dublin City University Research Ethics Committee, c/o Research and Innovation Support, Dublin City University, Dublin 9. Tel 01-7008000, e-mail rec@dcu.ie.

By clicking the "YES" button below, you acknowledge that your participation in the study is voluntary, you are over 18 years of age, and that you may terminate your participation in the study at any time and for any reason.

–NO - I do not wish to participate ○

– YES - I wish to participate. ○

Name: _____

Signature: _____

Informed Consent: Please read the following statements and confirm your informed consent by selecting the Yes or No button at the bottom of the page.

- *I have read the Plain Language Statement (or had it read to me)*
- *I understand the information provided*
- *I understand the information provided in relation to data protection*
- *I have had an opportunity to ask questions and discuss this study*
- *I have received satisfactory answers to all my questions*
- *I understand that I may withdraw from the Research Study at any point.*
- *I understand that my personal data is for administration purposes only*

- *I have read and understand the arrangements to be made to protect confidentiality of data including that confidentiality of data is subject to legal limitations.*

- NO - I do not consent. Cancel this survey. – YES - I consent, begin the survey.

○ ○

Name: _____

Signature: _____

This section contains a series of statements about your behaviour at work. Please note that there are no right or wrong answers. Your honest account is vital for research insights to be drawn.

Not at all	Slight / very little extent	Moderate extent	Great extent	A very great extent
1	2	3	4	5

To what extent have you:	Not at all				A very great extent
1. Initiated better ways of doing your core tasks?	1	2	3	4	5
2. Come up with ideas to improve the way in which your core tasks are done?	1	2	3	4	5
3. Made changes to the way your core tasks are done?	1	2	3	4	5
4. Suggested ways to make your work unit more effective?	1	2	3	4	5
5. Developed new and improved methods to help your work unit perform better?	1	2	3	4	5
6. Improved the way your work unit does things?	1	2	3	4	5
7. Made suggestions to improve the overall effectiveness of the organisation (e.g., by suggesting changes to administrative procedures)?	1	2	3	4	5
8. Involved yourself in changes that are helping to improve the overall effectiveness of the organization?	1	2	3	4	5
9. Come up with ways of increasing efficiency within the organization?	1	2	3	4	5

How easily would you say you:	With great difficulty	With comparative difficulty	Not all that easily	Fairly easily	Easily	Very Easily
10. Can adapt to changes in your workplace?	1	2	3	4	5	6
11. Are able to change organizations, if necessary?	1	2	3	4	5	6

12: "I adapt to developments within my organisation."



How quickly do you generally anticipate and take advantage of changes:	Very slowly	Rather slowly	Not all that fast	Fairly fast	Fast	Very Fast
13. In your working environment?	1	2	3	4	5	6
14. In your industry sector?	1	2	3	4	5	6

15: How much variation is there in the range of duties you aim to achieve in your work?

Very little variation	Relatively little variation	Not much variation	Fair amount of variation	A great deal of variation	A very great deal of variation
1	2	3	4	5	6

16: "I have a _____ attitude to changes in my function.".



17: "I find working with new people _____."



The next set of statements relate to your psychological state in the context of your work.

Please select the category that best represents your feelings towards each statement.

Again, there are no right or wrong answers to these questions. Your honest account is vital for research insights to be drawn.

Please indicate your level of truthfulness to each statement

Never true	**Rarely true**	**Sometimes true, but infrequent**	**Neutral**	**Sometimes true**	**Usually true**	**Always true**
1	2	3	4	5	6	7

18. "I can concentrate on what I have to do at work."	1	2	3	4	5	6	7
19. "I don't lose sleep over work-related issues."	1	2	3	4	5	6	7
20. "I can cope with work problems."	1	2	3	4	5	6	7
21. "I have confidence in myself."	1	2	3	4	5	6	7
22. "I enjoy my usual work activities."	1	2	3	4	5	6	7

Please indicate your level of agreement to each statement.

Strongly disagree	**Disagree**	**Somewhat disagree**	**Neutral**	**Somewhat agree**	**Agree**	**Strongly agree**
1	2	3	4	5	6	7

23. I often obtain useful knowledge from others' experience, ideas, comments, or insights.	1	2	3	4	5	6	7
24. I frequently consult with others for tacit knowledge (e.g., experience, ideas, and insights) when I need to improve my knowledge on a topic or issue.	1	2	3	4	5	6	7
25. When I need to access knowledge, I frequently seek ideas or comments from others.	1	2	3	4	5	6	7
26. I frequently consult with others for advice when I need to improve my knowledge on a topic or issue.	1	2	3	4	5	6	7

27. "I rarely use targeted one-on-one conversations with others to acquire work-related knowledge that is based on their insights, intuitions and ideas [r]."	1 2 3 4 5 6 7
28. "When I need to access to rules of thumb or tricks of the trade, I frequently use personal communication with individuals."	1 2 3 4 5 6 7
29. "When I'm working on a difficult issue, I often communicate one-on-one with others who may have encountered similar issues to obtain their insights, intuitions and ideas."	1 2 3 4 5 6 7

This next set of statements will allow us to gather information about your job and your working environment.

Please indicate your level of agreement to each statement.

Strongly disagree	**Disagree**	**Somewhat disagree**	**Neutral**	**Somewhat agree**	**Agree**	**Strongly agree**
1	2	3	4	5	6	7

	Strongly disagree				Strongly agree		
30. "I have significant autonomy in determining how I do my job."	1	2	3	4	5	6	7
31. "I can decide on my own how to go about doing my work."	1	2	3	4	5	6	7
32. "I have considerable opportunity for independence and freedom in how I do my job."	1	2	3	4	5	6	7
33. "The most important things that happen to me involve my work."	1	2	3	4	5	6	7
34. "The major satisfaction in my life comes from my work."	1	2	3	4	5	6	7
35. "I have other activities more important than my work."	1	2	3	4	5	6	7

This last set of statements will help us to assess your level of interdependence with people in your working environment.

For each statement, please select the level that best represents your agreement with regard to each stakeholder category.

Strongly disagree	**Disagree**	**Somewhat disagree**	**Neutral**	**Somewhat agree**	**Agree**	**Strongly agree**
1	2	3	4	5	6	7

36: "I work closely with _____ in doing my work."

a. Team / unit members	1	2	3	4	5	6	7
b. Colleagues, peers, co-workers other than team members	1	2	3	4	5	6	7
c. Clients, customers	1	2	3	4	5	6	7
d. Suppliers, business partners	1	2	3	4	5	6	7
e. Other members of my working environment (not mentioned above)	1	2	3	4	5	6	7

37: *"I frequently must coordinate my efforts with _____."*

a. Team / unit members	1	2	3	4	5	6	7
b. Colleagues, peers, co-workers other than team members	1	2	3	4	5	6	7
c. Clients, customers	1	2	3	4	5	6	7
d. Suppliers, business partners	1	2	3	4	5	6	7
e. Other members of my working environment (not mentioned above)	1	2	3	4	5	6	7

38: *"My own performance is dependent on receiving accurate information from _____."*

a. Team / unit members	1	2	3	4	5	6	7
b. Colleagues, peers, co-workers other than team members	1	2	3	4	5	6	7
c. Clients, customers	1	2	3	4	5	6	7
d. Suppliers, business partners	1	2	3	4	5	6	7
e. Other members of my working environment (not mentioned above)	1	2	3	4	5	6	7

39: *"The way I perform my job has a significant impact on _____."*

a. Team / unit members	1	2	3	4	5	6	7
b. Colleagues, peers, co-workers other than team members	1	2	3	4	5	6	7
c. Clients, customers	1	2	3	4	5	6	7
d. Suppliers, business partners	1	2	3	4	5	6	7
e. Other members of my working environment (not mentioned above)	1	2	3	4	5	6	7

40: *"My work requires me to consult with _____fairly frequently."*

a. Team / unit members	1	2	3	4	5	6	7
b. Colleagues, peers, co-workers other than team members	1	2	3	4	5	6	7
c. Clients, customers	1	2	3	4	5	6	7
d. Suppliers, business partners	1	2	3	4	5	6	7
e. Other members of my working environment (not mentioned above)	1	2	3	4	5	6	7

Closing Statement

This questionnaire is now completed.

A **reference code** will allow your responses across the questionnaires to be ***anonymously combined***. This will be the last 4 digits of your telephone number followed by the day of your birth. E.g., Tel: 012.345.6789, DOB (day/month/year): 01/03/77 ---> Reference Code: 678901

Can you please enter your unique code in the box below?

My reference code is: _____

Thank you so much for your contribution today. It is extremely valuable for meeting the objectives of this research. A survey link to begin the next key stage of this study will be sent to you in three months. If you would like to receive a summary of your responses, please send an email to Natasha McDowell natasha.mcdowell2@mail.dcu.ie along with your confidential reference code.

B3. SURVEY 3

Research title: Social relationships at work: An investigation into employees' well-being and innovative performance in the context of hybrid working.

Longitudinal research study
DCU Business School
Administered by Natasha McDowell, PhD researcher

Dear participant,

This research seeks to understand how a hybrid worker's well-being and innovative performance can be supported by their social network, and how this may be impacted by hybrid working. It asks participants about their social network to understand where hybrid workers source knowledge and support. This survey will also you questions about your learning and performance behaviour at work. Your perception about your job and your working environment will also be solicited.

To participate in this study, you must be a hybrid worker. This means that you are working away from your central office at least one day a week at the beginning of this study. You must also have held the same position for a minimum of six months.

The study requires participants to complete a total of three short surveys over the course of six months. Each online survey is to be completed exactly 8 weeks after you have completed the previous.

Please be assured that your contribution will be treated in strict confidence. There are no wrong or right answers to the questions in this study. Werequest that you answer these questions as honestly as possible so that your contribution will support positive developments in hybrid working policy. Insights gained from this study will also enable your organisation to develop interventions that support their hybrid workers from a learning perspective, but also in terms of promoting their well-being and innovative performance.

Thank you very much again for your participation.

***Privacy Notice**:* I (Natasha McDowell), the PhD researcher at DCU, will be the data controller who is responsible for processing the data that you provide.

- This research is to support the development of a doctoral thesis.
- Personal information will only be used for administration purposes.
- This study will use aggregate data only. Individual responses will be combined with other participants' responses to create summary statistics.
- Your individual responses will be kept completely confidential.
- Your employer will not be able to gain access to your individual response at any time.
- Your anonymity will be protected with numeric identifiers / codes. Your name is not required at any time.
- All information that you provide will be stored under password protection.
- The data will be used to address the PhD research objectives and for publication in academic journals.
- Any personal data that you provide will be destroyed upon completion of this research project in 2024.
- Your individual responses will be fully anonymised prior to data analysis.
- This research study is voluntary. You have the right to withdraw at any point during the study, for any reason, and without any prejudice. Data collection will cease from the point of your withdrawal from the study. Data collected prior to your withdrawal from the study may still be used to address the PhD research objectives and for publication purposes in academic journals.

"Confidentiality of information can only be protected within the limitations of the law - i.e., it is possible for data to be subject to subpoena, freedom of information claims or mandated reporting by some professions".

5. Please contact the principal investigator (Natasha McDowell) natasha.mcdowell2@mail.dcu.ie if you wish to discuss this research, need support, you need to obtain an alternative means of completing this survey.
6. If participants have concerns about this study and wish to contact an independent person, please contact: The Secretary, Dublin City University Research Ethics Committee, c/o Research and Innovation Support, Dublin City University, Dublin 9. Tel 01-7008000, e-mail rec@dcu.ie.

By clicking the "YES" button below, you acknowledge that your participation in the study is voluntary, you are over 18 years of age, and that you may terminate your participation in the study at any time and for any reason.

–NO - I do not wish to participate ○

– YES - I wish to participate. ○

Name: _____

Signature: _____

Informed Consent

Informed Consent: Please read the following statements and confirm your informed consent by selecting the Yes or No button at the bottom of the page.

- *I have read the Plain Language Statement (or had it read to me)*
- *I understand the information provided*
- *I understand the information provided in relation to data protection*
- *I have had an opportunity to ask questions and discuss this study*
- *I have received satisfactory answers to all my questions*
- *I understand that I may withdraw from the Research Study at any point.*
- *I understand that my personal data is for administration purposes only*
- *I have read and understand the arrangements to be made to protect confidentiality of data including that confidentiality of data is subject to legal limitations.*

- NO - I do not consent. Cancel this survey. – YES - I consent, begin the survey.

Name:	_____
Signature:	_____

In this section, we would like to learn about your current **social network**. We are especially interested in the people that provide you with advice, information, and emotional support when you conduct your work activities. Therefore, we will ask you to list all the people in your social network that you draw upon right now for these resources.

A member of your **social network** can be anyone (e.g., work colleague, mentor, role model, friend, acquaintance, family member etc.). This social network study requires that you identify at least one contact, up to a maximum of six people.

The information that you provide will be stored securely and treated confidentially.
It will only be used for scientific purposes.
It will not be shared with your employer.

1: Please list the people that may provide you with one or more of the following resources when you are performing your daily job activities:

- Emotional support (i.e., affection, acceptance etc.).
- Tangible assistance on your work tasks.
- Advice and guidance based on their professional experience.
- Technical knowledge regarding your work tasks.
- Sponsorship, exposure, and protection at work.
- An example for how to behave at work.

Please list each person (one name per box) as follows: FIRST NAME, 1st initial of LAST NAME, e.g., "Janet McDowell" is Janet M.

Note: This approach will enable us to protect the anonymity of the people that you list, whilst enabling you to answer the questions about them. It will also allow us to track developments in your social network over the course of this study.

A minimum of one individual is required.
Please try to add at least 5 people.
You can leave the remaining fields blank.

Name 1:
Name 2:
Name 3:

Name 4:
Name 5:
Name 6:

2: How long have you known the individual(s)?

	Years	Months
Name 1:		
Name 2:		
Name 3:		
Name 4:		
Name 5:		
Name 6:		

The next set of questions will solicit characteristics about the individuals in your social network and the types of resources that each person provides to you.

You can select more than one person. You may also leave all the boxes blank.

3: Can you please identify the individual(s) who are <u>internal</u> to your organization?

*** Internal: A person who works for the same organization as you do.*

	These people work at my company ...
Name 1:	☐
Name 2:	☐
Name 3:	☐
Name 4:	☐
Name 5:	☐
Name 6:	☐

4: Please identify the individual(s), if any, who provide you with **tricks of the trade** and / or the benefit of their **practical know-how and experience**.

Name 1:	☐
Name 2:	☐
Name 3:	☐
Name 4:	☐
Name 5:	☐
Name 6:	☐

5: Please identify the individual(s), if any, who **support your emotional well-being** at work, e.g., if you needed someone to talk to or someone to comfort or encourage you.

Name 1:	☐
Name 2:	☐
Name 3:	☐
Name 4:	☐
Name 5:	☐
Name 6:	☐

6: Do you consider any of these people to be a **role model**, e.g., if you needed an example from which to model your own behaviour at work?

Name 1:	☐
Name 2:	☐
Name 3:	☐
Name 4:	☐
Name 5:	☐
Name 6:	☐

7: Please identify the individual(s), if any, who provide you with **mentoring support**, e.g., if you needed someone to help you to set goals, identify resources, and help you deal with workplace challenges.

Name 1:	☐
Name 2:	☐
Name 3:	☐
Name 4:	☐
Name 5:	☐
Name 6:	☐

8: Who, if any, provides you with **tangible aid, assistance**, or **service** with a problem or challenge at work, e.g., helps you deal with a heavy workload and/or assists you to accomplish your work tasks?

Name 1:	☐
Name 2:	☐
Name 3:	☐
Name 4:	☐
Name 5:	☐
Name 6:	☐

9: Who (if any) do you go to for **technical information** relating to your work? These people give you information that could otherwise be found within books, documents, reports, software, manuals, memos, etc.

Name 1:	☐
Name 2:	☐
Name 3:	☐
Name 4:	☐
Name 5:	☐
Name 6:	☐

10: How close do you feel to each of the people in your social network?

	Very distant	Somewhat distant	Neither close or distant	Somewhat close	Very close
Name 1:	☐	☐	☐	☐	☐
Name 2:	☐	☐	☐	☐	☐
Name 3:	☐	☐	☐	☐	☐
Name 4:	☐	☐	☐	☐	☐
Name 5:	☐	☐	☐	☐	☐
Name 6:	☐	☐	☐	☐	☐

11: Can you please identify the people who you consider to be a personal friend?

Name 1:	☐
Name 2:	☐
Name 3:	☐
Name 4:	☐
Name 5:	☐
Name 6:	☐

12: For your INTERNAL relationship(s), can you please indicate the position level of each person relative to yours within your organisation?

	Lower level e.g., subordinate	Same Level e.g., colleague	One level higher e.g., supervisor, first line manager	Two or more levels higher e.g., middle manager, senior

				manager, director etc
Name 1:	☐	☐	☐	☐
Name 2:	☐	☐	☐	☐
Name 3:	☐	☐	☐	☐
Name 4:	☐	☐	☐	☐
Name 5:	☐	☐	☐	☐
Name 6:	☐	☐	☐	☐

The following statements will allow me to evaluate the level of shared understanding that you have with individuals within your social network.

Please select your level of agreement to each statement with regard to each person in your social network. Again, there are no right or wrong answers. Your honest account is vital for research insights to be drawn.

Strongly disagree	**Disagree**	**Somewhat disagree**	**Neutral**	**Somewhat agree**	**Agree**	**Strongly agree**
1	2	3	4	5	6	7

13: "We are able to communicate on the same wavelength."

Name 1:	1	2	3	4	5	6	7
Name 2:	1	2	3	4	5	6	7
Name 3:	1	2	3	4	5	6	7
Name 4:	1	2	3	4	5	6	7
Name 5:	1	2	3	4	5	6	7
Name 6:	1	2	3	4	5	6	7

14: "We use similar terminology and jargon while communicating with each other."

Name 1:	1	2	3	4	5	6	7
Name 2:	1	2	3	4	5	6	7
Name 3:	1	2	3	4	5	6	7
Name 4:	1	2	3	4	5	6	7
Name 5:	1	2	3	4	5	6	7
Name 6:	1	2	3	4	5	6	7

15: "We understand what each other means when we talk."

Name 1:	1	2	3	4	5	6	7
Name 2:	1	2	3	4	5	6	7
Name 3:	1	2	3	4	5	6	7
Name 4:	1	2	3	4	5	6	7
Name 5:	1	2	3	4	5	6	7
Name 6:	1	2	3	4	5	6	7

The following set of questions will allow me to characterise the relationships that you have with each of the individuals in your social network.

Please select the level that best represents **your feelings** towards each person in the context of your job and work activities.

There are no right or wrong answers to these questions. Your honest account is vital for research insights to be drawn.

Completely NOT Willing	**Unwilling**	**Somewhat unwilling**	**Neither willing or unwilling**	**Somewhat willing**	**Willing**	**Completely willing**
1	2	3	4	5	6	7

16: How willing are you to rely on their work-related judgements?

Name 1:	1	2	3	4	5	6	7
Name 2:	1	2	3	4	5	6	7
Name 3:	1	2	3	4	5	6	7
Name 4:	1	2	3	4	5	6	7
Name 5:	1	2	3	4	5	6	7
Name 6:	1	2	3	4	5	6	7

17: How willing are you to rely on their task-related skills and abilities?

Name 1:	1	2	3	4	5	6	7
Name 2:	1	2	3	4	5	6	7
Name 3:	1	2	3	4	5	6	7
Name 4:	1	2	3	4	5	6	7
Name 5:	1	2	3	4	5	6	7
Name 6:	1	2	3	4	5	6	7

18: How willing are you to depend on the individual(s) to handle an important issue on your behalf?

Name 1:	1	2	3	4	5	6	7
Name 2:	1	2	3	4	5	6	7
Name 3:	1	2	3	4	5	6	7
Name 4:	1	2	3	4	5	6	7
Name 5:	1	2	3	4	5	6	7
Name 6:	1	2	3	4	5	6	7

19: How willing are you to rely on the individual(s) to represent your work accurately to others?

Name 1:	1	2	3	4	5	6	7
Name 2:	1	2	3	4	5	6	7
Name 3:	1	2	3	4	5	6	7
Name 4:	1	2	3	4	5	6	7
Name 5:	1	2	3	4	5	6	7
Name 6:	1	2	3	4	5	6	7

20: How willing are you to depend on the individual(s) to back you up in difficult situations?

Name 1:	1	2	3	4	5	6	7
Name 2:	1	2	3	4	5	6	7
Name 3:	1	2	3	4	5	6	7
Name 4:	1	2	3	4	5	6	7
Name 5:	1	2	3	4	5	6	7
Name 6:	1	2	3	4	5	6	7

21: How willing are you to share your personal feelings with each of these individual(s)?

Name 1:	1	2	3	4	5	6	7
Name 2:	1	2	3	4	5	6	7
Name 3:	1	2	3	4	5	6	7
Name 4:	1	2	3	4	5	6	7
Name 5:	1	2	3	4	5	6	7
Name 6:	1	2	3	4	5	6	7

22: How willing are you to confide in these individuals about personal issues that are affecting your work?

Name 1:	1	2	3	4	5	6	7
Name 2:	1	2	3	4	5	6	7
Name 3:	1	2	3	4	5	6	7
Name 4:	1	2	3	4	5	6	7
Name 5:	1	2	3	4	5	6	7
Name 6:	1	2	3	4	5	6	7

23: How willing are you to discuss honestly how you feel about your work, even negative feelings, and frustrations?

Name 1:	1	2	3	4	5	6	7
Name 2:	1	2	3	4	5	6	7
Name 3:	1	2	3	4	5	6	7
Name 4:	1	2	3	4	5	6	7
Name 5:	1	2	3	4	5	6	7

Name 6:	1	2	3	4	5	6	7

24: How willing are you to discuss work-related problems or difficulties that could potentially be used to disadvantage you?

Name 1:	1	2	3	4	5	6	7
Name 2:	1	2	3	4	5	6	7
Name 3:	1	2	3	4	5	6	7
Name 4:	1	2	3	4	5	6	7
Name 5:	1	2	3	4	5	6	7
Name 6:	1	2	3	4	5	6	7

25: How willing are you to share your personal beliefs with the individual(s) below?

Name 1:	1	2	3	4	5	6	7
Name 2:	1	2	3	4	5	6	7
Name 3:	1	2	3	4	5	6	7
Name 4:	1	2	3	4	5	6	7
Name 5:	1	2	3	4	5	6	7
Name 6:	1	2	3	4	5	6	7

The following questions will also help us to track changes in how you interact with members of your social network.

Please select the <u>level that best represents your interaction</u> with each individual.

Never	**Rarely** *Once or twice in the past six months*	**Occasionally** *Monthly*	**Sometimes** *A few times each month*	**Often** *Weekly*	**Very often** *A few times each week*	**Daily**
1	2	3	4	5	6	7

26 How frequently do the individual(s) initiate work-related interaction with you?

Name 1:	1	2	3	4	5	6	7
Name 2:	1	2	3	4	5	6	7
Name 3:	1	2	3	4	5	6	7
Name 4:	1	2	3	4	5	6	7

Name 5:	1	2	3	4	5	6	7
Name 6:	1	2	3	4	5	6	7

27: How frequently do you initiate work - related interaction with the individual(s)?

Name 1:	1	2	3	4	5	6	7
Name 2:	1	2	3	4	5	6	7
Name 3:	1	2	3	4	5	6	7
Name 4:	1	2	3	4	5	6	7
Name 5:	1	2	3	4	5	6	7
Name 6:	1	2	3	4	5	6	7

28: How frequently do you interact with the individual(s) while working?

Name 1:	1	2	3	4	5	6	7
Name 2:	1	2	3	4	5	6	7
Name 3:	1	2	3	4	5	6	7
Name 4:	1	2	3	4	5	6	7
Name 5:	1	2	3	4	5	6	7
Name 6:	1	2	3	4	5	6	7

29: How frequently do you interact with the individual(s) informally, or socially, while you are at work?

Name 1:	1	2	3	4	5	6	7
Name 2:	1	2	3	4	5	6	7
Name 3:	1	2	3	4	5	6	7
Name 4:	1	2	3	4	5	6	7
Name 5:	1	2	3	4	5	6	7
Name 6:	1	2	3	4	5	6	7

30: Which category best describes your situation?

Full time: off-site field employee	○
Full-time: on-site at central office	○
Full time: remote working from home	○
Mix: central office and field work	○
Mix: central office and work from home	○
Mix: central office, off-site / field, and remote working	○
Other, please describe ...	○

31: How many days per week do you currently work in the office? How many days do you work in the same physical location with your colleagues?

Zero days per week	○
Less than once a week	○
One day a week	○
Two days per week	○
Three days per week	○
Four days per week	○
Five days per week	○
More than five days per week	○

32: How much time do you spend working remotely each week?

Less than once a week	○
One day a week	○
Two days per week	○
Three days per week	○
Four days per week	○
Five days a week	○

33: On average, how many hours do you work per week? (slider)

34: When you are engaging with others for work purposes, how do you tend to communicate with them?
Please allocate a percentage level to each form of interpersonal communication below.
Note: Total percentage must sum to 100

	% Level
1. Face to Face / In person	
2. Video communication via web-conferencing tools e.g. Zoom, Skype, Google Meet, GoTo meetings etc.	
3. Audio Communication e.g. telephone, Voice Over Internet Protocol (VOIP), conferencing service etc.	
4. Written communication via technology e.g. email, instant messaging, intranet etc.	
5. Avatar communication - using a 2D or 3D graphic to communicate and interact with others in an online forum.	

35: Please indicate the percentage of face-to-face, physically co-located (not virtual) interaction that you have with people belonging to each of the following stakeholder categories.

% Of Face-to-Face Interaction (0-100%)

	% Level
a. Team / unit members	
b. Colleagues, peers, co-workers other than team members	
c. Clients, customers	
d. Suppliers, business partners	
e. Other members of my working environment (not mentioned above)	

36: When you perform your daily work-related tasks, how much are you dependent on the interaction and input from individuals belonging to each of the stakeholder category(ies) below?

Note: The % sum of categories may not exceed 100.

(0% = Not at all / never dependent - 100% = Extremely dependent)

	% of dependence
a. Team / unit members	
b. Colleagues, peers, co-workers other than team members	
c. Clients, customers	
d. Suppliers, business partners	
e. Other members of my working environment (not mentioned above)	
TOTAL	100

This last set of statements will help us to assess your level of interdependence with people in your working environment.

For each statement, please select the level that best represents your agreement with regard to each stakeholder category.

Strongly disagree	**Disagree**	**Somewhat disagree**	**Neutral**	**Somewhat agree**	**Agree**	**Strongly agree**
1	2	3	4	5	6	7

37. "I work closely with _____ in doing my work."	1	2	3	4	5	6	7
38. *"I frequently must coordinate my efforts with _____."*	1	2	3	4	5	6	7

39. *"My own performance is dependent on receiving accurate information from _____."*	1	2	3	4	5	6	7
40. *"The way I perform my job has a significant impact on _____."*	1	2	3	4	5	6	7
41. *"My work requires me to consult with _____fairly frequently."*	1	2	3	4	5	6	7

This section contains a series of statements about your behaviour at work. Please note that there are no right or wrong answers. Your honest account is vital for research insights to be drawn.

Not at all	**Slight / very little extent**	**Moderate extent**	**Great extent**	**A very great extent**
1	2	3	4	5

To what extent have you:	**Not at all**				**A very great extent**
42. Initiated better ways of doing your core tasks?	1	2	3	4	5
43. Come up with ideas to improve the way in which your core tasks are done?	1	2	3	4	5
44. Made changes to the way your core tasks are done?	1	2	3	4	5
45. Suggested ways to make your work unit more effective?	1	2	3	4	5
46. Developed new and improved methods to help your work unit perform better?	1	2	3	4	5
47. Improved the way your work unit does things?	1	2	3	4	5
48. Made suggestions to improve the overall effectiveness of the organisation (e.g., by suggesting changes to administrative procedures)?	1	2	3	4	5
49. Involved yourself in changes that are helping to improve the overall effectiveness of the organization?	1	2	3	4	5
50. Come up with ways of increasing efficiency within the organization?	1	2	3	4	5

How easily would you say you:	With great difficulty	With comparative difficulty	Not all that easily	Fairly easily	Easily	Very Easily
51. Can adapt to changes in your workplace?	1	2	3	4	5	6
52. Are able to change organizations, if necessary?	1	2	3	4	5	6

53: "I adapt to developments within my organisation."



How quickly do you generally anticipate and take advantage of changes:	Very slowly	Rather slowly	Not all that fast	Fairly fast	Fast	Very Fast
54. In your working environment?	1	2	3	4	5	6
55. In your industry sector?	1	2	3	4	5	6

56: How much variation is there in the range of duties you aim to achieve in your work?

Very little variation	Relatively little variation	Not much variation	Fair amount of variation	A great deal of variation	A very great deal of variation
1	2	3	4	5	6

57: "I have a _____ attitude to changes in my function.".



58: "I find working with new people _____."



The next set of statements relate to your psychological state in the context of your work.

Please select the category that best represents your feelings towards each statement.

Again, there are no right or wrong answers to these questions. Your honest account is vital for research insights to be drawn.

Please indicate your level of truthfulness to each statement

Never true	Rarely true	Sometimes true, but infrequent	Neutral	Sometimes true	Usually true	Always true
1	2	3	4	5	6	7

59. "I can concentrate on what I have to do at work."	1	2	3	4	5	6	7
60. "I don't lose sleep over work-related issues."	1	2	3	4	5	6	7
61. "I can cope with work problems."	1	2	3	4	5	6	7
62. "I have confidence in myself."	1	2	3	4	5	6	7
63. "I enjoy my usual work activities."	1	2	3	4	5	6	7

Please indicate your level of agreement to each statement.

Strongly disagree	Disagree	Somewhat disagree	Neutral	Somewhat agree	Agree	Strongly agree
1	2	3	4	5	6	7

64. I often obtain useful knowledge from others' experience, ideas, comments, or insights.	1	2	3	4	5	6	7
65. I frequently consult with others for tacit knowledge (e.g., experience, ideas, and insights) when I need to improve my knowledge on a topic or issue.	1	2	3	4	5	6	7
66. When I need to access knowledge, I frequently seek ideas or comments from others.	1	2	3	4	5	6	7

This next set of statements will allow us to gather information about your job and your working environment.

Please indicate your level of agreement to each statement.

Strongly disagree	Disagree	Somewhat disagree	Neutral	Somewhat agree	Agree	Strongly agree

1	2	3	4	5	6	7

	Strongly disagree						Strongly agree
67. "I have significant autonomy in determining how I do my job."	1	2	3	4	5	6	7
68. "I can decide on my own how to go about doing my work."	1	2	3	4	5	6	7
69. "I have considerable opportunity for independence and freedom in how I do my job."	1	2	3	4	5	6	7

70. How many years have you worked…

	Years	Months
For your organisation		
In your current job		

71: Please indicate the global geographical region where ...

You live	**Select:** Asia, Africa, North America / Western Europe, South America, Europe (central and eastern), Mediterranean
You work	**Select:** Asia, Africa, North America / Western Europe, South America, Europe (central and eastern), Mediterranean

72: Please indicate the local geographical region where ...

You live	**Select:** Dublin, Connaught, Rest of Leinster (outside Dublin), Ulster, Munster, Outside Ireland
You work	**Select:** Dublin, Connaught, Rest of Leinster (outside Dublin), Ulster, Munster, Outside Ireland

73: Can you please provide your age?

Answer: _____(number)

74: Can you please indicate your gender?

Male	○
Female	○
Other, please specify _____	○
Prefer not to say	○

75: Can you please indicate your level of education?

Primary	○
Leaving certificate / Secondary school	○
Advanced certificate / higher diploma	○
Undergraduate degree	○
Master's degree	○
PhD and above	○
Other _____	○

76: Can you please indicate your level in your organisation?

Administrative / Entry level	○
Team leader	○
Supervisor / First line manager	○
Middle manager / Department head	○
Top / Senior management	○
Other _____	○
Prefer not to say	○

Q77. My job falls under the following functional area
(Please select one option from the drop-down menu. Examples are provided for guidance.)
Drop-down options:
Marketing • Human Resources • Operations • Finance • Research • Management • Rural Development • Education • Crops • Food • Animal Science • Advisory Services

Closing Statement

You have now completed this survey!

A survey to begin the next key stage will be sent to you in three months.

Thank you so much for your contribution. Your continued input is extremely valuable for meeting the objectives of this research. If you would like to receive a summary of your response, please contact Natasha McDowell, the lead researcher at natasha.mcdowell2@mail.dcu.ie.

APPENDIX C: Calculation Methods for Study Variables

C1. Calculating Network Diversity - Range of Resources (weighted)

The following procedure describes how the *weighted diversity* variable was computed in R, following Perry et al. (2018).

Step 1. Defining what is being measured

This measure represents the effective diversity of support types available within an individual's social network. For each person in the study, the program looks at:

- **Network size**: how many people (alters) are in their personal network.
- **Resource types:** the six kinds of support that might be provided by those alters. These include tacit knowledge, emotional support, role model, mentor, instrumental support, and explicit knowledge.
- **Counts of support**: for each of the six resource types, the program counts how many alters provide that type of help.

In the dataset, each alter is labelled with an "N" (for example, N1, N2, up to N6). Each "N" represents one specific network member. When a response shows "N1 N3" under Tacit Knowledge, it means that alter 1 and alter 3 both provide Tacit Knowledge. The R command str_count(..., "N") counts how many "N"s appear in the response for each resource type. This gives the number of people in the respondent's network who provide that type of support.

Step 2. Identifying whether each type of support is present

After counting how many people provide each resource, the program checks whether that resource is present at all. If at least one person provides the resource, it records a **1** (meaning "yes, this type of support exists in the network"). If no one provides it, it records a **0** (meaning "no, this type of support is missing"). This step changes the data from "how many people provide this help" to a simple "yes or no" for each type of support.

Step 3. Counting the number of different types of support available

Next, the program adds up those six yes/no indicators to find out how many different types of support the person "EGO" has available. For example, if a person receives emotional support, instrumental Support, and mentoring, they have access to three different types of resources. This

total is called "**Resource Count"** and can range from zero (no support types present) to six (all support types that can be present). Note: In this study the maximum possible number of support types is 6. If another study uses a different maximum number of alters, both the denominators in later formulas would need to be adjusted accordingly.

Step 4. Converting the count to a proportion

To make results easier to compare, the total number of resource types is converted to a proportion of the total possible six resource types.

$$\text{Proportion of total resources} = \frac{\text{Number of resource types present}}{6}$$

For example:

- If all six types are present, the proportion is 1.0.
- If only three are present, the proportion is 0.5.
- If two are present, the proportion is 0.33.

This value is stored as the "Proportion of Total Resources".

Step 5. Adjusting for network size

People with larger networks can potentially draw on a wider variety of resources. To account for this, the diversity score is multiplied by the person's network size, divided by six.

- If a person's network has six people, the full diversity score is kept.
- If their network is smaller, the score is reduced in proportion to its size.

Note: This adjusted value in R is called "Range of Resources (weighted)". It represents the person's range of different support types, scaled according to how big their network is.

Rationale for weighting: The weighting deliberately reduces the score of smaller networks, even if they have a high variety of resource types, to acknowledge that with fewer alters, each resource is likely represented by only one person and the ability to mobilise or sustain those resources is smaller. This operationalisation ensures that the weighted diversity variable reflects both the variety of support types and the structural capacity of the network to provide them. In doing so, it shifts the construct from *diversity of types* to *effective diversity* in terms of the usable range of resources relative to network capacity.

This represents a theoretical choice about how network diversity is interpreted in this study, following the structural-capital view that emphasises not only the presence of diverse resources but also the size of the network through which those resources can be accessed.

Examples: Network Diversity Calculations

Person	**Network size**	**Number of different resource types present in network**	**Unweighted proportion (resource count ÷ 6 types of different resources)**	**Weighted (× Network Size ÷ 6)**
Ego A	6	2	2 ÷ 6 = **0.33**	0.33 × (6 ÷ 6) = **0.33**
Ego B	3	2	2 ÷ 6 = **0.33**	0.33 × (3 ÷ 6) = **0.17**
Ego C	6	3	3 ÷ 6 = **0.50**	0.50 × (6 ÷ 6) = **0.50**
Ego D	3	3	3 ÷ 6 = **0.50**	0.50 × (3 ÷ 6) = **0.25**

Note: In some cases, a smaller network may show a greater variety of support types, and thus appear more diverse on the unweighted scale (See example Ego A and D above). However, the weighted version used here adjusts for network capacity, meaning that smaller networks receive proportionally lower scores even if they include several resource types.

C2. Calculating Employee Task Virtuality Levels

This write-up is based on the work of Orhan et al. (2016).

Step 1: Calculating Virtuality Levels Across Different Work Categories.

The virtuality of each group is calculated using the formula:

$$\text{Virtuality}_{\text{Group}} = 100 - \varphi_{\text{Group}}$$

Where φ_{Group} represents the percentage of face-to-face interaction with that specific group. Examples include:

- Team Virtuality: $100 - \varphi_{\text{Team}}$
- Coworker Virtuality: $100 - \varphi_{\text{Coworkers}}$
- Customer Virtuality: $100 - \varphi_{\text{Customers}}$
- Supplier Virtuality: $100 - \varphi_{\text{Suppliers}}$
- Other Virtuality: $100 - \varphi_{\text{Other}}$

Step 2: Calculating Weights of Interdependence Across Work Categories

Each group has a weight of interdependence (ω) representing the individual's reliance on that group's contribution for their work. The sum of all weights must equal 1:

$$\omega_{\text{Team}} + \omega_{\text{Coworkers}} + \omega_{\text{Customers}} + \omega_{\text{Suppliers}} + \omega_{\text{Other}} = 1$$

Step 3: Calculating the task virtuality Score

The overall **task virtuality Score** is calculated as follows:

$$\text{Task virtuality} = \omega_{\text{Team}}(100 - \varphi_{\text{Team}}) + \omega_{\text{Coworkers}}(100 - \varphi_{\text{Coworkers}}) + \omega_{\text{Customers}}(100 - \varphi_{\text{Customers}}) + \omega_{\text{Suppliers}}(100 - \varphi_{\text{Suppliers}}) + \omega_{\text{Other}}(100 - \varphi_{\text{Other}})$$

Where:

- ϕ indicates the percentage score of the self-reported level of face-to-face interaction ranging from 0 (fully virtual) to 100 (fully face-to-face).
- ω indicates the self-reported weight of interdependence ranging from 0 (no interdependence) to 1 (full interdependence).

C3. Calculating Employee Digital Information Communication Quality (DICQ) Levels

This write-up is based on the work of Kirkman and Mathieu (2005).

Step 1: Categorising Communication Patterns:

Participants assign percentage levels to different communication channels: Written, Audio/Verbal, Avatar, and Video. The dominant communication pattern is determined by identifying the channel with the highest percentage, employing the argmax function:

Let: $P_{Written}$, $P_{Audio/Verbal}$, P_{Avatar}, and P_{Video} be the percentages of communication in the Written, Audio/Verbal, Avatar, and Video channels, respectively.

Communication Pattern=argmax($P_{Written}$, $P_{Audio/Verbal}$, P_{Avatar}, P_{Video})

** *"argmax" is a mathematical term that indicates the input value at which a function achieves its highest output, essentially identifying the point where the function reaches its maximum value.*

Step 2: Communication Pattern Quality Classification:

"High," "Low," and "Balanced," based on the specified thresholds for video, written, and avatar communication percentages. The resulting factor variable is denoted as CQR (Communication Quality Richness).

Kirkman & Mathieu's(2005) framework provides classifications of communication richness and immediacy, which, along with the extent of use of virtual tools, form the basis for the CQR classification categories:

CQR=

Classification	Condition
"High"	if $P_{Video} \geq 0.5$ or ($P_{Video} \geq 0.5$ and $P_{Avatar} \geq 0.5$)
"Low"	if ($P_{Video} < 0.5$ and $P_{Written} \geq 0.5$) or ($P_{Video} < 0.5$ and $P_{Avatar} < 0.5$ and $P_{Written} \geq 0.5$)
"Balanced"	if ($P_{Video} < 0.5$ and $P_{Written} < 0.5$ and $P_{Avatar} < 0.5$) AND ($P_{Audio/Verbal} \geq 0$)

- **High**: Participants predominantly use video communication (≥50%) or a mix of high video and avatar usage, indicating a strong preference for rich media that facilitates immediacy and multiple cue transmission, enhancing interpersonal interaction.

- **Low**: When video usage is low (<50%) but written communication is above average, it suggests reduced immediacy. This reflects a reliance on media that, while informative, lacks the immediacy and cue richness of higher-quality channels.
- **Balanced**: When all three primary channels (Video, Written, Avatar) are used minimally (<50%) with some audio/verbal communication, the richness is categorised as "Balanced." This indicates a mixed communication approach that does not favour high- or low-quality channels, employing multiple forms but lacking dominance in any for substantial informational richness.

Step 3: Creating the Digital Informational Communication Quality (DICQ) variable

Assigning a discrete value based on the content of the CQR variable.

Let: CQR be the Communication Quality Richness variable with three categories: "LOW," "BALANCED," and "HIGH."

The DICQ variable is calculated as follows:

DICQ =

Classification	Value	Condition
“Low”	0	if CQR = "LOW"
“Balanced”	1	if CQR = "BALANCED"
“High”	2	if CQR = "HIGH"

Notes: Individuals who predominantly utilise communication technologies rich in immediacy and informational value for interpersonal communication are classified as “High,” corresponding to a value of 2 (e.g., ≥50% for high video usage). This classification considers factors such as feedback immediacy, the ability to transmit multiple verbal and non-verbal cues, personalization, and language variety (Daft & Lengel, 1986; Daft, Lengel, & Trevino, 1987). Kirkman and Mathieu’s framework (2005) classifies communication richness, immediacy, and the use of virtual tools, serving as the basis for the DICQ categories ("High," "Low," "Balanced").

C4. Calculating the Hybrid Relational Communication Ratio (HRCR)

Step 1: Categorising the task virtuality score

The task virtuality Score (TV) is categorised into discrete numerical values (TV∗) based on the following conditions:

Value (TV*)	Condition
4	if 80≤ TV ≤100
3	if 65≤ TV <80
2	if 50≤ TV <65
1	if 0 ≤ TV<50

Where *TV** is a discrete numerical value categorising task virtuality levels.

Step 2: Calculate the Hybrid Relational Communication Ration (HRCR)

Let:

- HRCR represent the **Hybrid Relational Communication Ratio**.
- TV* represent the **task virtuality** categorical variable.
- DICQ represent the **Digital Information Communication Quality** variable.

The calculation of HRCR is represented as:

$$\mathbf{HRCR = (25 \times TV^*) - (10 \times DICQ)}$$

***Scaling Factor*:** This scaling factor, 25×TV*, amplifies the influence of task virtuality on HRCR. Multiplying by this factor ensures a substantial impact while maintaining values within the desired range of 0 to 100. This approach strikes a balance between task virtuality and DICQ, optimising their combined influence.

***Weighting Factor**:* The weighting factor, 10X DICQ, addresses the impact of digital communication quality on HRCR. This weight varies based on the quality of digital communication, ensuring that higher quality results in a more significant impact on the HRCR.

HRCR Values Based on task virtuality (TV*) and Digital Information Communication Quality (DICQ) Classifications

TV*	DICQ = 0	DICQ = 1	DICQ = 2
4	100	90	80
3	75	65	55
2	50	40	30
1	25	15	5

Explanation:

Each cell represents the calculated **Hybrid Relational Communication Ratio (HRCR)** for the corresponding combination of **task virtuality (TV∗)** and **Digital Information Communication Quality (DICQ)** classifications.

- **TV∗ :** Represents the categorical variable for task virtuality, ranging from 1 to 4.
- **DICQ:** Represents the digital communication quality classification, where :

  DICQ=0 indicates low quality,

  DICQ=1 indicates balanced quality,

  DICQ=2 indicates high quality.

For example, an HRCR value of 100 represents a scenario with no face-to-face communication and the lowest richness communication experience when using technology.

C5. Calculating Threshold for DICQ via Process of Interpolation

Thresholds for *Digital Information Communication Quality (DICQ)* were developed to classify observations based on their ordinal scale: 0 = poor communication, 1 = balanced communication, 2 = high communication.

Since DICQ is categorical, thresholds were derived from the data distribution using statistical interpolation to maintain consistency and interpretability.

Data Summary (from descriptive statistics):

Minimum = 0

Median = 1

Maximum = 2

Mean = 0.6441

Most values cluster around 0 (poor) and 1 (balanced), with fewer at 2 (high).

66th Percentile Selection: The 66th percentile was chosen to represent above-average communication quality while retaining a sufficient number of cases for statistical analysis. This percentile lies between the median (1) and the maximum (2), reflecting the upper tier of communication quality.

Step 1: Interpolation to Determine the Threshold

To determine the percentile threshold for DICQ, the **linear interpolation** method was applied. This method estimates a value between two known data points using the following general equation:

$$P = P_1 + (P_2 - P_1) \times F$$

Where:

- P_1= lower bound value (e.g., 50th percentile or median)
- P_2= upper bound value (e.g., 100th percentile or maximum)
- F= fractional distance between the two percentile ranks

The interpolation method follows the linear interpolation principle described by Burden and Faires (2011, Chapter 3, pp. 110-113).

Formula for F

$$F = \frac{P_{\text{target percentile}} - P_{\text{lower percentile}}}{P_{\text{upper percentile}} - P_{\text{lower percentile}}}$$

Substituting the percentile values:

$$\boldsymbol{F = \frac{66 - 50}{100 - 50} = \frac{16}{50} = 0.32}$$

Then:

$$\boldsymbol{P = 1 + (2 - 1) \times 0.32 = 1.32}$$

Thus, the interpolated threshold is **1.32.**

The threshold (1.32) served as the basis for splitting the dataset into _Low and _High communication groups for statistical comparisons.

Step 2: Threshold Interpretation and Use

- _Low Communication Quality: DICQ ≤ 1.32
- _High Communication Quality: DICQ > 1.32

This categorisation ensures a meaningful comparison of groups in subsequent analyses (e.g., *t*-tests, regressions).

C6. Calculating proportion of knowledge resources (weighted)

The following steps describe how the variable was calculated in R.

Step 1. Defining what is being measured

This measure reflects the proportion of a person's social network that provides *knowledge-based support* (both tacit and explicit), adjusted for the size of their overall network.

For each person ("EGO"), the analysis identifies which of their contacts ("alters") provide **knowledge resources**.

Knowledge resources include:

- **Tacit Knowledge**: know-how or expertise shared informally through personal interaction.
- **Explicit Knowledge**: documented, formal, or codified information shared directly.

In the dataset, each alter is listed as "Name 1" through "Name 6" (or N1-N6). Each response column records which alters provide each type of support. The program first extracts the alter numbers. Then, for each respondent, it creates a combined variable containing all alters who provide *either* tacit or explicit knowledge. This combination is made by taking the union of the two lists, so that duplicates are removed if the same person provides both forms of knowledge. When the program merges the list of people who give tacit knowledge with the list of people who give explicit knowledge, it makes sure that each person (alter) is counted only once, even if they provide both kinds of knowledge. The union function ensures each alter is counted only once. Without it, combining *Tacit Knowledge* (N1 N2) and *Explicit Knowledge* (N2 N3) would produce *N1 N2 N2 N3*, incorrectly suggesting four providers instead of three.

Step 2. Counting how many alters provide knowledge resources

The program then counts how many unique alters appear in the combined string.

Tacit	Explicit	Combined (union)	Count
N1 N2	N2 N3	N1 N2 N3	3

Step 3. Converting the count to a proportion of total network size

The programme divides the number of alters providing knowledge by the total number of alters in that person's network:

$$\frac{\textit{Number of alters providing Tacit or Explicit Knowledge}}{\textit{Total Network Size}}$$

Step 4. Adjusting for network size (weighting)

Because the value of that proportion should also reflect how many total connections the person has, the variable is weighted by the person's network size relative to the six-alter reference:

$$\text{Proportion of knowledge resources (weighted)} = \text{Proportion of knowledge resources} \times (\text{Network Size}/6)$$

Example: Comparing weighted vs unweighted knowledge proportions

Person	**Network size**	**Alters providing knowledge**	**Unweighted proportion (resource count ÷ network size)**	**Weighted (× Network Size / 6)**
Ego A	6	3	3 ÷ 6 = 0.50	0.50 × (6 ÷ 6) = 0.50
Ego B	6	2	2 ÷ 6 = 0.33	0.33 × (6 ÷ 6) = 0.33
Ego C	3	3	3 ÷ 3 = 1.00	1.00 × (3 ÷ 6) = 0.50
Ego D	3	2	2 ÷ 3 = 0.67	0.67 × (3 ÷ 6) = 0.33

Note: In the weighted measure, network size expresses each value relative to the six-alter reference but does not give greater weight to larger networks. Instead, the weighting standardises scores across respondents so that the resulting value represents a normalised proportion of knowledge-providing alters, comparable across different network sizes. This adjustment prevents smaller networks from appearing to have disproportionately high levels of knowledge support.