Platform Protocol Place:

A practice-based study of critical media art practice (2007-2020)

Paul O' Neill BA MA MSc.

Thesis presented for the award of PhD

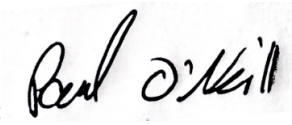
School of Communications, Dublin City University

Supervisor: Dr Trish Morgan

January 2022

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, that I have exercised reasonable care to ensure that the work is original, 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: 

I.D. No: 55823323

Date: 11/01/22

Acknowledgements

This research project would not have been possible without the support of colleagues, friends and family.

I would first like to express my gratitude to my supervisor Doctor Trish Morgan for her never-ending patience, wisdom and guidance. Thanks Trish, I really wouldn't have made it this far without your support and I am eternally grateful.

As a practice-based researcher engaging with many different technologies, I have often benefited from the technical guidance of others. My thanks to Sinead McDonald and James Delaney for their help with the *Greetings from…* project and also to Robbie Collins for his help with *Whois Ireland?,* the ESP8266 microchip and for many inspiring (and often depressing!) tech-art conversations. Thanks also to Lisa Crowne and Andrew Edgar from A4 Sounds for their help with the *Platform Protocol Place* exhibition.

During the lifetime of this research project, I have been fortunate to meet many artists, academics and activists, all of whom have influenced the direction of this thesis in different ways. Thanks to everyone I met at the Freeport summer school in Barcelona in 2018, and to all involved in Nø School Nevers in 2019 - in particular to my former lecturer Benjamin Gaulon for introducing me to the world of tactical media and media archaeology in NCAD over a decade ago.

From Bray to the Lower East Side, to El Raval to Dublin 07 and beyond, I raise a glass to all my wonderfully degenerate friends!

To Èrika, thank you for all the love and support over the past few years - we did it Bonica!

And finally, to my family. My eternal gratitude and love to my mother Dolores, my brother Graham, my sister-in-law Sharon, and my two nephews Jake and Max.

This thesis is dedicated to the memory of my father Anto O' Neill.

Table of Contents

Declaration 2

Acknowledgements 3

Table of Contents 4

List of Figures 8

Abstract 11

Chapter One Introduction 12

1.1 Overview 13

1.2 Research Objectives 13

1.2.1 Key Concepts and Terms 14

1.3 Rationale for the Research 15

1.4 A Practiced-based Methodology 18

1.5 Exhibition and Documentation of Artefacts 20

1.6 Thesis Outline 21

Chapter Two Towards a Digital Culture Industry 25

2.1 Introduction 26

2.2 Platform Protocol Place 26

2.3 Critical Theory and the Culture Industry 27

2.4 The Digital Culture Industry 30

2.4.1 Supply Chains 33

2.4.2 The User Commodity 35

2.4.3 Data Accumulation 37

2.5 The General in the Particular 39

2.6 Conclusion 40

Chapter Three The Art of the Weak **41**

3.1 Introduction **42**

3.2 Media Art Histories **42**

3.2.1 Hacktivism 43

3.3 Defining Tactical Media **45**

3.3.1 The Art of the Weak 49

3.3.2 Situations 52

3.3.3 Developments 56

3.3.4 The Next Five Minutes, NetTime and The Californian Ideology 58

3.4 Dead Capital **60**

3.4.1 Culture Jamming 64

3.5 Decline of Tactical Media **65**

3.6 Conclusion **68**

Chapter Four Tactical Media Archaeology **69**

4.1 Introduction **70**

4.2 Rerelease **70**

4.2.1 Evil Engine 71

4.3 Problematic Progress **73**

4.3.1 A Material World 75

4.3.2 Broken Things 76

4.3.3 Cloudy Circuits 78

4.4 Towards a Tactical Media Archaeology **81**

4.4.1 Excavations 83

4.4.2 Manifestos 85

4.5 We Lost **87**

4.5.1 Common Subversions 90

4.5.2 What Next? 92

4.6.4 Tactical Media Archaeology as Praxis 94

4.7 Conclusion **96**

Chapter Five Platform **97**

5.1 Introduction **98**

5.2 *Act* **100**

5.2.1 Snowden and Surveillance 102

5.2.2 Networked Détournement 103

5.3 *Act*: Exhibition and Reflection **106**

5.4 Embassy **108**

5.4.1 Online Resources 111

5.5 *Embassy*: Exhibition and Reflection **114**

5.6 *Farm* **116**

5.6.1 Reflective processes 118

5.6.2 Slow Computing 121

5.7 *Farm*: Exhibition and Reflection **123**

5.8 Conclusion **124**

Chapter Six Protocol **125**

6.1 Introduction **126**

6.2 *Platform Protocol Place* v.01 ..... **127**

6.2.1 *Captive Audience* v.01 129

6.2.2 Wireless Explorations 131

6.3 Representational Space and Locative Media Art **135**

6.3.1 Visualising and Decentralising 136

6.3.2 Hybrid Strategies 139

6.4 *Platform Protocol Place* v.01 & *Captive Audience* v.01: Exhibition and Reflection **141**

6.5 Whois Ireland? **142**

6.5.1 Freeport 143

6.5.2 Tracerouting 145

6.6 *Whois Ireland?*: Exhibition and Reflection **147**

6.7 Conclusion **149**

Chapter Seven Place **151**

7.1 Introduction **152**

7.2 Dublin Infrastructure Tour **153**

7.2.1 Conceptual Development 154

7.2.2 From Periphery to Core 155

7.2.3 Dublin Will Begin to be Visible 157

7.2.4 Designed by Data 161

7.3 Stage and Stops **166**

7.3.1 Stage One 166

7.3.2 Stage Two 170

7.3.3 Stage Three 175

7.3.4 Stage Four 182

7.3.5 Stage Five 184

7.4. Greetings From… **186**

7.5 Place: Exhibition and Reflection **188**

7.6 Conclusion **189**

Chapter Eight Conclusion **191**

8.1 Introduction **192**

8.2 Key Concepts and Objectives Revisited **192**

8.2.1 Techniques and Practices 193

8.2.2 Compatibility 195

8.2.3 Learning and Sharing 196

8.3 Limitations of the Research **197**

8.4 Original Contribution to the Field **199**

8.5 Future Directions **199**

8.6 Final Comments **200**

Bibliography **202**

List of Figures

Figure 5.1: Passage from the Protect America Act.

Figure 5.2: Passage in Fig.6.1 tweeted by *Act* bot after being passed through natural language algorithm.

Figure 5.3: A screenshot of the *Snowden's Cloak* Twitter bot.

Figure 5.4: Installation view of *Snowden's Cloak* at the '*Performing a Translation'* group exhibition, Ormond Studios, Dublin, May 2017.

Figure 5.5: Extract of python code for *Act.*

Figure 5.6: Installation view of *Act*, *Platform Protocol Place* solo exhibition, A4 Sounds Gallery Dublin 01, January 2021.

Figure 5.7: Installation view (Foreground left & right) of *Embassy - Platform Protocol Place* solo exhibition, A4 Sounds Gallery, Dublin, January 2021.

Figure 5.8: Screengrab of tweeterid.com showing the numerical ID for the US Embassy's Twitter account in Dublin.

Figure 5.9: Installation view (background) of *Farm - Platform Protocol Place* solo exhibition, A4 Sounds Gallery, Dublin 01, January 2021.

Figure 6.1: Installation view (left) *Captive Audience v.01,* (centre) *Platform Protocol Place v.01,* (right) *whois Ireland? - Platform Protocol Place* solo exhibition, A4 Sounds Gallery, Dublin 01, January 2021

Figure 6.2: A screengrab of *Platform Protocol Place v.01.*

Figure 6.3: Anti-Racism protest outside of Google European Headquarters, Barrow Street, Dublin, August 2019.

Figure 6.4: #SpeakersUnicorner Home SSID.

Figure 6.5: Captive Audience - captive portal, opening page.

Figure 6.6: Wardriving rig – Battery pack, GPS, Wi-Fi antennae & Raspberry pi.

Figure 6.7: Map of warwalk through Dublin city centre on April 28th 2018 - a total of 527 Wireless Access points identified.

Figure 6.8: Map of wartram through the north side of Dublin city centre on May 3rd 2018 - a total of 4,332 Wireless Access points identified.

Figure 6.9: Whois Ireland? installation view**.**

Figure 6.10: Mapping Network Topologies workshop, Freeport, Barcelona, June 2018**.**

Figure 6.11: Traceroute to google.com.

Figure 6.12: Traceroute to the website of the Irish government.

Figure 7.1: Ten companies with highest IPv.4 address registration in Ireland.

Figure 7.2: Google data centre in west Dublin.

Figure 7.3: Mark Zuckerberg announces a new Facebook data centre in Meath, Ireland.

Figure 7.4: Google satellite view of various industrial estates in Tallaght, Dublin.

Figure 7.5: An AWS data centre on the corner of Belgard and Airton Roads in Tallaght, Dublin

Figure 7.6: Planning permission application on the fence of an AWS data centre on Greenhills Road, Tallaght, Dublin.

Figure 7.7: Introductory presentation explaining Internet Protocol addresses.

Figure 7.8: A street map of the urban infrastructure and Grand Canal Dock stages of the *Dublin Infrastructure Tour* project.

Figure 7.9: Manhole cover on Pearse Street.

Figure 7.10: Department of Posts & Telegraphs logo.

Figure 7.11: Telephone mast operated by Three Ireland.

Figure 7.12: Telecom Eireann manhole cover.

Figure 7.13: Telecom Eireann logo.

Figure 7.14: Vodafone telephone mast.

Figure 7.15: Virgin (left) and Eircom (right) manhole covers.

Figure 7.16: Eircom logo.

Figure 7.17: Virgin logo.

Figure 7.18: Companies with underground fibre optic cables in Dublin city.

Figure 7.19: Tour stop outside of Facebook's European offices in Dublin.

Figure 7.20: The office on the right is the office of the Irish data protection commissioner in Portarlington.

Figure 7.21: The blue line is the T-50 fibre optic cable (source: esb.ie).

Figure 7.22: AWS data centre, Tallaght, Dublin 24.

Figure 7.23: Tour stop outside of same data centre.

Figure 7.24: AWS Global data centre infrastructure (source: aws.amazon.com).

Figure 7.25: AWS Availability Zones in Dublin.

Figure 7.25: The original *Greetings from…* postcard featuring an aerial view of an AWS data centre in Tallaght.

Figure 7.27: *Greetings from…* & *Greetings from EU West One* installation view.

Figure 7.28: *Greetings from…* installation view.

Figure 7.29: *Greetings from EU West One* installation view.

Abstract

Platform Protocol Place:

A practice-based study of critical media art practice (2007 – 2020)

Paul O' Neill

This practice-based research project focuses on critical media art practices in contemporary digital culture. The theoretical framework employed in this inquiry draws from the work of the Frankfurt School, in particular Theodor Adorno and Max Horkheimer's *The Culture Industry: Enlightenment as Mass Deception*. Using Adorno & Horkheimer's thesis as a theoretical guide, this research project formulates the concept of the *digital culture industry* - a concept that refers to the contemporary era of networked capitalism, an era defined by the unprecedented extraction, accumulation and manipulation of data and the material and digital infrastructures that facilitate it. This concept is used as a framing mechanism that articulates certain techno-political concerns within networked capitalism and responds to them through practice.

The second concept formulated within this research project is *Platform Protocol Place*. The function of this second concept is to frame and outline the body of practice-based work developed in this study. It is also used to make complex technological issues accessible and to communicate these issues through public exhibition and within this written thesis.

The final concept developed in this research project is tactical media archaeology. This concept describes the techniques and approaches employed in the development of the body of practice-based work that are the central focus of this research project. This approach is a synthesis of two subfields of media art practice and theory, tactical media and media archaeology. Through practice, tactical media archaeology critiques the geopolitical machinations and systems beneath the networked devices and interfaces of the digital culture industry.

Chapter One

Introduction

1.1 Overview

This PhD research project is a practice-based inquiry focusing on critical media art practices that engage with the techno-political machinations of networked communications, infrastructures and platforms. With a specific focus on my own practice, this inquiry posits that critical media art practices are conceptually and practically informed by two subfields of media art practice and theory – tactical media and media archaeology. Within this research project, these two subfields are synthesised together and referred to as *tactical media archaeology*. I use this synthesis to describe the set of practical techniques and methods - and the concepts that inform them – employed in my practice and also in the work of other critical media artists between 2007 to 2020.

In January 2020, I exhibited a collection of artworks at A4 Sounds gallery in Dublin. These artefacts are a critical element of this practice-based research project. They were developed using the tactical media archaeology approach mentioned previously and as a response to a series of thematic concerns associated with our current networked era. To identify and engage with these concerns, I have developed a concept which I refer to as the *digital culture industry* and which describes the present era of networked capitalism. I use this concept as framing mechanism with which to focus my practice-based research. This concept is then deconstructed using the theme *platform protocol place* – the artefacts developed in this research project practice are presented and communicated using this thematic division.

1.2 Research Objectives

The primary focus of this research project is to develop a series of artefacts as a method of practice-based inquiry. Through the development and of these artefacts the following objectives are realised:

This thesis examines these objectives as they evolve. They will be implicitly engaged with at various points in the following chapters, and will be explicitly addressed in the final chapter of this thesis.

- To identify the various techniques and approaches used in my practice and situate them within the wider context of critical media art practice.

- To consider the relationship between tactical media and media archaeology asking whether they are compatible forms of practice.

- To reflect on the limitations of tactical media archaeology and critical media art practice within the context of my own practice.

1.2.1 Key Concepts and Terms

The following three concepts are significant components of this research project. I provide a brief overview of them here as a reference for the reader.

The Digital Culture Industry

A concept that refers to the contemporary era of networked capitalism, an era defined by the unprecedented extraction, accumulation and manipulation of data through digital and material networks and infrastructures. This concept is used as a framing mechanism within this research project and allows me to articulate and highlight particular techno-political concerns within networked capitalism and respond to them through practice.

Platform Protocol Place

This is a thematic division of the digital culture industry. It is utilised to frame and outline the body of practice-based work developed in this research project. It is also used to make complex technological issues accessible and to communicate these issues through public exhibition and within this written thesis – each of the three practice-based chapters focus on one part of this thematic division.

Tactical Media Archaeology

A concept that refers to the practical techniques - and concepts that inform them - used in the development of the practice-based work that is central to this research project, and also in the work of other artists working in this field.

The *digital culture industry* and *platform protocol place* are discussed in detail in chapter two and *tactical media archaeology* in chapter four.

Critical media art

The term *critical media art practice* is featured in the title of this research project and it, *critical media art*, and *critical media artist* are used throughout this thesis. They refer to artworks, artists and art practices that critically engage with themes related to the current networked era, including surveillance, data sovereignty and the environmental impacts of information communication technologies. My use of these terms borrows from the work of Michael Dieter and his focus on projects that 'cultivate an antipositivist or problem-based encounter with digital and networked processes' (2014, p.216). I also draw on Nathan Jones' understanding of *critical new media art* which, he argues, operates in methodological and technical fields that overlap with science, technology and activism, focusing on the 'affective intensities of the internet' and turning them into subjects of study (2020, n.p.).Dieter, Jones, and myself are all influenced by Philip Agre's *critical technical practice* which has 'one foot planted in the craft work of design and the other foot planted in the reflexive work of critique' (1997).

As is noted in section 1.4 and throughout chapter four, my practice is similarly rooted in both material and critical processes and reflections. My understanding and use of the term critical media art often overlaps with the concept of tactical media archaeology, and indeed they are similar in meaning. The main difference between them is that tactical media archaeology specifically addresses the practical techniques and methods within art practice to critique the digital culture industry, whereas critical media art can be more broadly understood as being in fundamental ideological opposition to the digital culture industry.

1.3 Rationale for the Research

Whereas the first decade of the 21st Century offered a sense of optimism in relation to the emerging networked technologies and platforms that promised a digital commons of knowledge, connectivity and community through participatory interactions, the subsequent decade suggested that this optimism was at best misplaced. High profile information dumps by WikiLeaks, online actions by Anonymous, and the revelations of the former intelligence analyst and CIA subcontractor Edward Snowden exposed in different ways the vulnerabilities, challenges and consequences of being connected. These vulnerabilities became even more apparent when it was revealed that networked communications were being used to erode

the legitimacy of the democratic process in western democracies. This erosion occurred through data harvesting (Cambridge Analytica), state-led campaigns of online misinformation (the Internet Research Agency), and the emergence online of a new 'alternative' far-right ideology that promoted networked jingoism, targeted minority groups, manipulated vulnerable individuals all of which manifested itself on the streets of Charlottesville,[1] in the voting booths of the US presidential elections of 2016 and 2020, and the Brexit referendum of 2016.

What connects all of the aforementioned events is that they are linked to the networks, platforms and devices that have become an integral part of contemporary life. These devices and platforms, and the connectivity that they enable, are now ubiquitous and have been integrated into our lived experience at almost every conceivable level. From lifestyle apps that monitor and direct our 'wellbeing', to platforms that are designed to encourage us to stay connected and stay consuming. Events such as those mentioned above have moved critical discourses surrounding network technologies from universities, conferences and hacker spaces to the front pages of international media outlets and as trending topics on the platforms from which they originally emerged - a feedback loop and echo chamber all at once. A consequence of this is an increased public awareness that beneath the bright logos and tech utopian mottos of the tech platforms that have emerged over the past two decades, are vast infrastructures that not only connect, but also function as sites of extraction and exploitation, manipulation and marginalisation. We are all connected but we are also all complicit.

Despite this increased critical awareness of the dark side of 'Big Tech', it has done little to impact on the profits and power of these companies - all of them have experienced unprecedented growth in the last decade (Owens, 2019), a growth that has increased during the 2020-2021 Coronavirus pandemic (Ovide, 2021). All of this points to an even greater need for increased awareness and critique surrounding the pitfalls and issues in our interactions with these platforms. Whilst there has been an increased reaction to some of these issues associated with these companies - evident in educational programs surrounding media

[1] In August 2017, a large 'Unite the Right' white supremacist rally was held in Charlottesville which led to violent clashes culminating in the murder of activist Heather Heyer.

literacy and also in more mainstream media formats such as documentaries and television,[2] there is still much to be done.

As is highlighted throughout this thesis, a critical reflection and engagement with the role of networked technology has featured in the work of many critical media art practices since the world wide web emerged in the early 1990s. An example of this can be found in the following extract from an essay written by the artist collective Critical Art Ensemble:

'*Government and corporate surveillance have reached an all-time high. Data bases are overflowing with information about consumers, both in terms of aggregates based on racial and social categories, and in terms of personal portfolios tracing the spending habits of individual consumers*' (1996).

This extract serves as an accurate description of our current networked condition and what I formulate as the digital culture industry in chapter two. However, as noted, this essay was written a quarter of a century ago. A central thread pursued throughout this thesis is that contemporary critical media artists are fundamentally opposed to the neoliberal interpretation of technological progress that is at the centre of the digital culture industry. The technology-based concerns of these artists are the concerns of us all, and as such, critical media art acts as a cultural bellwether for the many complex issues associated with the digital culture industry. They also have the ability to communicate and disseminate these issues to various publics - be that within the gallery space, online, or through different pedagogical or participatory approaches, and as such, are worthy of further study.

The critical position on networked technology taken in this research project should not be construed as a form of neo-luddism or 'techlash'. It is beyond the scope of this research project to highlight the multitude of benefits afforded by networked devices and infrastructures, it is sufficient to acknowledge the impact of the same on health, connectivity and access. However, as discussed above, there are a multitude of reasons to question and

[2] Documentaries such as 'The Great Hack' (2019) and 'The Social Dilemma' (2020) deal with these issues and have attracted significant public attention. Popular television shows such as Silicon Valley (2014 – 2019) which offers a general humorous critique of the tech industry and Mr. Robot (2015 – 2019) which features the multinational conglomerate 'E Corp' as one of its central villains - the power and influence of 'E Corp' make it comparable to any of the Big Tech companies, in particular Amazon.

critically reflect on such progress and innovation and to be suspicious of the dominant narratives surrounding networked technologies. The suggestion is not to 'stop' these companies, whatever that may mean - but rather to cultivate even greater public awareness around the dangers and risks associated with them and regulate accordingly - as has been done previously with the tobacco, alcohol and pharmaceutical industries and to a lesser extent the aviation industry within the context of environmental concerns. The companies and networked operations of Big Tech encroach on all aspects of our lives, enabled by an unassailable form of networked capitalism in which the individual is reduced to a networked commodity form at the expense of tangible and material social networks. Consequently, there is a need for political, cultural and social spaces and actions, both online and offline, that highlight and critique this encroachment whilst suggesting alternative ways in which to engage with Big Tech that protect and empower the user - the body of practice-based work produced during this research project serves as an example of such a critique.

1.4 A Practiced-based Methodology

The main methodology employed in this research project is a practice-based one. My interpretation of practice-based research is informed by Linda Candy's definition which considers it to be an 'original investigation undertaken in order to gain new knowledge partly by means of practice and the outcomes of that practice' (2006). As a practising critical media artist, I work with digital technologies to explore and examine different themes and issues related to contemporary networked culture. I consider these technologies within wider techno-political contexts whilst simultaneously engaging with them through practice. My practice offers new insights into these themes and allows me to communicate issues that resonate with me as an artist. Such an engagement with digital technology is not unique to my own practice. Simon Biggs recognises that media artists engage with new and emerging forms of technology within their respective practices and as a result of this, they are required to conduct research into the new media forms that they use (2009). My practice extends on this, not only do I conduct research into the new media forms employed in my practice, but they also serve as a point of departure to engage with the wider technological systems and networks in which they are situated.

Before starting this PhD project, I had mostly engaged with 'traditional' media software within my practice. I had little experience with coding, physical computing or other approaches which fostered a practical engagement beneath the interfaces and platforms of digital culture. However, as is detailed in chapter four, due to my engagement with various online and offline communities of peer learning and knowledge sharing, my practice began to evolve and expand. This evolution included focusing on programming fundamentals using creative coding languages such as *Processing* and *P5.js*, and on hardware interfaces like Arduino and Raspberry pi. Although often frustratingly unsuccessful in my initial efforts to understand this new world of functions, loops and networked streams, my engagement with these tools offered new possibilities for me as a practice-based researcher.

This idea of creative tools informing and expanding artistic practice is supported by Barbara Bolt who argues that our understanding of the world is as a result of direct experience gained through use and handling (2014). Bolt cites her own practice, highlighting that it is only when she uses brushes and other materials that they begin to reveal their potential (*ibid*.p.2). It is through this process of use that the tools become collaborators in creating an 'open space of possibility' enabled by art (*ibid*.p.2). My early engagements with code and digital materiality cultivated open spaces of possibility within my practice and it was at this point that it moved in a direction that I felt could not be solely realised through proprietary media software or graphical user interfaces. Rather, I was becoming increasing conscious of the world(s) beneath these screens.

Using an expanded set of tools that engaged with code and the materiality of digital artefacts encouraged me to reflect on, not just the technical processes upon which networked culture operates, but also on the social, cultural and political factors that inform, and are informed by, these processes. At this point, I realised that bringing my practice into this research project would allow me to critically engage with dominant narratives related to technological systems and networks, echoing Cox & Soon's position of using 'aesthetic programming' as a way to 'question existing technological paradigms and further create changes in the technical system' (2020, p.14). My practice has also been influenced by two fields of media art, tactical media and media archaeology. Both of these fields embrace a critical engagement with networked culture through technological experimentation and expression. This approach overlaps with critical theory and its emphasis on identifying and challenging dominant power

structures. As is detailed in the following chapters, this combination of practical experimentation and theoretical engagement has allowed me to develop a practice-based methodological approach that is eminently suited to this research project.

1.5 Exhibition and Documentation of Artefacts

As previously noted in this chapter, in January 2020 I held a solo exhibition of my work in A4 Sounds Gallery, Dublin. The body of work exhibited consisted of nine artefacts and interventions that were developed during the course of this research project. These artefacts are examples of the tactical media archaeological approach employed in my practice and are an integral part of this research project. In order to provide the reader with the most encompassing understanding of these artefacts and their centrality to this project, their documentation within this submission takes two forms.

The first is in the accompanying folder that accompanies this written thesis. This folder, entitled, *Platform Protocol Place Documentation*, contains a series of short videos pieces focusing on each artefact individually. These videos contain visual documentation of the respective artefact and also audio commentary that explains the conceptual rationale behind the work and the technical processes involved in its development. It is recommended that the reader watches these videos before engaging with chapters two to seven of this thesis. Accompanying each of these videos are a series of related assets that further illuminate the practice-based artefacts and include examples of code, audio files, and demonstration videos and sources. To access and navigate these materials please refer to *000 Documentation Overview.pdf* contained within the *Platform Protocol Place Documentation* folder. Whilst documentation is not the same as experiencing the work first hand, these materials provide the reader with a more informed and nuanced understanding of these artefacts and their importance to this research project.

The second form in which these artefacts are documented within this research project is through this written thesis. Chapters two, three and four of this research project outline the theoretical concerns of this research project allowing me outline the key concept of tactical media archaeology. Chapters five, six and seven are practice-based chapters, each one focusing on an individual part of the *platform protocol place* theme. These chapters document the body of work produced using the tactical media approach. Broadly speaking, each chapter

contains an overview of each individual artefact, which is then situated within wider techno-political and critical media art discourses. This is followed by a final reflection on the artefact, including its conceptualisation and inclusion within the exhibition. Here I return to Linda Candy's definition of practice-based research which acknowledges that the significance and claims of originality and contribution to knowledge by practice are described in words. These practice-based chapters allow me to provide context to the artefacts and to their conceptual and practical evolution, whilst elucidating as to how research has informed practice (Elkin, 2002).

The structure and format of this written thesis, and the decision to complete the written component of the thesis after the exhibition should not imply a hierarchy that prioritises the written thesis over the artefacts. The decision to exhibit and then write up was partly influenced by external timelines and considerations, but also as a consequence of the way my own practice evolves – I develop the artworks whilst reflecting on their processes and outcomes during and after their production. Whilst the written thesis provides context to the practice, it is the practice itself that is the most integral part of this research project.

1.6 Thesis Outline

Chapter two outlines the concept of the digital culture industry and the related theme platform protocol place. It begins with a brief outline of the platform protocol place theme and then of the Frankfurt School's interpretation of critical theory with a particular focus on Theodor Adorno & Max Horkheimer's thesis *The Culture Industry: Enlightenment as Mass Deception*. The chapter continues with the introduction and definition of the digital culture industry concept. This concept is further detailed in the following sections which focus on various key components of networked capitalism including global supply chains and mass data extraction. This chapter concludes by situating both the digital culture industry concept and the platform protocol place theme within the context of practice-based research.

Chapter three provides an overview of the practical and conceptual development of tactical media and in doing so demonstrates its influence on contemporary critical media art practices including my own. The chapter begins by situating tactical media within two distinct fields of technological experimentation and expression, media art and hacktivism. This is then followed by an overview of the work of prominent media theorists on tactical media in order

to establish a working definition for this research project. Having established this definition the theoretical origins of tactical media are outlined through an engagement with the work of Michel de Certeau and also the Situationist International. These theoretical origins are then used to analyse what I refer to as the first wave of tactical media which begins in the early 1990s and declines in the early 2000s - the chapter concludes with an overview of the reasons for the decline of this first wave.

Chapter four introduces the concept of media archaeology as an integral part of this research project. The chapter begins with an overview of the work of the Free Art and Technology Lab. This overview establishes that not only were the FAT lab engaging in tactical media practices but also a variation of media archaeology. The diverse nature of media archaeology is then examined through the work of Siegfried Zielinski, Friedrich Kittler and Wolfgang Ernst. This examination is further expanded on using Jussi Parikka and Garnet Hertzs' interpretation of media archaeology as an art method. It is from this interpretation that the concept of *tactical media archaeology* is formulated - examples of which are provided through the work of various artistic practices and literature that I suggest incorporate such an approach. This is followed by a discussion on the issues surrounding this concept and of critical media art practices in general - concerns that are subsequently addressed in the final section of this chapter which situates tactical media archaeology within the context of my practice, as a form of praxis through its combination of theory, practice and pedagogy.

Chapter five is the first of three practice-based chapters within this thesis. These practice-based chapters are all underpinned by the concept of the digital culture industry as outlined in chapter two. Chapter fice engages with the conceptual theme of *Platform* and starts with an overview of the project *Act* – an online/offline networked intervention on the social media platform, Twitter. This overview situates *Act* within the wider canon of critical media art practices that emerged in response to the disclosures made by Edward Snowden in 2013 and also as a project that practically evolved from earlier versions which themselves were developed through the appropriation and remix of pre-existing coding projects. The second artefact produced through the conceptual lens of *Platform* is then analysed through both its technical and theoretical evolution – an evolution that positions the work as a form of imaginary media that critically engages with the concept of 'new' in relation to media technologies. The chapter concludes with an analysis of *Farm* – the final piece developed

through the first of the three themes employed in both the research project and exhibition. This analysis situates *Farm* as a work that serves as a critique of hyper- algorithmic media consumption influenced by the ideas of refusal and the 'slow' movement as legitimate forms of protest and resistance.

Chapter six is the second practice-based chapter and engages with the theme of *Protocol*. As with the previous chapter, it contains an overview of three artworks and interventions developed during the course of this research project. The first two artworks - *Platform Protocol Place v.01* and *Captive Audience v.01* - are interventions that occur over local area networks by engaging with the IEEE 802.11 Wi-FI protocol standards. The chapter begins with a brief description of both projects individually before situating them within a wider analysis of critical interventions of the wireless space. This analysis engages with Henri Lefebvre's idea of hegemonic space, locative media art and is further complimented by various reflections on the development of these two projects through various practices and ideas that I suggest are an example of a tactical media archaeological approach including wardriving, critical cartography, the idea of the exploit and decentralised and community orientated communication networks.

The second part of this chapter focuses on a project entitled *Whois Ireland?* which engages with the technical protocols involved in Internet governance. The analysis of this project includes an overview of its evolution by utilising basic networking techniques and tools such as tracerouting and the whois directory as creative methods of practice-based inquiry. The chapter concludes with an overview of various artistic practices that investigate and map techno-political infrastructures, practices that are not only relevant to the *Whois Ireland?* piece but also to the subsequent body or work documented in the final practice–based chapter.

Chapter seven is the final practice-based chapter in this thesis, engaging with the theme of *Place*. The artefacts documented and analysed in this chapter differ from the previous two chapters which clearly delineate between each individual project. The same approach is not employed for this chapter, as the first 'artefact' is not an artefact per se but a project entitled *Dublin Infrastructure Tour*. This project is a series of ongoing physical and online walking tours that began in 2018. Although the other two projects in this chapter, *Greetings from*… and

Greetings from EU West One are artefact based, they are a conceptual and practical extension of *Dublin Infrastructure Tour* project. The chapter begins with an overview of the conceptual development of *Dublin Infrastructure Tour* connecting it to the *Whois Ireland?* project documented in the previous chapter. This is followed by an overview of Ireland's relationship with the many tech companies currently based in the country, which in turn is followed by a discussion on the use of walking as a method of intervention and inquiry within the context of contemporary art practice. The walking tour is then broken into five distinct stages which are then individually described and documented. The final section of this chapter describes the development of the *Greetings from…* projects, which are then considered within the context of the *Platform Protocol Place* theme and exhibition.

Chapter eight is the final chapter in this thesis. It begins by reprising and reflecting on the research concepts and objectives outlined in section 1.2. This is followed by an analysis of the limitations of this research project and then of the original contribution it makes to contemporary media art practice and theory. There is then a discussion on the potential future directions of this research, a discussion that focuses on each artefact individually and then on the research project as a whole. This chapter concludes with some final comments and reflections.

Chapter Two

Towards a Digital Culture Industry

2.1 Introduction

This chapter outlines the concept of the *digital culture industry* and the related theme *platform protocol place*, both of which are central points of focus for the artefacts developed during this research project. The chapter begins with a brief explanation of the *platform protocol place* theme and how it is employed to frame and communicate the concerns of my practice. This is then followed by an overview of the critical theory employed by the Frankfurt School with a specific focus on the Theodor Adorno & Max Horkheimer's thesis *The Culture Industry: Enlightenment as Mass Deception*. This overview establishes that critical theory and *The Culture Industry* thesis have provided a theoretical framework in which to situate and evolve my practice within the context of this study.

This evolution is evident in the following section which details the concept of the digital culture industry - a concept used in this research project to express some of the key concerns of networked culture that are the focus of my practice. This section allows me to state these concerns and elaborate on themes related to networked capitalism and Big Tech. The following three sections highlight key issues of the digital culture industry, specifically the material supply chains of networked capitalism, the user as a commodity form and the unprecedented accumulation of personal data in our current era. The final section of this chapters situates both the digital culture industry concept and the platform protocol place theme within the context of practice-based research.

2.2 Platform Protocol Place

As noted in the previous chapter, in January 2020 I held an exhibition of the practice-based artefacts produced during this research project. These artefacts were developed using a tactical media archaeological approach and responded thematically to the exhibition title, *platform protocol place*. The concept of tactical media archaeology and the artefacts themselves are the focus of chapters three through seven. This chapter is concerned with how the theme of the exhibition and the practice-based research have been conceptually framed. This framing process did not occur instantaneously. It evolved in tandem with my creative practice and at different points throughout this research project. The theme is an analytical construct that demonstrates a logic of my own making, and has been determined and finalised retroactively (Griffiths, 2011). More detailed individual explanations for

platform protocol place are provided in chapters five, six and seven respectively, but for now these three components can be understood as:

- The dominant tech platforms of our networked era.
- The technical and political protocols that regulate networked communications.
- The physical and material places and infrastructures of contemporary digital culture.

The *Platform Protocol Place* theme is a deconstruction of a concept I refer to as the digital culture industry. This concept is used in this research project as a way for me - as a media artist working with networked technologies - to interpret and articulate the techno-political concerns of contemporary networked culture as I perceive them within my own practice. It is a concept that I have developed in order to focus my practice on the tensions between the algorithms and artefacts of networked technology, those who use them and those who control them. The artefacts produced in this research project are my response to this concept and to these tensions.

As with the *platform protocol place* theme, the digital culture industry concept has evolved through my practice, and also through an engagement with a canon of literature that draws from art theory, media studies, the digital humanities, science and technology studies and other related fields. This engagement was informed by my role as an artist – scholar within an academic setting as noted in the previous chapter. The naming of this concept is in reference to Theodore Adorno and Max Horkheimer's thesis *The Culture Industry*: *Enlightenment as Mass Deception*, which, along with the critical theory that it is situated in, was central to my conceptualisation of the digital culture industry.

2.3 Critical Theory and the Culture Industry

Theodor Adorno & Max Horkheimer were members of the Frankfurt School - the name used to describe the group of intellectuals affiliated with the Institute of Social Research - a research organisation founded in 1923 at Goethe University in Frankfurt. The Institute of Social Research developed a critical theory based on a Marxist influenced reading of social theory. Critical theory utilises the fields of sociology, social psychology, philosophy and political economy to analyse the post-industrial societies of the 20th Century (Marris, 1997).

The Frankfurt School's interpretation of critical theory has three distinct features: it is intrinsically emancipatory, it is a specific form of knowledge, and in contrast to the objectivity of theories within the natural sciences, critical theory is inherently reflective (Geuss, 1981). As such, critical theory is a reflective theory that provides those who engage with it a form of knowledge 'inherently productive of enlightenment and emancipation' (*ibid*.p.2).

As a theoretical framework, critical theory is itself dialectical, meaning that its development is built upon previous contributions and developments (Fuchs, 2016). It has the capacity and depth to engage with, and assimilate, a broad range of intellectual positions and perspectives, it is 'not a closed universe, but an open endeavour that cross-references other critical approaches' (*ibid.*p.3). As is detailed in section 1.4, my interpretation of practice-based research is a process of engaging with networked technologies both materially and conceptually, and continuously reflecting on this process. It is this reflective approach that makes critical theory a suitable tool for a practice-based analysis of contemporary networked culture. This is a culture that is both material and immaterial, permanent yet ephemeral, and which provides tools to build new networks and communities whilst simultaneously exacerbating tensions within pre-existing ones, and in doing so, compounds the experience of alienation for the user.

Adorno & Horkheimer's thesis *The Culture Industry: Enlightenment as Mass Deception* details how, as a result of the development of mass media technologies (television, radio and magazines), culture has been reduced to a commodity form in the interests of capital (Spier,2016). This has lead to the production of cultural goods devoid of autonomy and the appropriation of organic popular culture, reducing the aesthetic to a function of the creative object as a commodity form (*ibid*.p.391). For Adorno & Horkheimer, culture has been commodified, the profits from its exchange-value have dominated any cultural use-values (1947/2020, cited in Fuchs, p.54). The culture industry is a representation of the knowledge that a capitalist society needs to have of itself in order to set the parameters for all the concrete activities that occur within it, and in doing so, it fosters theoretical synchronization between production and consumption (Lotz, 2018).

According to Adorno & Horkheimer, 'all mass culture under monopoly is identical' (2006, p.42). Within the culture industry, culture is defined by its sameness, repetition, and as being

a means to an end – that end being the reinforcement of the dominant ideology. As a consequence of its commodification, culture has lost its critical potential (Adorno & Horkeimer, p.24). The industrialisation of culture occurs as a result of the development of mass media technologies, specifically radio, cinema and print. These technologies are not operating in isolation within a capitalist system and are economically interdependent with other dominant industries within society – all of which are ultimately controlled by the ruling elite and as such, media technologies are used to promote ideology and exercise control.

The Culture Industry has been criticised for its pessimistic and elitist tone.[3] Bernard Miège challenges Adorno & Horkheimer's attachment to 'pre-industrial forms of cultural production' (cited in Hesmondalgh, 2013, p.25), arguing that although industrialisation and the development of new technologies for cultural production contribute to commodification, they also lead to new innovations and creativity (*ibid*.p.25). As such, the process of commodification is more complex and nuanced than Adorno & Horkheimer allow for in their analysis (*ibid*.p.25). This analysis implies that culture has already been subsumed by capital, a flawed assessment as the encroachment of capitalism into the realm of culture is incomplete, and as such, this is a location of ongoing and contested struggle (*ibid*.p.25). There is merit in Miège's criticisms. Adorno & Horkheimer ignore the potential benefits of emerging media forms and are elitist in their understanding of what constitutes culture - indirectly acting as gatekeepers to what they perceive as 'high' culture, and in doing so, revealing themselves to be out of sync and touch with a rapidly modernising world. However, whilst their views of culture are elitist, the *Culture Industry* does recognise how the commodification of cultural forms through emerging media technologies may be used to promote and reinforce dominant ideologies.

Robert E. Babe laments that Adorno & Horkheimer did not extend their analysis of the culture industry to include broader systems of economic and political power (2013). For the benefit of my own practice, I extend this analysis within the context of contemporary networked culture as way of acknowledging the dominance of tech platforms who, as is discussed in chapter four, promote and reinforce dominant narratives and ideologies focused on

[3] Christian Fuchs' *Critical Theory of Communication* provides a list of intellectuals who are critical of the analysis of culture offered by Adorno & Horkheimer (2016, pp.76-77).

unquestionable technological progress and solutionism.The industrialisation of culture has been superseded by hyper-mediated industrialisation built upon algorithms and a perpetually expanding network of connectivity and information. However, this process is still incomplete and remains a site of contested struggle. *The Culture Industry* thesis has guided my own practice by offering insights into how to engage and disentangle with this hyper-mediated industrialisation by establishing the relationship between networked culture, technology and ideology, and the ongoing struggles that emerge from this relationship.

2.4 The Digital Culture Industry

Adorno & Horkheimer's thesis emphasises the manipulation and exploitation of the masses through the passive consumption of commodified culture forms. For the purpose of this research project, I use the term the *digital culture industry* to reference the processes of manipulation and exploitation of the user within our present networked society through the extraction of personal data.[4] Although the reasons for this process remain the same as when Adorno & Horkheimer focused on media technologies - social control as a means to realise the acquisition of capital and/or the consolidation of power - the methods employed have, mirroring the communications technologies that they engage with, evolved into a cycle of participation, extraction and manipulation.

This process occurs not only at the user level, but the digital culture industry operates on different levels and through multiple platforms. It is the content that we consume, the networked devices through which we consume it and the commodification of both of these processes. It is also beneath the interfaces of networked devices - borrowing from Christian Fuchs' analysis of digital labour, the digital culture industry is evident in the extraction of rare earth materials, in the manufacturing and assembly of networked devices in factories of the global south, in the call centres of India and also in the product design and software engineering that takes places in Silicon Valley and other sites of economic power (2013). It is also in the global infrastructures of data centres and fibre optic cables that serve as the backbone of the internet and in the corporate tech hubs of Dublin, London, Tel Aviv and elsewhere.

[4] See *The Rise of the Network Society* (Castells, 2009).

The digital culture industry is inherently political and also encroaches on *the political*, as Langdon Winner observes, 'it is no surprise to learn that technical systems of various kinds are deeply interwoven in the conditions of modern politics' (1980, p.122). James Bridle addresses the consequences of this entwinement arguing that 'technology is political. Everything is political. If you cannot perceive the politics, the politics are being done to you' (2013, n.p). From the manipulation of the democratic process through the services of data analytics companies to the unprecedented levels of mass surveillance enabled by the collusion between tech platforms and state actors,[5] events over the past decade have shown that networked technologies can be utilised to reinforce and achieve dominant ideological positons and goals. The digital culture industry allows ruling elites to engage with networked capitalism to set and disseminate their political agenda, as Colakides *et al*., observe, 'it is those who control the algorithms who have the power to influence public opinion today' (2018, p.8).

My use of the phrase 'ruling elites' is purposely broad and can be interpreted to mean political actors, non-state actors or corporate entities who utilise networked technologies to achieve political or economic objectives. Within the context of my own practice, my primary focus is on the corporate entities that are most commonly associated with 'Big Tech' and whom constitute the GAFAM acronym – Google, Amazon, Facebook, Apple and Microsoft. It is these companies that have come to define networked capitalism. I consider networked capitalism to be a continuation of neoliberalism, characterised by economic liberalisation and deregulation, increased global corporate production and distribution methods, and technological development that removes any impediments to the global trade of goods and services and the hypermobility of capital (Önis & Ayasan, 2000).

My understanding of networked capitalism draws from three related interpretations of digital capitalism. The first is Jodi Dean's 'communicative capitalism', which acknowledges the ability of information communication technologies to foster democratic values whilst simultaneously being used as tools of exploitation and manipulation (2009). The second is

[5] See 'NSA Files: Decoded What the revelation mean to you' (MacAskill & Dance, 2013), '50 million Facebook profiles harvested for Cambridge Analytica in major data breach' (Cadwalladr & Graham-Harrison, 2018) and 'Update: Russian interference in the 2016 US presidential election' (blog.twitter.com, 2017).

‘platform capitalism’ which focuses on the extraction and monetization of data (Srnicek, 2016). Finally, I draw on Shoshanna Zuboff’s concept of ‘surveillance capitalism’ - the unprecedented convergence of freedom and knowledge and the commodification of personal data by the companies of Big Tech, a process that ‘works to accelerate the asymmetry of power between surveillance capitalists and the societies in which they operate’ (2019, p.1071)

There are of course many other entities within the digital culture industry. The social media platform Twitter is used in the development of a significant body of practice-based work within this research project. As is discussed in chapter five, I take a certain amount of creative licence in this instance due to technical accessibility of this platform, but also an acknowledgement of the ability of Twitter to shape and influence significant global political events. However, it is the GAFAM companies who are most responsible for the current centralised model of the internet and world wide web. They have the most control over our shared digital spaces and have accumulated unprecedented economic strength and influence over the past two decades, as Nikos Smyrnaios notes, it is the GAFAM oligopoly ‘that governs the information heart of our societies’ (2018, p.4).

Adorno & Horkheimer argue that in comparison to industrial sectors that produce steel, electricity and chemicals, culture monopolies are ‘weak and dependent’ (2006, p.43). To maintain their economic interests within society, they are obliged to ‘keep in with the true wielders of power (*ibid.*p.43). This dependency of the mass media on supporting financial or utility-based services and industries consolidates the culture industry within the capitalist system and in doing so, the ‘relentless unity of the culture industry bears witness to the emergent unity of politics’ (*ibid*.p.43). Within the context of ‘traditional’ mass media formats, this logic is still apparent – the susceptibility of news networks to external economic elements becomes apparent when advertisers threaten to boycott them, television stations such as Fox News leaves us in no doubt about the lack of political impartiality, apparent also in the coveted support of the Murdoch Empire by whoever resides, or wishes to reside in Downing Street. In the context of Hollywood, any number of ‘blockbusters’ reinforce post 9/11 concepts of the ‘other’ or in literature through the ‘heroic’ endeavours of Jason Bourne, Jack Reacher and so on.

However, the companies of Big Tech are less beholden to advertisers or governments. To understand the digital culture industry is not just to be concerned with the content that appears on timelines or newsfeeds, but also to focus on the physical, economic and political infrastructures that these platforms engage with, and due to their scale, often create. The scope and operations of these companies continue to expand into diverse and at times controversial areas - from the development of subsea infrastructures, to a new space race fuelled as much by ego as liquid oxygen, to ongoing engagements with military research and development[6] and in doing so, brings to mind Adorno & Horkheimer's comment that technical rationality is the 'rationality of domination' (2006, p.42).

2.4.1 Supply Chains

This domination occurs through a relentless process of extraction that occurs in both digital and physical worlds. Anna Tsing defines supply chain capitalism as the various processes in which 'the autonomy of component enterprises is legally established even as the enterprises are disciplined within the chain as a whole' (2009, p.148). Supply chains contribute towards international standardisation practices whilst simultaneously aggravating the inequalities between the global North and South, partly through the mobilization of labour which is built upon pre-existing systems of 'patriarchy, colonialism, war, racism and imprisonment' (*ibid*.pp.149- 151). Supply chains capitalism allows us to engage with the "bigness'" of global capitalism through the analysis of successful corporate entities *(ibid*.p.150). Imagery from these entities are often used as representations of the capital-labour relationship (*ibid*.p.154) and serve as templates for corporate practices, influence 'business literatures', stimulate national and transnational policy and regulations, and in doing so, allow us to imagine 'the size, spread, and generality of capitalism' (p.154).

David Harvey argues that there is an inherent tension within capitalism 'between monopoly and competition, between centralisation and decentralisation of economic power' (1992, p.159). This has meant that capital has become organised through geographical mobility,

[6] Chapter seven discusses both subsea cables and the military connections of Big tech within the context of Amazon Web Services, see also 'Nasa picks Bezos's Blue Origin and Musk's SpaceX to build new lunar landers (Clark, 2020) and 'Aqua Comms plans Havfrue, transatlantic cable network funded by Facebook, Google' (Dawn-Hiscox, 2018).

flexibility in relation to labour and consumer markets and innovations in technology, and in institutions and products (*ibid.*p.159). The organisation of capital into efficient and profit-maximising supply chains is enabled by logistics. Deborah Cowen claims that the development of logistics, from its military origins to a business science, was a revolution in the 'calculation and organization of economic space' (2014, p.23). It is dependent on the most efficient movement of capital and goods, which as both Cowen and Harvey acknowledge, draws from Marx's work on speed and mobility in relation to capital (ibid.24-25). Mezzadra & Nielson interpret Marx's main argument as being that production within a capitalist system must reduce the 'circulatory time of capital as much as possible' to turn surplus-value into profit (p.150, 2019). From this perspective, logistical efficiency is a critical part of the maximization of capital and is a vital part of the production process itself (*ibid.* p.150).

The infrastructures of logistics that enable the swift and efficient movement of labour, commodities and data through international supply chains are regulated and managed by locational media and software (Rossiter, 2016). These information and communication technologies are significant forces in the production of 'subject and economy', in that their main function is to extract value through labour and supply chain optimization (*ibid*.p.xv). Rossiter argues that whereas infrastructures make worlds, logistics govern them (ibid.p.xv), and the 'algorithmic architectures' of logistical media are central to both logistical operations and global-service based markets (ibid.p.19).

In his analysis of the relationship between labour-power and the value of products, Karl Marx refers to the commodity as a 'mysterious thing' (Tucker, 1978, p.320). Commodities are even more mysterious when they are networked. Networked devices are simultaneously material and immaterial, everything that makes a networked device a 'thing', can be held and felt in one's hand, yet everything that makes it 'smart' is invisible and untouchable. The supply chains that produce these devices and the tech platforms that engage with them are intrinsically linked to exploitation and extraction. The companies of the digital culture industry contribute to the adverse conditions of networked capitalism, however, it should also be stated that these conditions did not exist in a vacuum – the global supply chains associated with Big Tech reinforce and exasperate the conditions created by capitalism as opposed to creating them.

2.4.2 The User Commodity

The material concerns associated with the global supply chains of Big Tech are one set of extractive practices that I associate with the digital culture industry. Above the interface is another set dependent on the extraction and monetization of user data. This extraction occurs in a multitude of ways and forms by different actors – from data brokers compiling personal profiles to states utilising advances in surveillance technologies such as facial recognition to monitor its citizens. However, most personal data accumulated within the digital culture industry is done so through the networked devices that have become a central part of our professional and personal lives – the 'applification' of the everyday has seen proliferation of lifestyle, games, news and utility apps all providing services in exchange for some form of data extraction. However, it is social media apps and more specifically the companies that operate them, that are the most pervasive and effective in both targeted advertising and data extraction.

In his analysis of the economic function of mass media communications and their related institutions within capitalism, Dallas Walker Smythe argues that the activities of these institutions such as advertising, market research, public relation and product design are 'intimately connected' with 'consumer consciousness, needs, leisure time use, commodity fetishism, work and alienation' (1977, p.1). Smythe states that the audience is the 'commodity form of mass-produced advertiser-supported communications under monopoly capitalism' (ibid.p.3) and outlines a cycle of consumption and production in which the audience performs both tasks. Smythe suggests that for most of the population all 'non-sleeping time' is work time and is focused on the production of 'commodities-in-general', and in the 'production and reproduction of labour power' (*ibid*.p.3). The rest of the non-sleeping time is 'off-the-job' work time which is sold by the mass media to advertisers (*ibid*.p.3). Employing Marx's concept of Base and Superstructure in which, as a result of the totality of the relations of production, the foundational base of society is wholly economic, and upon which rests the legal and political superstructure (Marx, 1978, p.4), Smythe argues that the audience commodity is the integration of superstructure and base as economic forces of capitalism -the base interacts with the superstructure by buying audiences to complete the marketing of consumer goods and services (*ibid*.p.20).

The consciousness industry – a term originally coined by Hans Magnus Enzensberger to explain the exploitation of the consumer through the manipulation of their consciousness (1980) - produces three different types of alienation for members of the audience commodity. The first is alienation from the result of their own work. Next is the alienation from commodities-in-general which the audience markets to themselves, and then finally, there is the audience's alienation from their own labour power which they produce and reproduce to themselves and their children (*ibid*.p.20). For Smythe, this is the primary focus of the mass media, not the promotion or reproduction of dominant ideologies but in creating the audience as a commodity form for them to be sold to advertisers (Murdock,1978, pp.110-111). As a consequence of their exposure to the mass media, audiences learn to buy the goods that are advertised to them, which completes the cycle of production and consumption whilst simultaneously reproducing labour power through the relaxation and replacement of energy afforded by consumption (*ibid*.p.111).

Graham Murdock critiques Smythe for underestimating the role and importance of the state in contemporary capitalism (*ibid*.pp.111-113), a lack of awareness about the independent role of media content in the reproduction of dominant ideologies, and how he presents the operations of mass communications as running relatively smoothly without issue (*ibid*.pp.113 - 114). David Hesmondalagh argues that Smythe's account is 'crude, reductionist and functionalist' and underestimates contradiction and struggle in capitalism (2010, p.280), whereas Sut Jhally suggests that Smythe's conceptualisation of the audience commodity is too general (2006). Despite these criticisms, the audience commodity is a useful framework in which to engage with the digital culture industry, as Christian Fuchs - paraphrasing Smythe – observes, 'most online time is advertising time' (2012, p.712).

The online audience commodity form that has emerged over the past two decades differs from Smythe's audience commodity as online media forms contain user-generated content (Fuchs, 2010). Whereas TV and Radio are centralised media forms, the internet's decentralised model facilitates the communication required for the production of user-generated content (*ibid*.p.192). The decentralised model of the internet, along with advancements and convergence in media technologies – most obviously smartphones with their ability to record images and upload to platforms such as Facebook and Instagram -has led to a dramatic increase in user-generated content, all of which as Mark Andrejevic

observes, blurs the distinction between the consumer and producer (2012, p.73). This of course brings to mind the *prosumer* - a term first used by futurist Alvin Toffler to describe somebody who both produces and consumes (1980). Tiziana Terranova warns that the erosion of boundaries between work and culture that have arisen as a result of the internet, does not 'signal the recomposition of the alienated Marxist worker' (p.35, 2000). According to Christian Fuchs, users of social media are 'double objects of commodification' (2012, p.712) First, as a result of the commodification process that occurs through being online, followed then by the commodification that occurs due to the users' exposure to online advertising (*ibid*. p.712).

2.4.3 Data Accumulation

As previously noted, data extraction and online advertising are central to social media's economic modus operandi. Christian Fuchs suggests that the capital accumulation models that corporate social media actors employ are exploitative of the unpaid labour of internet users (*ibid.*p.734). This exploitation manifests itself in three different ways (*ibid.* p.708). First, they are coercive - users are forced into using these platforms, by not using them their ability to communicate and maintain social relations is negatively affected. Second, they are alienating – users do not own the platforms nor the profit that is generated through their interactions with the platform. Finally, the capital accumulation models appropriate the data generated by users in their interactions on social media platforms, it is then sold to third party advertisers (2012, p. 708). Capital accumulation also occurs through targeted advertising and economic surveillance (*ibid* p.734) – this accumulation is facilitated through the wholesale extraction of personal data.

Writing in 2004, Cox *et al.,* argue that the pervasiveness of networked technologies has contributed to an erosion of the boundaries between high art, mass culture and the economy (2004). This has led to new forms of cultural production that are inherently contradictory – digital technologies are utilised for 'resistant strategies', all the while being in the service of capital (*ibid.*p.2). Almost two decades later and this dialectical tension is even more acute, from Tahir Square in 2011 to Hong Kong in 2019, networked technologies have facilitated resistance in the form of political protest and dissent, whilst simultaneously used as a tool for

surveillance.[7] As outlined in the previous section, a key feature of networked capitalism in the 21st Century focuses on the accumulation of user-based data - this accumulation is based upon the extraction of data as raw material, with the activities of platform users serving as its natural source (Srnicek, 2017, pp.53-54).

This unprecedented accumulation of data is enabled by the operations of tech platforms which aside from their other operations, function as an 'extractive apparatus for data', positioned to accumulate data from everything from natural and production-based processes, to other businesses and users (*ibid*.p.63). As outlined in section 2.4 within the context of the political sphere, this acquisition of user data is often unethical and in violation of user's data rights - the European Union's General Data Protection Regulation (GDPR) serves as an acknowledgement of the necessity to define and safeguard these rights for the citizen-user.[8] This acquisition process usually begins with the user assenting to some form of implied consent in relation to data, via a terms and conditions option. The complexity of these options are usually prohibitive and does not realistically facilitate the 'shared understanding' that is required under data protection laws (Lugar *et al.,* 2013, p.2695). Once the consent door has been unlocked, the process of commodifying all actions of the user begins. This process occurs through two different iterations of the platform within the context of the digital culture industry – the interface through which the user engages with, and through the extraction and manipulation carried out by the tech platform itself. The analysis of consumers to compile predictability models is of course nothing new. In the *Culture Industry* thesis, Adorno & Horkheimer describe the statistical analysis conducted on consumers, arguing that it is 'indistinguishable from political propaganda' (p.43, 2006), they also highlight the potential for bias in data analysis when they claim that 'ideology hides in probability calculations' (ibid. p.57). What is different now is the amount of data being accumulated, and how that accumulation occurs.

The digital culture industry may, to a certain extent, be user-generated, but it is built upon a 'cycle of manipulation and retroactive need' (Adorno & Horkheimer,2006, p.42) that further entrenches the user within the platform(s) they use, whilst simultaneously alienating them

[7] There is a discussion on networked protests movements in chapter three.
[8] A set of regulations passed into EU law in 2018 to safeguard the data and privacy of EU citizens.

from the commodity form that they produce - data. Reification occurs through the language and symbols that define this industry, 'likes', 'tweets' and 'the cloud', as such actions and concepts are examples of human activity being 'fragmented and reconstructed' based on rational models of efficiency under capitalism (Jameson, 1979, p.130). It is essentially mistaking social relations for things (Lukács, cited in Feenberg, 2015, p.490). We are classified and quantified by the companies that dominate this industry. Our collective human experiences utilized as 'free raw material for translation into behavioural data' (Zuboff, 2019, p.14) and sold to third parties, shared with state and non-state actors, or fed back into another algorithm to give us what we want - or what an algorithm determines we want - all to 'impress the omnipotence of capital' (Adorno & Horkheimer, 2006, p.44).

2.5 The General in the Particular

The digital culture industry concept and its thematic deconstruction *platform protocol place* are purposely broad. The intention is for them not to convey the complexities of networked capitalism or society, but rather to allow me to establish some of the key concerns that are central to my practice, and respond to them again through practice. Practice is an integral part of this thesis and has determined the direction of the research at all times. However, my practice does not operate in isolation, but rather in conjunction with a process of theory, analysis and reflexivity. Critical theory facilitates my approach to practice-based research on digital culture, as David Berry notes, it has always engaged with the many issues raised by technology (Berry, 2014).

Platform Protocol Place is not the only instance of our current networked era being deconstructed into conceptual layers or themes. In his analysis of planetary scaled computation, Benjamin Bratton divides the 'Stack' into six distinct layers -Earth, Cloud, City, Address, Interface, and the User, as a way to not only map political geography, but to understand how technologies shape that geography (2015). Bratton's project is vast and his deconstruction has been a useful reference for my own formulation of the *platform protocol place* theme. However, Bratton is a theorist and his work theoretical, I am a practicing artist and my research is situated in practice.

Another influence on this research project that is more comparable is Kate Crawford and Vladan Joler's *Anatomy of an AI System*. This project utilises the Amazon Echo 'as an

anatomical map of human labour, data and planetary resources' (2018), analysing its life cycle through disparate stages from raw minerals, to networked infrastructures to land fills. Theproject features a detailed map of this life cycle and an accompanying essay that engages with the social, political, economic and environmental realities of artificial intelligence and networked systems. *Anatomy of an AI* is a useful reference point within the context of this research project as it take complex concepts and issues related to technology and power and communicates them in an accessible way whilst making an indelible impression on the viewer. This is my intention with the body of work produced in this research project. This body of work engages in complex issues related to networked culture, issues that are expressed through the concept of the digital culture industry within the development and research of this work, and then situated and communicated using the *platform protocol place* theme. Here, I draw on Elliot Eisner's observation that 'artistic approaches to research try to locate the general in the particular' (1981), and in doing so, they are attempting to identify unique moments and events whilst simultaneously 'conveying insights that exceed the limits of the situation in which they emerge (*ibid.*pp.7-8). As is detailed in the following chapters, the approaches employed in my practice and the different ways in which this body of work are disseminated offer new insights that I suggest are specific to practice-based research.

2.6 Conclusion

This chapter began with an outline of the platform protocol place theme and its relevance to the digital culture industry and my own practice. This was followed by an overview of both critical theory and of Theodor Adorno and Max Horkheimer's *Culture Industry* thesis, establishing them as important conceptual frameworks for this research project. The concept of the digital culture industry was then detailed and analysed through its supply chains, the commodity form of the user and the extraction of personal data. The final section considered both the digital culture industry and platform protocol place as conceptual frameworks that are the central to this body of practice-based research. Having established these concepts, the following two chapters focus on two subfields of media art that are central to my practice and which are fundamentally opposed to the digital culture industry and networked capitalism.

Chapter Three

The Art of the Weak

3.1 Introduction

This chapter provides an overview of both the practical and conceptual development of tactical media. In doing so, it demonstrates the relevance of tactical media within this research project due to its influence on my practice and on other contemporary media artists. Furthermore, as is discussed in chapter four, the synthesis of tactical media with media archaeology is a central component of the practice-based work undertaken during this research project. The chapter begins by situating tactical media within two distinct fields of technological experimentation and expression, media art and hacktivism. The following section then outlines different interpretations of tactical media allowing me to develop my interpretation based specifically on the work of Erik Kluitenberg and Rita Raley. The main theoretical origins of tactical media are then analysed. This is first through the work of Michel de Certeau whose distinction between strategies - employed by hegemonic actors- and tactics - what he refers to as the 'the art of the weak'- has come to define tactical media, and second by an overview of the conceptual and practical techniques developed by the Situationist International.

Having established the theoretical development of tactical media, the following sections trace its emergence from the early 1990s to the post 9/11 world through a series of related events and texts including the dotcom boom, the *Next 5 Minutes* festival, Richard Barbrook and Andy Cameron's thesis *The Californian Ideology* and the work of artist collectives such as the Critical Art Ensemble and the Bureau of Inverse Technology, alongside a discussion on the artistic interventionist method, culture jamming. The final section in this chapter details some of the reasons for the decline of tactical media at the beginning of the 21st Century.

3.2 Media Art Histories

The emergence of tactical media can be understood through two different technologically informed fields and histories, media art and hacker culture. The evolution of media art has a long history (Grau, 2007) and can be traced back to the early 20th Century avant-garde Dada movement (Tribe & Jana, 2009). Through the 'anarchistic critique of the machine as a cultural form' (Huhtamo, 1996, p.243), artists such as Hannah Hoch and John Heartfield experimented with new techniques and processes such as photomontage, collage and chance -techniques

that are still utilised in media software (Tribe & Jenna, 2009), and in programming languages like Processing and P5.js (Navas, 2018).

Post Dada, the emergence of media art can be traced through movements such as Russian Constructivism, Bauhaus and Futurism. As with the Dadaists whilst these movements were interested in technology, they did not necessarily believe in it. They were interested in using technology with the intention of aestheticizing modernity and defunctionalizing it to reveal the ideology of progress as phantasmal and absurd (Groys, 2014). As is discussed in the chapter four, my practice is similarly focused on highlighting and challenging ideologies of progress that are associated with networked technology. Technological advances made during the Second World War led to the emergence of critical discourses surrounding cybernetics and information theory, which in turn inspired artistic responses (Gere, 2008). These advances influenced groups and events such as the Fluxus movement, the artist – engineer collaborations of Experiments in Art and Technology (E.A.T) and the *Software – Information Technology: Its New Meaning for Art* exhibition at the Jewish Museum in New York in 1970. At the same time Pop art and the emerging Video art movement contributed to what Michael Rush refers to as the final avant-garde movement of the 20th Century – technology-based art (2005, p.8).

3.2.1 Hacktivism

Within a contemporary context, the term hacking usually holds negative connotations and is often associated with the idea of cracking – a term that refers to illicitly gaining access to other computers through social engineering and/or the exploitation of technical faults (Jordan, 2017). However, such an interpretation lacks awareness of its origins. In the 1950s and 1960s, members of the Tech Model Railroad Club (TMRC), a student organisation at the Massachusetts Institute of Technology (MIT), used the term 'hack' to describe the process of completing a project. However, the emphasis was not on the finished project or its outcomes, but rather on the processes involved in its completion (Levy, 1984). Whilst in MIT the term was originally understood as a synonym for prank, TMRC members who at that time were working with early computers such as the IBM 705, used it as a compliment for technical tasks that displayed 'innovation, style, and technical virtuosity' (*ibid.*p.19).

Steven Levy identifies a series of values that comprise what he refers to as a 'hacker ethic'. These include freedom of information, distrust of authority, decentralization and inclusivity (1984, pp.32-41). Juli Laczkó observes that the history of hacker culture developed in tandem with overlapping technical, social and economic conditions of the late 20th Century, consequently, the meaning of the term has continued to evolve (2020). One interpretation of particular relevance to this research project is hacking practiced within the context of activism. The Cult of the Dead Cow (CDC) is a hacking collective formed in 1984 and credited with coining the word 'hacktivism' – a portmanteau of hack and activism and defined by the group as hacking in the defence of human rights (Menn, 2019).

Stefania Milan observes that hacktivism is a 'highly contested concept', applicable to diverse approaches and often incompatible ethical codes (2015). Milan identifies three distinct phases in the brief history of hacktivism (ibid.p.552). The first phase occurred in the 1980s when NGOS with adequate resources used computer servers running Bulletin Board Systems to send and receive messages and files (*ibid*.p.552). A decade later, the second phase saw grassroots groups availing of activism opportunities afforded by the world wide web, a form of activism which had 'direct action in cyberspace at its core' (*ibid.*p.552). Milan highlights the actions of activist-journalist collective Indymedia, the Italian group Strano Network, the artist collective Critical Art Ensemble, and the Mexican Zapatistas as examples of DIY radical communications projects engaging with autonomous networked interventions. These communities recognised the importance of the internet as a tool for empowerment both individually and collectively (*ibid*.p.552). As is discussed later in this chapter, it is within this second phase of hacktivism that tactical media emerged. It is also worth noting that Milan's inclusion of the Critical Art Ensemble within this phase highlights the overlap between media art and hacktivism within the context of tactical media.

The final phase suggested by Milan is the hacktivism utilised by groups such as Anonymous - the online, decentralised collective responsible for coordinated attacks on various governments, organisations and corporate entities. These online actions have seen the collective become an integral component in some of the most contested struggles of contemporary networked culture (Coleman, 2014). Milan suggests that as a consequence of groups like Anonymous, hacktivism has evolved from the isolated 'cell-based interventions' of the 1990s to 'transnational decentralised networks of individuals' that attempt to affect

real-world issues (2015, pp.552—553). Disruptive online interventions combined with self-organisation are also employed by internet activists. Such activists try to defend and expand autonomous spaces in the online world through the development of encryption tools like the Tor Project (*ibid*.p.553), and in platforms and networks that prioritise user privacy over profit such as Duck, Duck, Go, the Tor Project and Mastodon.

It is within this final phase that I situate the tactical media archaeological approach that is central to my practice. This approach engages with an open source philosophy and uses various methods and techniques that draw from media art practice and experimentation to critique issues associated with the digital culture industry, and in doing so, are similarly defending and expand autonomous spaces in both the online and offline worlds. This approach overlaps conceptually with the aforementioned platforms and networks and also with organisations and communities engaging with tech related activism such as Tactical Tech, Radical Networks and the Disruption Network Lab. Tactical media archaeology is detailed in chapter four, but having established the historical situations from which tactical media emerged, the following section develops a definition of it within the context of this research project.

3.3 Defining Tactical Media

There are numerous interpretations and variations of tactical media, both conceptually and as a set of cultural, political and activist-led practices that utilise media technologies. Practice is central to any understanding of tactical media, as it is through practice that it has been 'continuously re-articulated' since its emergence in the 1990s (Garcia *et al.*, 2017). Broadly speaking the practice of tactical media facilitates an engagement with emerging technological tools and networks whilst simultaneously reacting to them and the world(s) that they create. This process of reaction and re-articulation has allowed tactical media to avoid becoming a fixed academic concept or discipline – its conceptualisation serves not to emphasise itself, but rather to highlight the various evolving practices that constitute it (*ibid.* n.p).

The 'orthodox' interpretation of tactical media suggested by Alexander Galloway sees it emerging out of 'tech savy social movements taking place in and around the Western world'

(2004, p.175).[9] These movements, including those outlined in Milan's second phase of hacktivism in the previous section, were led by influential media artists, activists and theorists and were focused on the political uses of new and old technologies (*ibid*.p.175). Two such theorists were Geert Lovink and David Garcia, who in 1997 wrote *The ABC of Tactical Media*. Although there is no 'official' manifesto of tactical media – such a document would be anathematic to the concept and practice of what Erik Kluitenberg refers to as a 'non-movement' (2011, p.17). *The ABC of Tactical Media* provides invaluable insights into how tactical media was perceived in its formative years. Furthermore, it details concepts, practices and an ethos that I identify within my own practice and in other artists engaging in critical media art practices. According to Garcia & Lovink, tactical media is what happens when…

'.. *the cheap 'do it yourself' media, made possible by the revolution in consumer electronics and expanded forms of distribution (from public access cable to the internet) are exploited by groups and individuals who feel aggrieved by or excluded from the wider culture'* (1997).

There are parallels between the 1990s and the present day in this opening statement. The affordability - and therefore availability - of consumer electronics devices such as the camcorder facilitated an engagement with previously inaccessible media tools. From camcorders in the 1990s to camera phones in the noughties alongside media software such as *Photoshop*, or its non-proprietary equivalent *Gimp,* or indeed media software acquired through torrent websites such as The Pirate Bay or its numerous mirrored iterations.[10] Media production tools are still enabling digital DIY cultural practices to flourish, complimented by Garcia & Lovink's second point -the ability to distribute and share media content widely. This distribution was originally as a result of public access networks, and the internet – the (future) impact of the internet and the world wide web was understandably understated in The *ABC of Tactical Media*. Such an understatement is impossible now as a result of the rise of social media platforms alongside their associated folksonomies and online participatory culture in general. The contemporary era is one of hyper-convergence, distribution and sharing in which the user is encouraged to find new information and connections between 'dispersed' media content (Jenkins, 2008, p.3).

---

[9] Western world can be understood to mean Western Europe and the United States. Issues surrounding the western centric perspective of tactical media are discussed later in this chapter.

[10] For a full analysis of the cultural impacts of media software see *Software Takes Command* (Manovich, 2013).

Whereas the previous two points focused on the cultural opportunities afforded by media technologies, the final point highlights the political, or at least, politically engaged opportunities of these same technologies and how they can be 'exploited' by those on the fringes and peripheries of the mainstream. It is difficult to read the sentence '..*who feel aggrieved by or excluded from the wider culture'* from a contemporary perspective without briefly reflecting on what Mark Hamm & Ramón Spaaij refer to as the 'age of Lone Wolf Terrorism'. Hamm & Spaaij use this term to define terrorist actions committed by lone individuals, as opposed to actions carried out as part of a terrorist organisation (2017, p.5). These attacks are often carried out by males with far-right/alt-right sympathies whom engage with online platforms to promote the belief that "white identity" is being attacked by multicultural forces using "political correctness" and "social justice" (splcentre.org). However, *The ABC of Tactical Media* comes from a diametrically opposed place to such groups and ideologies – it is left-leaning, socially aware and committed to liberal ideals whilst celebrating 'the activist, Nomadic media warriors, the pranxter, the hacker, the street rapper, the camcorder kamikaze' (Lovink & Garcia, 1997). As with hacktivism, tactical media are not meant to be impartial and always participate (*ibid*, n.p). They identify with the powerless and are 'media of crisis, criticism and opposition' (*ibid.* n.p).Tactical media are 'never perfect, always in becoming, performative and pragmatic, involved in a continual process of questioning the premises of the channels they work with' (*ibid.* n.p.), and in doing so, they promote DIY culture as a method to critique the networks that they are embedded in.

The ABC of Tactical Media offers a useful insight into the world from which it emerged, and also to the practices and themes central to its development such as DIY culture and the co-option of communication networks to distribute and share content. I strongly identify with the themes and practices outlined in *The ABC of Tactical Media* within my own practice. However, technologies change and focus evolves – the text in isolation does not provide a definite account of what tactical media was, or is – and neither Lovink nor Garcia claim that it did – or does. David Garcia refers to it as the founding text of tactical media (2017) -implying foundation, something that is unfinished and can be built upon. Within the context of this research project, my interpretation of tactical media also draws from other scholars in this field. Of particular relevance is the work of Erik Kluitenberg who regards tactical media as a 'transnational critical interdisciplinary practice' (2011, p.8), and also Rita Raley, whose

primary focus is on media art practices with 'clear socio-political engagements' (2009, pp.14-15).

The practices and projects that are central to Raley's inquiry are not focused on any particular 'grand, sweeping revolutionary event' (*ibid*.p.1), such a focus might suggest the autonomous role of art in remaining on the outside looking in, but rather Raley is concerned with media art practices that 'engage in micropolitics of disruption, intervention, and education' (ibid.p.1). This is art that is concerned not with mirroring society, but changing it – even if this change occurs at a micro level. This is another example of tactical media's default position of opposition, an opposition that is not only political, but also cultural and intellectual.

Raley's work was published in 2009 and focuses on artistic practices up until this period. My research focus briefly overlaps, starting from 2007 and continues until 2020. For the purpose of this research project, I have identified the second wave of tactical media as beginning in 2007. The reasons and timeline for the decline of the first wave are detailed in section 3.5. At this point, it is sufficient to say that by 2007 that first wave had come to an end. I have identified 2007 as the start of the second wave of tactical media as it is the year that the artist collective the Free Art and Technology lab (FAT Lab) formed.As I discuss in chapter four, the critical focus and output of this collective can be broadly framed as a reaction to the then emerging concerns associated with the digital culture industry. Furthermore, as is also discussed in chapter four, the collective employ a tactical media archaeological approach – a synthesis of tactical media and media archaeology that I employ within my own practice.As this research project is practice-based my focus is not as specific as Raleys', instead my practice-based approach allows me to situate tactical media within a wider context of artistic practices from this era.

There are many other scholars, artists and activists -some of whom are referenced in this thesis – who have, and are still, contributing to, discourses and practices surrounding tactical media. To provide the most encompassing view of tactical media for this research project, I borrow the 'specific conjunction of activism, art, media and technological experimentation' which Erik Kluitenberg describes as being a defining characteristic of tactical media (2011, p.17). I also incorporate Rita Raley's position that tactical media is something that emerged out of, and in direct response to, 'post-industrial society and neoliberal globalization'

(*ibid.*p.3). Kluitenberg's defining characteristic connects creativity to the political, and to the experimental and avant-garde – all within the context of communication and community. Raley allows us to place tactical media within wider socio-economic and political contexts and chronologies. It is worth noting that outside of these two specific references, Kluitenberg positions tactical media more directly within the context of hybrid political activism, and as such, his interpretation of tactical media is more aligned with hacktivism. This is in contrast to Raleys' position which, as previously noted, situates it more within the context of media art practice.

These two interpretations combined are applicable to both the first wave of tactical media, to my own practice and to other contemporary media artists working in this field. However, any interpretation of tactical media should be fluid, tactical media as both a concept and a set of material practices should be neither fixed or exclusive (ibid.p.6). The interpretation provided here offers the reader a clear understanding of tactical media within the context of this research project. Although tactical media draws from a diverse range of transdisciplinary approaches and concepts depending on what is required at a specific instance (Dieter, 2017), it is informed by two distinct theoretical frameworks and influences, the work of Michel de Certeau and the Situationist International respectively.

3.3.1 The Art of the Weak

The tactical in tactical media is a reference to the work of French philosopher Michel de Certeau. According to de Certeau, studies of representation and modes of consumer behaviours must be accompanied by an analysis of how the consumer 'makes' or 'does' (1988, xii). This is reiterated again by De Certeau when he states 'What is counted is *what* is used, not the *ways* of using' *(ibid*.p.35). Our understanding of cultural production and consumption should not just derive from analysing images, signs or consumer behaviour but should also consider how consumers incorporate them into their own lives (Miekle, 2002). De Certeau uses a polemological frame of reference to analyse power relationships between the weak and strong (1988 p.34). Within this relationship, those in positions of strength – 'producers' – such as governments, corporations and other established formal institutions, adopt strategies in order to maintain their position of power (*ibid.*p.36). In contrast, consumers engage in tactics -the 'art of the weak' -calculated but temporary actions that occur within

the controlled space of dominant producers (*ibid.*p.37). Any victories from these tactical incursions are short-lived – as de Certeau states 'what it wins, it cannot keep' (*ibid.*p.37). The power and effectiveness of strategies depend on the stability that the '*establishment of a place* offers to the erosion of time', whereas tactics rely on a 'clever *utilisation of time*.' (*ibid*.pp.38-39, original italics).

Rita Raley incorporates De Certeau's perspective on the temporality of tactics whilst also acknowledging the tension of victory, stating that 'absolute victory is neither a desirable nor truly attainable object for tactical media' (2009, p.10). This tension is similarly acknowledged by Erik Kluitenberg who states that the only way the weak can occupy and hold any strategic space is to become 'strategic brokers of power themselves' (2011,p.18), a process that negates the concept of the tactic. The temporal and nomadic nature of tactics is also apparent in the concept of the *Temporary Autonomous Zone*, a concept developed by the anarchist writer and poet Hakim Bey whom is referenced by Garcia & Lovink in the *ABC of Tactical Media.* A Temporary Autonomous Zone is a type of 'guerrilla operation which operates an area (of land, of time, of imagination) and then dissolves itself to reform elsewhere/elsewhen' (1987).

Kluitenberg points to the Tahir Square Protests in Egypt, and the Occupy Movement in 2011 as examples of the nomadic and precarious nature of tactics, and of how 'the weak' can challenge the strategic methods of those in power (2011, p.18). Since 2011, there are numerous other examples of protest movements that can be considered Temporary Autonomous Zones that engage with a more direct action form of tactical media -physical protests and demonstrations that culminated in the temporary occupation of space. These include the Black Lives Matter movement (2013), The Euromaidan protests in the Ukraine (2013-2014), the Dakota Access Pipeline Protest (2016), various environmental protests such as The Climate Strike (2019) and the formation of related and associated groups like Extinction Rebellion (2018), and more recently the Capital Hill Autonomous Zone (CHAD) – the 2020 occupation protest in Seattle, Washington in response to the murder of George Floyd.

These all serve as examples of how disadvantaged individual groups and parties can effectively challenge 'strategic power' (Kluitenberg, 2011, p.19). The nomadic aspect is both a strength and weakness of the tactical movement (*ibid*.p.19). The ability to assemble and

disperse can be a powerful method in terms of protest and achieving temporal victories, perhaps most effective in drawing attention to a particular issue or cause. However, more often than not victory is temporary, implying that if you are not victorious then you have lost. It should also be noted that along with the co-option of meme culture, tactics focused on the temporary occupation of space have also been utilised by the ideological opposite of tactical media, examples including 'free speech' protests against various tech multinationals in Dublin, the Capitol Hill insurrection in Washington in 2021, worldwide corona virus anti–lockdown protests – although protesters in these anti-lock events represent the political spectrum, the protests are linked to the spread of online misinformation promoted by far-right groups and organisation (Crawford, 2020), leading me to paraphrase Langdon Winner's question regarding the political qualities of technological artefacts, do tactics have politics?

Kluitenberg suggests that examples of social and political protest look beyond 'the media-question' deemed to be at the heart of tactical media and what he refers to as the 'tired discourses' surrounding online activism which in turn challenge arguments that favour 'electronic isolation' (*ibid*.p.1). However, whilst it appears that political action can only be fully realised 'in the theatre of the grand urban space' (*ibid.* p.1), this process of realisation occurs through an 'excess of mediation' enabled by digital technologies and infrastructures (*ibid.*p.11). This 'choreography of assembly' (Gerbaudo, 2012) utilises social media platforms to galvanize and coordinate participants into public spaces, whilst simultaneously generating an emotional tension towards the idea of participation (*ibid*.p.103).

In her analysis of Galas, a crowdsourcing protest logistics group active during the Euromaiden protests in Ukraine, Tetyana Lokot states that urban hybrid protests may facilitate new methods of decentralized, grassroots collaboration alongside forms of spatiality that combine the digital and the material, and in doing so, 'renegotiate the balance of power and, thus, the right to create and shape the city in protest' (2018, p.5346). Kluitenberg also acknowledges the hybrid space where mediated and embodied spaces are layered upon each other, however, he warns of such spaces facilitating new forms of surveillance (2011, p.11).[11] This surveillance has increased exponentially within the context of the digital culture industry, as such, the focus is on how to work through these technologies and hybrid networks whilst

[11] Kluitenberg's hybrid space is also discussed in chapter seven.

simultaneously working *against* them, as Kluitenberg notes 'contemporary subjects are entrapped in insular networks of communicative exchange that uphold massive distortions of wealth and power…the big question before us is whether the hybrid linking of mediated and embodied exchange can ultimately help to break this entrapment' (*ibid*. p.12).

De Certeau's recognition of the potential power of the consumer has been adapted by artists, activists, the networked user and a hybrid form of all. Tactics and strategies provide a clear and useful, if perhaps insufficiently nuanced dichotomy between the dominant and marginalised, the haves and have nots, the 1% and the 99%, and so on. As noted previously, Kluitenberg's interpretation of tactical media is more focused on the hacktivist space than Rita Raley's focus on media art practice. Although I believe my own practice to be better situated within the context of media art as opposed to overt hacktivism, these interpretations are not fixed and are inherently flexible. This is the same for the concept of tactical media archaeology outlined in the next chapter. It is an intentionally broad concept and can be considered a form of hacktivism, art practice, or a hybrid form of both. Irrespective of specific focus, both Raley and Kluitenberg's positions draw from De Certeau's theoretical engagement with production and consumption within the every day, and the politics of the same. Another theoretical framework underpinning tactical media that is more overt in its engagement with the political, and also more closely aligned with art practice than De Certeau can be found in the work of the Situationist International.

3.3.2 Situations

Although the influence of the Situationist International (SI) on tactical media is less stated than the tactics and strategies of Michel De Certeau, it is no less relevant. The SI was established in 1957, the result of three different avant-garde artists groups merging together; The Lettrist International, the International Movement for an Imaginist Bauhaus and the London Psychogeographical Association. The theoretical framework of the group drew from Marxism and avant-garde art movements such as Dada and Surrealism, as well as less structured sources of resistance, struggle and rebellion (Plant, 1992). Although the SI had a diverse range of members and contributors, it is best understood through the work of its founding member and de facto leader, Guy Debord. According to Debord, life within a modern capitalist society is 'an accumulation of spectacles' in which everything has 'receded into a

representation' (2014, p.1). The spectacle is the successful colonization of social life by the commodity -everything that is experienced is done so through the commodity form (*ibid.*p.16). Alienation has permeated all aspects of society, meaning that people are not just alienated from the goods they produce and consume, but also from their emotions, desires and experiences (Plant, 1992, p.1). Originally emerging from avant-garde artistic practices, the SI developed a political position from which its members were able to express their hostility towards capitalist society (*ibid*. p.1.). As with the avant-gardists that preceded them, the Situationists rejected the institutionalisation and autonomy of art, arguing that art in isolation lacked any critical capacity and could only be realized within the context of revolutionary praxis (Rasmussen, 2006).

Despite disbanding in 1972, the contribution of the Situationists to philosophy and politics is widespread – evident in their influence on postmodernism through the work of Jean Baudrillard (Plant, 1992,p.5), and also on popular culture -most notably on punk through the music of The Sex Pistols (Marcus, 2009).[12] Of most relevance to this research project is the influence of the Situationists on the artists and collectives who regard the work of the SI as 'common property' and appropriate it when needed (Wark, 2008). This appropriation occurs through a conceptual and practical engagement with various Situationist techniques and concepts which have been used by artists broadly aligned with tactical media.

These techniques include 'détournement' – the process of reusing pre-existing elements to create something new (Debord, 1959). Ken Knabb translates détournement as the 'deflection, diversion, rerouting, distortion, misuse, misappropriation, hijacking, or otherwise turning something aside from its normal course or purpose' (2020). Détournement is the 'flexible language of anti-ideology' that serves as a reminder that theory can only be realised through historical action and 'historical correction' (Debord, 2014, p.110). In a more practical sense, détournement is the practice of taking the expressions, slogans, brands and logos of capitalist society and turning it against itself. This process of using the visual language of the Spectacle from within was used by the Situationists as a tactic to reject contemporary, capitalist society (Kurczynski, 2008, p.606).

[12] For a more detailed overview of punk and the influence of the Situationists, see 'Magnificent Failures Collide' (Garrett, 2020).

Détournement as a practical technique is reminiscent of the photomontages and collage work of Dada artists such as Hannah Hoch and John Heartfield. It is also evident in the work of tactical media practitioners and culture jammers of the 1990s, examples of which are detailed in the following section. It is still a viable tactic today within the broader context of digital culture and media art practices including remix and glitch art – the practice of intentionally forcing errors through the corruption of data or the manipulation of electronic devices as a form of creative expression and critical inquiry.[13] In opposition to détournement is the idea of recuperation, a term used by the Situationists to highlight the process in which the potential of radical practices and materials are absorbed into the culture they oppose, a process that neutralises the originally intended critique (Bunyard, 2014). An obvious example of this process can again be found in punk music, its recuperation apparent in the many high street stores selling Ramones t-shirts. More relevant to this research project is the recuperation of various tactics and techniques associated with both waves of tactical media such as guerrilla marketing or the practice of glitch art. As Geoff Cox & Morton Riise observe, glitch music has the potential to be commercially exploited (2018), the same is true of its visual aesthetic which has been employed in commercial movies like Ghost in the Shell (2017), and also in numerous phone apps that glitch supplied images instantaneously.

Recuperation is also evident more broadly within the context of hacking and DIY practices that were originally considered to be subversive, before being adopted into industrial, institutional or educational innovation programs (Delfanti & Söderberg, 2018). This has lead to a more sanitised maker culture, exemplified commercially by Make magazine and by tech platforms such as Facebook whose headquarters in Menlo Park is located at no. 1 Hacker way. The cultural recuperation of hacking practices is evident in the presentation of various hacking-related tropes in film and television, from the 1983 *War Games* movie to the more recent anti-hero Elliot Alderson in the popular TV show *Mr. Robot*. All of these serve as examples of 'revolutionary negativity' being recouped to strengthen the reigning social order (McDonogh, 2002) which invariably is a capitalist one.

[13]For an overview of glitch art, see '*Glitch Expectations: A* conversation with Jon Cates' (2014) and for a more theoretical framing of glitch culture, see *The Glitch Moment(um)* (Menkman, 2011).

Influenced by the idea of the flâneur, Debord and the Situationists developed the concept of Psychogeography as a way to explore the effects of the geographical environment 'on the emotions and behaviour of individuals' (Debord,1955). [14] [15] This exploration is achieved by employing the method of the dérive - drifting through 'varied ambiances' (Debord, 1958) in an effort to understand how urban spaces resonate and impact our mental and emotional state, whilst simultaneously critically resisting the functionality of the designed urban environment (Plant, p.59). The dérive cuts through the various divisions of space within urban environments, the process of wandering cultivates time in a way that it is no longer divided into labour and the negative time assigned for leisure, in doing so the derive is an attempt to construct 'positive freedom within time' (Wark, 2011, p.25). Karen Kurczynski argues that the ''intrusion' of outsiders' is critical to the concept of the dérive as it initiates a cultural confrontation between institutionally separated bodies and spaces, allowing the dérive to deconstruct the 'spatialisation of power' (2008, p.610). More mainstream interpretations of iy within digital culture, can be found in Pokémon Go (Davies & Innocent, 2017) and apps such as *Randonautica* that allows you to 'explore the world you never knew existed (randoautica.com, 2020).

Debord states that the accumulation of capital in society becomes part of the spectacle – in the digital culture industry this accumulation of capital is achieved through an accumulation of data, the spectacle is further consolidated by the user – the self. The practices developed by the Situationists, and the theories and concepts that evolved alongside them, provide useful intellectual tools to critique capitalist society, and also to intervene, disrupt, hack and subvert it – whilst simultaneously acknowledging the relative positioning of power. By incorporating the polemological framework offered by Michel De Certeau, the digital culture industry can be posited as a site of perpetual iterations of networked conflict and tension. The techniques of the Situationists are tactics, the art of the weak. These techniques influenced artists working in the first wave of tactical media and, as is outlined in chapter four, have also influenced my own tactical media archaeological approach.

---

[14] The idea of the 'passionate spectator' was originally conceived by Charles Baudelaire in his 1863 essay 'The Painter of Modern Life'(1863) and extended further by Walter Benjamin in his 'Arcades Project' (1927-1940). Later, Michel de Certeau also engaged with it in his *Walking in the City* chapter of *The Practice of Everyday Life*.
[15] For a comprehensive overview of psychogeography, see *Psychogeography* (Coverly, 2006).

Although some of the aspirational elements of practices like the dérive may appear to be derisory from a contemporary perspective (Lavery, 2018),[16] the 'radical energy' of such concepts should not be dismissed or abandoned as they still offer the utopian ideal of possibility (2018, p.2). My interpretation of this possibility is hope. Tactical media was, and still is, not the great revolutionary act that the Situationists aspired to,[17] but that does not mean it should be abandoned, on the contrary, it should be encouraged and fostered. As is detailed in the following sections, and in chapter four, this hope can be identified not just through the coordination of the online/offline worlds, but also in hybrid forms of art, activism, peer learning and open source culture – all influenced by the theoretical foundations offered by De Certeau and the Situationists.

3.3.3 Developments

Having considered the theoretical underpinnings that inform the practices of tactical media, it is necessary to look at the wider socio-political environment from which it emerged to best understand its relevance today. As previously noted, tactical media emerged in conjunction with a phase of hacktivism that was largely enabled by the possibilities afforded by the emergence of the world wide web.This was also a time of heightened neoliberal globalization and the dotcom boom – a boom that began in the mid-1990s when corporate America realised the economic possibilities of the internet and world wide web and 'adopted it with the zeal of converts' (Cassidy, 2003), leading to reckless investment in internet companies and poorly regulated market speculation (Murdock, 2020). This was complimented by the United States Framework for Global Electronic Commerce which effectively privatised the internet allowing companies to self regulate. Following the fall of the Berlin Wall and the subsequent 'End of History' – a term used by Francis Fukuyama to describe the collapse of the Soviet Union as representing the end point of ideological evolution and the 'universalization of Western liberal democracy as the final form of human government' (1989) – a so-called 'New World Order' emerged within the global system. This new order signified a world led by the United State, beginning with the first Gulf War – an 'event' that saw the emergence of the 24/7 news cycle (Medosch, 2016), a mediated spectacle that foreshadowed

[16] For a more focused critique of the SI see Gilles Dauvé 'Critique of the Situationist International.' (2000).
[17] And failed, as Andrew Gallix notes, Debord would be horrified that group have gone on to be celebrated by the French Government – the worst form of recuperation (2009).

the 'always on' and always consuming media content of the following decades. The hierarchical 24/7 news cycle would eventually dissolve into a more participatory one as a consequence of the camcorder revolution and the rise of citizen journalism through organisations such as Indymedia,[18] before ultimately evolving into a mediated landscape of updates & hashtags that promised more democratisation and access, yet ultimately monetized the user through the 'expropriation and exploitation of communicative processes' (Dean, 2014).

As previously noted, due to the increased availability of affordable media production and distribution tools during the early to mid-1990s, artists, activists and marginalized communities were able to promote their own political, cultural and personal agendas by 'occupying the public sphere "by any media necessary"'(Critical Art Ensemble, cited in Kluitenberg, 2011,p.8). Initially, the focus was on camcorders and experimentations with open access and cable television to create alternative communication networks within the 'newly open Cold War broadcast media space' (*ibid*.p.9).[19] As noted in section 3.2.1 in relation to Stefania Milan's second phase of Hacktivism, these experimentations would soon overlap with the cultivation of a new cyber space enabled by the emergence of the world wide web, which produced new opportunities for communication, networking and 'self-produced media expression' (*ibid*.p. 9).

Geert Lovink refers to this period as being its own Temporary Autonomous Zone (2015), using Hakim Bey's concept discussed in section 3.3.1. It was a period marked by freedom of expression enabled as a result of emerging and accessible communications platforms and technologies, and also by a variety of available organisational methods, including virtual campaigns, cultural initiatives and social movements, alongside more avant-garde movements including the emerging form of net art (*ibid*. n.p.). Although there are minor debates about whether net art is distinct from tactical media,[20] Domenico Quaranta highlights a contradiction inherent in net art that is relevant also to tactical media, stating that net art

---

[18] See '*Alternative and Activist New Media*' (Lievrouw, 2011).

[19] For a short but detailed overview of television activism leading up to the camcorder revolution, see Felix Stalder's '30 Years of Tactical media'.

[20] Caroline Guertin considers net art as an initial (first) wave of Tactical media in its own right (2012). For a comprehensive overview of the history of net art, see Rhizome's *Net Art Anthology*.

believes in the 'emancipatory power of the technology it relied upon without identifying with the techno-utopianism of Silicon Valley' (2019, p.9).

3.3.4 The Next Five Minutes, NetTime and The Californian Ideology

As discussed in section 3.3, no manifesto, text or theory can adequately define the scope, creativity and experimentation of tactical media, and the same is true of actual events. Whilst the end of the Cold War, Timothy Berners Lee's NeXT Computer at CERN, the first Gulf War and the general economic effects of hyper globalisation impacted practically and conceptually on its evolution, they do not explain how tactical media became a community, or indeed a non-community, comprised of a temporary confluence of diverse individuals and practices that would diverge within a few years (Kluitenberg, 2011, p.17). One more localised event that does offer in part an explanation is The *Next 5 Minutes* festival (N5M), a series of media festivals held in Amsterdam.

The first edition was held in 1993, its theme was 'Tactical Television' and focused on issues related to television and video culture, and methods of intervening and experimenting with the same (Critical Art Ensemble, 2001). As mentioned previously, this focus reflected the newly affordable media equipment and accessibility of communications networks.[21] The festival organisers, reacting to the changing (hyper)media landscape, included all forms of media in the festival's subsequent editions (1996, 1999 and 2003) with an emphasis on radio, television and the internet (*ibid.*p.1). The final event reflected concerns in the post 9/11 world, reflected in one of the events themes which stated, 'Corporate, state, or terrorist actors all seem to have become effective media tacticians, is the battle for the screen therefore lost?'(tacticalmediafiles.net, 2020). *The Next 5 Minutes* was inherently temporal, consisting of a coalition of individuals and institutions who would come together to organise the event before dispersing again without fully developing into a sustainable network (Lovink, 2005). This absence of permanence is ascribable to the provisional character of tactical media, something which Lovink attributes to the prevailing suspicion of institutionalisation prominent in the internet generation of the 1990s (*ibid.* n.p).

[21] In his essay 'The Strange Persistence of Tactical Media' (2019), David Garcia provides a first-person account of the origins of N5M linking it directly to the AIDS activism of ACT UP and also the Dutch squatting movement of the 1980s.

Section 3.6 discusses the decline of the first wave of tactical media, however, some of the issues associated with this decline were already apparent – or were at least being reflected – in the evolution of the festival. As the Critical Art Ensemble observed, 'all good things must come to an end', a process which they claim began with the naming of tactical media at the Next 5 Minutes festival (2001, p.1). Artist & activist Joanne Richardson argues that 'tactical' video activism was focused on the 'aesthetics of radical chic' and violent street battles at the expense of a more reflective and nuanced critical inquiry into the wider social contexts and concerns from which such violence emerged (cited in Medosch, 2019, p.365). The interpretation of the 'tactical' in tactical media was incompatible with the original meaning offered by Michel de Certeau (*ibid*.p.365). According to Richardson, for De Certeau genuine resistance was through a process of subversion as opposed to transformation (2002). The outputs of tactical media are often intentionally brash and overt. When fighting for a victory that will only ever be temporal, the claiming of (a temporal) victory becomes a surrogate for actually claiming a permanent one, much of the 'victory' lies in the commotion made and attention gained, as Rita Raley bluntly states '*See what I have made,* the tactical user says. *See how I try to manage the ties that bind and produce me* (2009, p.2, original italics).

Lack of diversity was another issue associated with the N5M. Armin Medosch highlights that despite its initial inception as a global survey, it evolved into becoming 'a mostly European, white male event' (Medosch, 2016, p.365), something that was addressed by the organisers through online call outs for decentralized tactical media labs outside of Europe (Garcia, cited in Medosch, p.364).[22] These issues aside, the Next 5 Minutes served as an important part of the formalizing of tactical media, despite the concept of tactical media inherently avoiding any such formalization. As with *The ABC of Tactical Media*, the Next 5 Minutes festival was another key 'non' element in the evolution of tactical media that, through its temporal evolving yet dispersive nature, was a temporal incursion into the commercial, corporate 24/7 media space of the 1990s.

The N5M was not the only focal point of tactical media in the 1990s. The *NetTime* mailing list evolved from a meeting of media activists, theorists, artists and journalists at the 1995 Venice

[22] A journal of contributions from international tactical media labs featured as part of the programme for N5M (2002) and is available at http://www.tacticalmediafiles.net/n5m4_journal/

Biennale, including Geert Lovink and David Garcia (Broekman,1997).[23] The mailing list was developed 'to define a different (net)politics than the one Wired magazine represented in Europe' (*ibid*. n.p).[24] This critique is best encapsulated in Richard Barbrook and Andy Cameron's 'canonical text of 1990s dot-com scepticism' (Barbrook, 2015, p.7), *The Californian Ideology*. This essay, originally disseminated on the *NetTime* mailing list (*ibid*. p.7) and presented at the 1996 edition of the Next 5 Minutes (Medosch, 2016), offers a critique of the systemic inequalities in the United States that are exasperated and reinforced by the neoliberal/free market economic policies of the dotcom era -an era that Barbrook and Cameron claim was enabled and promoted by the combination of the 'free-wheeling spirit of the hippies and the entrepreneurial zeal of the yuppies', and their mutual 'profound faith in the emancipatory potential of the new information technologies' (2015,p.12).

As evidenced in the contemporary digital culture industry, the central arguments of the *Californian Ideology* are still relevant, and will continue to be as a result of the problematic belief in the 'liberating power of information technologies' (Barbrook, p.8). Geert Lovink argues that *NetTime* and other mailing lists such as *Spectre* and *Fibreculture* are not examples of online tactical media networks as none of them were explicitly for media activists (2005).[25]*NetTime* however, with its critical counter-discourse centred on the neoliberal ideologies of Silicon Valley provides an example of early opposition to what has evolved into the digital culture industry. Both the Next Five Minutes festival and the *netTime* mailing list give a sense of the evolution of tactical media in its initial phase and the environment from which it emerged, which in turn, offers a better understanding of tactical media as it exists now within the context of contemporary networked capitalism.

3.4 Dead Capital

Whilst a full analysis of the artists that emerged in the first wave of tactical media is beyond the scope of this research project, a brief overview offers context as to how tactical media

---

[23] The media art mailing list Rhizome was started a year later.
[24] See also 'The Moderation Question: Nettime and the Boundaries of Mailing List Culture' (Lovink, 2002).
[25] Spectre is a mailing list founded in 2001 for media art and culture in 'Deep Europe' initiated in August 2001, founded in the same year Fibreculture was set up by David Teh & Geert Lovink and would evolve into the *Fibreculture Journal,* a peer reviewed journal of Digital Media & Transdisciplinary critique.

was used in hacktivist influenced creative practices and interventions. It also identifies commonalities in methods between the first and second wave. The first artist collective to conceptualize the idea of electronic civil disobedience were the Critical Art Ensemble (CAE) (Wray, 1998). The group focused on the various intersections between 'art, critical theory, technology and political activism' (Critical-art.net, 2009). In their essay, '*The Electronic Disturbance'* the collective argue that as a consequence of the transition of the fluid representation of power in late capitalism from 'sedentary concrete mass' to 'nomadic electronic flow' (1994, p.1), activism, resistance and civil disobedience are compelled to move into the digital realm on the basis that 'as far as power is concerned, the streets are dead capital' (*ibid*.p.11).

This statement is understandable within the context of the period it emerged from, which as has already been noted, embraced the opportunities offered by new technologies as a means to offset the ever-encroaching impacts of neoliberal globalisation. The movement towards the streets discussed in section 3.3.1 indicate that the streets may now be the site of a hybrid form of digital capital. However, the Critical Art Ensemble captured the time perfectly, and as noted in chapter one, proved an effective bellwether in relation to the prediction of data accumulation and algorithmic bias that are an inherent part of the digital culture industry.

Another group that both recognised and responded to the movement of power and capital to the online space were the Electronic Disturbance Theatre (EDT). Founded in 1997, EDT were a collective of artists, activists and theorists. '*FloodNe*t' (1998) was a type of virtual sit-in facilitated by a DDOS attack on Mexican and US governmental websites, the attack was in support of the Mexican left-wing group, the Zapatistas, highlighted in Stefania Milan's second phase of hacktivism in section 3.2.1, *FloodNet* was a combination of political tactics and poetics (anthology.rhizome.net,2020) highlighting what the EDT perceived to be injustices carried out by both the American and Mexican governments on the Zapatistas, as opposed to any form of destructive computing malware (*ibid*. n.p). Although, the EDT were not the first group to use DdoS attacks as political action,[26] they did popularise the idea of them, and can be seen as influencing other groups such as *Anonymous* (Lecher, 2017).

[26] That particular accolade goes to the Italian hacker group *The Strano Network* who carried out a DDOS on various French Government websites in 1995 in response to Nuclear testing (Sauter, cited in Lecher, 2017).

The Bureau of Inverse Technology (BIT) founded in 1991 by Natalie Jeremijenko and Kate Rich, utilise information technologies to reveal the politics beneath them (bureauit.org, 2020). Examples of their work include 'Bit Plane' (1997), a radio-controlled model airplane reconfigured with a micro-video camera that flew into various no-camera and no-fly zones in the 'glittering heartland of the information age', Silicon Valley. BIT Plane can be regarded as a forerunner to critical media art projects that incorporated drone technologies as a way of critiquing surveillance culture through sousveillance – a term coined by Steve Mann to explain the inversion of surveillance by citizens to monitor those in authority (2002) – such as *The Loitering Theatre* – a project by Dublin based collective *The Loitering Theatre* that explores the 'possible democratization of surveillance that drone flight affords' (loiteringtheatre.org, 2020). This project flew a drone over various centres of power and surveillance in Dublin city, including Google and Facebook's respective European Headquarters in Dublin city.[27]

The focus of the Bureau of Inverse Technology is 'not on the moment of execution' but on the instructions and reports that allow the user to understand the mechanism involved (2004). This materialistic approach hints towards both open source culture and critical pedagogy and also as a forerunner to artists whose practice is centred on the opening up of the 'black boxes' of technology as means to critically engage with the socio-political infrastructures that support them. Extensive examples of contemporary artists engaging in a variation of tactical media are featured in the following chapter. At this stage, however, it can be stated that many of these artists create temporal interventions often within a hybrid space, and are informed by a general philosophy that embraces open source culture and hacktivism, and as such, engage in similar tactical media art practices as those apparent in the work of the collectives discussed above.[28]

Other artists from this first wave of tactical media include Eva and Franco Mattes, whose projects including '*vaticano.org'* (1998) or '*Darko Maver'* (1998-1999) subvert and critique formal institutions through both technical and tactical practices involving appropriation and

---

[27] The Loitering Theatre piece was part of *Hack the City*, an exhibition held in Science Gallery Dublin and curated by Teresa Dillon. The '*Movable Borders: Here Come the Drones!*' exhibition held at the Furtherfield Gallery, London in 2013, similarly focused on questioning and critiquing the impact of drone technology on contemporary society and featured work from The Bureau of Inverse Technology, Dave Young and others.

[28] Although this research project is looking at these groups in the context of past work, they are all still active either individually or as part of other collectives.

remix. These practices are traceable back to earlier avant-garde moments, such as Dada and Surrealism, and also to the techniques of the Situationist International. However, whilst the techniques of the Situationists were utilised within a political context,[29] and influenced various theoretical frameworks related to postmodernism and different subcultures before being ultimately recuperated into the mainstream – their revolutionary potential negated, artists engaging in tactical media in the 1990s and the present day, are able to utilise networked technologies, and in doing so have the potential to reach a much wider audience (Lievrow, p.85, 2011).

Tactical media practices from this era did not always take the form of online or networked resistance but are still examples of tactical media due to their engagement with temporal and experimental practices that critique capitalist society and globalization. ®Tmark, an artist and activist collective originally founded in 1991, organised itself as a corporate entity as a way to challenge and critique the corporate personhood enabled by the 14th amendment which guarantees fundamental rights to American Citizens, but also to corporations through the concept of corporate personhood. Operating under this corporate image, ®Tmark provided finance to artists to execute projects such as the *Barbie Liberation Organisation* (1993), which switched the voice boxes of Barbie dolls with GI Joe action figures before placing them back on the shelves of various toy shops (Meikle, 2002). An online collaboration between the collective and satirist Zack Exley, *gwbush.com* (2000) copied the website of the then Presidential nominee George W. Bush, resulting in the Bush Campaign issuing legal proceedings against the collective, culminating in George W. Bush stating on a televised news conference that 'there ought to be limits to freedom' (Miekle, 2002). Founding members of ®Tmark, Jacques Severin and Igor Vamos would go on to form *The Yes Men*, an activist duo who engage with humour and trickery to critique and draw attention to the neoliberal ideologies at the centre of corporate culture (theyesmen.org, 2019). Whereas the work of the EDT and BIT explore the possibilities of the 'exploit', the Yes Men engage in reverse engineering and détournment – absurdist methods that have also been used by more contemporary artists such as the Free Art and Technology Lab. [30]

---

[29] The group were actively involved in the May 1968 student protests in France.

[30] They have impersonated a Dow Chemical Spokesperson live on BBC, distributed fake editions of the Washington post and used an Edward Snowden lookalike at various public events to convince audiences that

3.4.1 Culture Jamming

The work of ®Tmark and the Yes Men are examples of culture jamming, a term coined by the sound art group Negativeland in 1984 (Dery, 1993). As with tactical media, the term is often contested and open to different interpretations. DeLaure & Fink claim that one common definition frames culture jamming practices as essentially negative: jamming up or blocking the flow of commercial message (2017, p.43). Mark Dery argues that culture jammers are 'part artistic terrorists, part vernacular critics' who introduce 'noise into the signal as it passes from transmitter to receiver, encouraging idiosyncratic, unintended interpretations' (1993) and in doing so, reject the role of passive consumers whilst promoting and facilitating public discourse (*ibid*. n.p).

Historically, culture jamming can be traced back to Dada and Surrealism, and is strongly influenced by the techniques of the Situationists. Christine Harold suggests three different strategies in which to analyse culture jamming (2007). The first is as symbolic sabotage in which there is a dialectical engagement with consumer culture rhetoric and the spectacle. Specifically, in relation to what Harold refers to as a form of 'dialectical culture-jamming', it is best exemplified in the work of the anticonsumerism media organisation, Adbusters.Second, it is a strategy of appropriation that sees culture jammers using methods based on pranking and pirating to engage with consumer culture on its terms, something Harold regards as problematic on the basis that by playing the role of an outlaw, artists risk 'solidifying the codes they challenge', a process of recuperation that can perhaps be best explained in the work of UK graffiti artist Banksy. Harold's final strategy promotes the idea of the 'commons', which intensify and augment certain aspects of the market.

In an effort to understand not just what culture jamming is, but also what it *does,* DeLaure & Fink provide an outline of qualities that they suggest are common to most culture jamming interventions (2017, p.56). Culture jamming appropriates pre-existing material, is artful, occasionally playful, and often anonymous (*ibid*.pp.57-68). It is also participatory, political, transgressive and operates serially (*ibid.*pp.69 – 85). Most of these qualities are also applicable to tactical media. Graham Meikle argues that culture jamming practices such as

---

the whistle blower had been pardoned Snowden and are still active. The Free Art and Technology Lab are discussed in chapter four.

altering and manipulating public advertisements spaces like billboards,[31] the organisation of street events and pranks all fall under the broader heading of tactical media (2002, p.131). Leah Lievrow similarly connects the two, with the distinction that culture jamming subverts the images and ideas of mainstream culture to critique socio-political issues, whereas tactical media employs a wide range of media technologies to do the same (2011, p.73).

Xtine Burroughs argues that the main difference between culture jamming and tactical media is that tactical media takes 'a philosophically hybrid approach to media manipulation' and in doing, avoids being a reactive form of activism – time and space are both elements employed within the 'tactical arsenal' (2017, p.109). My interpretation of culture jamming is its meaning should be transmutable, it can be adopted to use a set of practices but also a political and philosophical position that inherently challenges capitalism through its many and varied semiotic regimes. I also use Miekle's interpretation of it as being a sub-category of tactical media. In a more contemporary context, I regard meme cultures as a legacy of culture jamming, albeit one that is very much a mainstream co-opted form of resistance, but here I make the argument that this is something that was part of tactical media and is now recognised everywhere.[32]

3.5 Decline of Tactical Media

It is impossible to pinpoint an exact date or event when the first wave of tactical media ended. As noted previously, the Critical Art Ensemble suggest it ended the moment it became formalized and named at the *Next 5 Minutes* festival. Despite the final N5M taking place in 2003, and the international tactical media labs that took place between 2001 to 2003, Geert Lovink and Ned Rossiter suggest that 'it was all over' by 2001 (2018, p.24). Tactical media emerged from the cultural shift of 'macro-history to micro-politics' that occurred during the 1980s and 1990s (Ray & Sholette, 2008, p.520), and as outlined throughout this chapter, drew

[31] This practice falls within the subcategory of subvertising (a portmanteau of subversion and advertising), a practice that can be traced back to the the SI and 1968 Paris revolt. It includes artists and collectives such as the Billboard Liberation Front (BLF) in San Francisco, and Billboard Utilising Graffitists Against Unhealthy Promotion (B.U.G.A.U.P.) in Sydney both starting in the late 1970s.More contemporary groups including Adbusters, Brandalism, and The Special Patrol Group and their Ad-Hack Manifesto. This information is collated from an online workshop in which I participated in May 2020 on Subvertising led by Vyvian Raoul.

[32] For a more detailed analysis of meme culture see the work of Francesca Sobande, Victoria Esteves and Jack Bratich. For artistic explorations of the same, see the work of the Clusterduck collective.

on theoretical concepts that informed a practical engagement consisting of 'ephemeral inversion and détournement, experimentation, camouflage and amateur versatility' (*ibid*.p.520).

However, tactical media also evolved at a time when the neoliberal corporate culture was embracing managerial mantras that promoted 'dis-organising the organisation' and 'thinking outside the box' (*ibid*.p.520). Practical examples of these mantras can be found in the guerrilla and viral marketing strategies that were prominent in the 1990s and early 2000s (Frank, cited, in Lievrow, p.82). Guerrilla marketing uses 'low-cost unconventional means' to promote a product or an idea (gmarketing.com,2020),[33] whereas the idea of viral is linked to word of mouth or localised communication networks to spread an idea rapidly and affordably – unconventional, speed and affordability are all common motifs within tactical media practices.[34] This is another example of the appropriation of ideas and styles from a counter-culture to produce consumer goods that appeal to rebellious lifestyles, and by doing so, erode the potential for cultural expression outside of the markets whilst simultaneously neutralising dissent and diversity (Frank, cited in Lievrow, 2011, pp.82-83).

As discussed in section 3.3.2 in relation to punk music, the recuperation of culture by corporate interests was not unique to tactical media, however, some of the issues centred around technology were. Felix Stalder observes that as the internet began to mature contradictions surrounding tactical media began to appear, in particular in relation to long term infrastructural requirements for projects associated with tactical media being a burden problematic (2009) – tactical media was inherently temporal, the logic of excess and sustainability meant there was a need from long term strategizing. Lovink & Rossiter similarly acknowledge the organisational contradiction inherent in tactical media stating 'tactical media will never become organized' (2018, p.18) and in relation to its first wave state 'once squatted spaces had to be rented back. Computer servers broke down and were not replaced, websites disappeared, as did video editing facilities and free radio studios' (*ibid.* pp.19-20). For Stalder, another contradiction appeared in the 'one size fits all' approach of incorporating media production into the tool kit of grassroots organisations and the creation of a

[33] The term guerrilla marketing was originally coined by author Jay Conrad Levison in 1984.
[34] For a more detailed description on the concept of the virus and the viral within digital culture see Alexander Galloway, Matthew Fuller, Jussi Parikka and Andrew Dwyer.

standardised identity around this 'increasingly common practice' (2009). Stalder suggests that in essence tactical media was a victim of its own success which meant it 'could no longer serve as a distinctive approach that would define a particular community (*ibid*. n.p.).

Armin Medosch also notes how temporal concerns impacted the first wave of tactical media, arguing that the realisation that the 'revolution can take a while' meant artist-activist began to focus on other issues surrounding intellectual property (2016). There were a few reasons for this particular focus including a push by corporate actors within the knowledge economy for stricter copyright regime in the digital domain, and as a consequence of this, the realisation by artists that effective sustainability in digital culture could only be found in free and open-source culture (FOSS) (*ibid*.p.373),[35] leading to a general embrace of this culture in contrast to the prevailing philosophy and logic of the free market which sought to monetize every aspect of the digital sphere.

Although at the beginning of the millennium tactical media was expanding, evidenced by the aforementioned tactical media labs, it had simultaneously begun to lose momentum, in part as a result of the changing international geopolitical landscape (Medosch,2016) brought about by the September 11th attacks in the United States. The attacks were a horrific visual détournement of the 24/7 news cycle, reducing emblematic symbols of capitalism to ashes in a matter of hours live on television screens around the world.[36] As Mark Fisher notes, the terrorist attacks stalled the anti-capitalist movement (2009), a movement that often overlapped with tactical media throughout the 1990s. The subsequent war on terror and conflict in Afghanistan and Iraq instigated a new era of security and surveillance. This, combined with the 'expansion of financial capitalism and the intensified implementation of neoliberal policies' (Raley, 2009, p.14), alongside the rise of social media platforms and even greater democratisation of media technologies associated with web 2.0, saw what I have defined as the digital culture industry begin to emerge.

---

[35] For more on the philosophy underpinnings of open-source culture see *The GNU Manifesto* (Stallman, 1985) and *The Cathedral and the Bazaar* (Raymond, 1999).

[36] The attacks took place before the emergence of social media sites with user generated content such as Facebook, twitter and Youtube, but major news sites such as CNN, MSNBC, the New York Times all had websites whose services were impacted by the attacks. See *How the internet broke on 9/11* (Fung, 2013).

It is at this point where this first wave of tactical media – a combination of art, activism and technological experimentation that was more broadly aligned with hacktivism and the 'activist scene per se' began to fade from view (Lovink & Rossiter, 2018). This is of course should not be interpreted as an absolute end to tactical media's first wave, many, if not all, of the artists already mentioned were active in the following years alongside new projects like YoMango.[37] Of course, the Iraq war led to unprecedented global protests and work by artists such as KennardPhillips and many others. However, in this post 9/11 period, another world order began to emerge that was centred on data extraction and accumulation, and it is at this point that tactical media began to rearticulate itself to react to these developments.

3.6 Conclusion

This chapter has mapped out the evolution of the first wave of tactical media. This mapping process focused first on the connections between tactical media, media art and hacktivism and then on the influence of the work of both Michel De Certeau and the Situationist International. This was then followed by a focus on tactical media as it evolved in the 1990s, highlighting a series of events, texts and artists relevant to its development during that decade. Next was a discussion on the concept and practice of culture jamming, a concept that overlaps with many of the ideas associated with tactical media. The chapter concluded by identifying the different reasons for the decline of the first wave of tactical media at the beginning of the century -whilst acknowledging that the second wave of tactical media was emerging around the same time. It is this second wave that is the focus of the next chapter, which engages with media archaeology, and its relationship to tactical media and the practices of contemporary media artists that draw attention to the 'various "gray" zones of technological culture' (Fedorova, 2020, pp.37-38).

37 A shoplifting 'movement' that started in Spain as a critique consumer culture.

Chapter Four

Tactical Media Archaeology

4.1 Introduction

This chapter presents and analyses the field of media archaeology and in doing so, incorporates it as a core conceptual and practice-based framework within this research project. This incorporation manifests itself through a synthesis of media archaeology with tactical media, a synthesis that is central to my practice and is employed in the development of the artefacts featured in this research project. The chapter begins with an overview of the Free Art and Technology (FAT) Lab – a collective of artists and practitioners engaging with digital culture. This overview establishes that not only was the work of the FAT Lab engaging in tactical media but, as a result of their critical position on various issues related to networked technologies and the corporations that control them, also conceptually engaged with an interpretation of media archaeology. This is then followed by an overview of media archaeology, focusing specifically on its opposition to the idea of technological progress within the context of neoliberal ideology and networked capitalism.

Media archaeology is then analysed as a form of media art practice using Jussi Parikka and Garnet Hertzs' *Zombie Media: Circuit Bending Media Archaeology into an Art Method* (2012) as a guiding text. Through this analysis, the concept of tactical media archaeology is formulated and a series of examples of artists engaging in this approach are documented along with relevant texts and manifestos. This is then followed by an engagement with some of the issues and critiques of this synthesised approach. The next section addresses these concerns and highlight peer learning and knowledge sharing as examples of tactical media archaeology being applied beyond traditional gallery formats. The final section describes how a tactical media archaeological approach is a type of praxis within the context of my own creative practice.

4.2 Rerelease

Founded in 2007 by Evan Roth and James Powderly, the Free Art and Technology Lab (FAT Lab) was a collective of artists, engineers, lawyers and various other backgrounds from the humanities and sciences (fffff.at, 2020). Influenced by open source culture, the group focused on the research and development of technologies and media as a way of contributing to the public domain (*ibid*.). Through creative and subversive practices centred on issues aligned with the digital culture industry including surveillance, privacy and intellectual property

rights, the group were prolific in the production and dissemination of their projects. This productivity was attributable in part to their adaption of a 'RERO' approach in their work. *Release Early, Release Often* is an expression in software development that encourages early and frequent releases as a way of effectively developing software based on tester and user feedback, FAT lab reconfigured it to 'release early, often and with rap music'- the reference to rap music emphasising the idea of tagging their work with popular elements to encourage viewers to click on it (Public Broadcasting Service, 2011), a recognition that their work needs to be in some way fetishized to become desirable and accessible.

Whilst projects such as *Hip Hop Pop Ups*, *Dead Drops* and *Public Domain Countdown* may appear irreverent and absurd, the FAT Lab examined various issues related to digital culture, as Regine Debatty observes 'they hop fast and furious on a new law, piece of news or idea that deserves to be discussed (or mocked) beyond the homogenized discourse of mainstream media' (2013, p.13). I consider the FAT Lab as part of a second wave of tactical media as both individually and collectively the group combined art practice with hacktivism to manipulate and challenge techno-political systems and ideologies. The group engaged with Situationist inspired tactics like détournment and culture jamming, whilst simultaneously acknowledging the importance and relevance of open source culture and the commons as both a philosophy and as a methodology for art practice. Evan Roth describes the group as follows:

'…people releasing virally on the web, paying attention to contagious media and figuring out how those systems work and how we can infiltrate ideas into those systems…We tend to make ourselves stronger by sharing… A lot of my work is looking at open source development models and applying that towards the arts' (2011).

4.2.1 Evil Engine

At the 2010 Transmediale festival the FAT Lab developed a project called '*How to Build a fake Google Street View Car'*- the project consisted of a car that was made to look like a Google street view car with a fake camera on its roof and Google logos displayed on its doors. The car was then driven around the city - a humorous and provocative commentary on the privacy concerns associated with Google street maps at that time, and a critique of the search engine

behemoth in general.[38] The FAT lab were not the first media artists to critique Google,[39] but with their *RERO* approach and general aesthetic accessibility '*How to build…*' was more visible and accessible than other Google-focused critical art projects. This is not to say that other projects did not receive media attention, Paulo Cirio's *Google Will Eat Itself* (2005) and Ben Grosser's *Scaremail* (2013) were featured in The Washington Post and The Atlantic respectively. However, '*How to build* … ' received significant media attention and featured on MSNBC, Forbes, The Guardian and others, compelling Google to issue a statement saying that the car was not 'an official Google car.'[40]

Although the project is both humorous and absurd, the conceptual rationale behind it is not. '*How to build…'* was one of a series of projects undertaken as part of FAT lab's contribution to Transmediale in 2010. During the week of the festival, working with the theme '*Fuck Google'*, the group engaged with 'browser add-ons, open source software, theoretical musings and direct actions', all focused on cultivating an awareness of the increasingly dominant role of the search engine giant in both online and offline worlds (Bartholl, 2010). Google is a corporate entity that controls much of the digital networks that society depends on, and as it is publicly traded it is largely unaccountable despite its influence - all of this occurs with few questioning or opposing 'the Google-ification of the internet' (*ibid*, n.p.). This lack of critique of Google is expanded on by Evan Roth who says '*How to build…'* allowed the group to 'hack into people's relationship with Google' (2011). The media coverage that the project received encouraged people to recognise that there were issues with the company and to question its monopoly (*ibid.* n.p*)*.

---

[38] Eight years later Berlin was the site of more intense anti-Google protests with a campaign that successfully stopped the company's plan to build a 'campus' in a suburb of the city, see 'How a Berlin neighbourhood took on Google and won' (Turk, 2018).
The online site for the '*How to…*'project includes a video of the car been driven around the city and instructions on how to make your own fake car, and is available at http://fffff.at/Google-street-view-car/

[39] Nor the last - See *Google Adwords Happening* (Christope Bruno, 2002), *Google Will Eat Itself* (Paulo Cirio, 2005), *The Revolving Internet* (Constant Dullart, 2010), *American Psycho* (Jason Huff, 2010), *Scaremail* (Ben Grosser, 2010), *Poem.py* (Pip Thorton, 2016), Simon Weckart and also Richard Rogers paper 'Aestheticizing Google critique: A 20-year retrospective' (2018).

[40] Google's statement is available at: https://www.theguardian.com/technology/blog/2010/feb/10/Google-street-view-germany-gps-hoax

Although by 2010 the *Do No Evil* motto of Google was becoming increasingly questionable due to various issues including antitrust, tax avoidance, privacy and copyright,[41] I suggest that the public perception and narrative of the company was still broadly positive in the pre-Snowden era, a perception that was similarly enjoyed by the other tech platforms associated with the digital culture industry. In 2010, Mark Zuckerberg was awarded Time magazine's Person of the year. In January of the same year, following the launch of the IPad, The Economist featured Steve Jobs on its front cover portrayed as a prophet holding an IPad with the headline 'The Book of Jobs'. The FAT Lab existed in direct opposition to such hagiographic narratives, constantly reacting to – and foretelling – concerns associated with the digital culture industry , and in doing so, as with collectives such as the Critical Art Ensemble, Bureau of Inverse technology and the Electronic Disturbance Theatre a decade before, acted as a cultural bellwether for the revelations that would emerge in the 2010s. Furthermore, beneath their street and networked-inspired praxis was a theoretical framework that had, at its core, a critical opposition to narratives of progress in relation to technological artefacts, networks and systems.

4.3 Problematic Progress

As with tactical media, there are various interpretations and approaches as to how media archaeology is both understood and utilised. Furthermore, like tactical media, media archaeology by its very nature avoids being situated within rigid academic categories or fields. Despite this lack of unified consensus, it has still contributed to historically influenced research whilst affording scholars the intellectual space to develop their particular approach to this field of media studies (Huhtamo & Parikka, 2011). As a consequence of diverging interpretations of Michel Foucault's work on the archaeology of knowledge, media archaeology can be split into two variations (ibid.p.9). The first is the new historical approach of the Anglo-American tradition which embraces Foucault on the basis of his recognition of the centrality of discourse in connecting knowledge with social and culture power – technology is subordinate to and conditioned by discursive formations (*ibid*.p.9). The second is the more techno-centric, deterministic and materialist interpretation associated with the

[41] See *Google and the Culture of Search* (Hillis, Jarrett, & Petit, 2012) and *Society of the Query Reader: Reflections on Web Search* (König & Rasch, 2014).

German tradition which draws on Friedrich Kittler's position that Foucault's emphasis on 'words and libraries' should be refocused to include more media-centred ways of understanding culture (Kittler, cited in Huhtamo & Parikka, p.8). Irrespective of these divisions, media archaeology can be, broadly speaking, situated between media theories embedded in materialism and a focus on the importance of obsolete and forgotten histories and narratives of media (Parikka, 2010). But why this emphasis on the forgotten and obsolete, on the 'discontinuities' of media history?

As Siegfried Zielinski observes 'nothing endures in the culture of technology' (2006, p.2). Media historians have failed to look back on the histories of media evolution to identify important events, moments or artefacts that may have been neglected (*ibid*.p.2.). This failure, partly attributable to ideological reasons, has contributed to the growth in the idea of the relentless and uncontested supremacy of technological progress (*ibid*.pp.2-3) and the fetishisation of the *new*. The *new* in new media implies 'most recent' indicating superiority, and is aligned with concepts associated with progressive or enlightened thinkers such as 'cutting edge' or 'avant-garde' (Lister *et al.,* 2003, p.11). This interpretation of *new* derives from a modernist perspective that celebrates the potential of technology to facilitate progress through increased productivity, education and communication (*ibid.*pp.10 - 11). It is associated with narratives of progress in western society and is promoted by a wide range of actors from industry, science and the humanities (*ibid.*p.11).

The promotion of the *new* in relation to digital technologies and culture is part of a dominant neoliberal ideology that has been at the centre of the globalised world since the fall of the Berlin wall. As noted in the previous chapter in relation to the *Californian Ideology* thesis, this interpretation of progress facilitates an uncritical view of digital networked technologies. Such an interpretation is intertwined with dominant neoliberal political, economic and technological discourses that offer nothing more than 'comforting fables about a bright future' (Zielinski, 2006, p.3) and support a techno-solutionist perspective that embraces technology, placing a blind faith in its ability to solve all problems (Morozov, 2013). According to Zielinski, histories of media should not be read linearly from most primitive to complex, and cutting through such chronologies reveals a more diverse interpretation of the development of media (*ibid*.p.7). These alternative interpretations spurn 'obligatory trends, master media, or imperative vanishing points' (*ibid*.p.7), and in doing so, provide a different

understanding not only of these dominant narratives, but also how they have emerged and how to counter them.

4.3.1 A Material World

Friedrich Kittler shares a critical view of such narratives, speaking scathingly of an 'alleged media pluralism' that advocates expression and experimentation - as long as the global dominance of silicon valley remains unchallenged (1999, XI). Originally written in 1985, Kittler's observations on the perceived pluralism of media are still relevant - technology appears to offer even more plurality in terms of communication and connectivity, yet as a result of the consolidation of communication platforms and infrastructures by various silicon valley actors, this plurality remains questionable. Although Kittler recognises the 'power related implications of technology' (Huhtamo & Parikka, p.9), his approach is techno-centric and deterministic, evident in his declaration that 'media determine our situation' (1999, xxxix).[42] It is from this position that Kittler argues that it is not the communicated message that is important, rather it is 'the circuits, the very schematism of perceptibility' (preface, 1999, p.xii). Kittler claims that 'archaeologies of the present must also take into account data storage, transmission, and calculation in technological media' (1990, p.369). In order to engage and understand with media technologies - from typewriters to those operating within and through digital networks - they must be placed within their specific material contexts (Huhtamo and Parikka, p.8.). Media or technological networks that allow for the emergence and dominance of specific language and discourse must not be overlooked or ignored (Siapera, 2011, p.10). To understand our present reality, we must consider the different ways in which information is stored and accessed (*ibid.*p.10), as Kittler observes 'romanticism notwithstanding, numbers and figures become the key to all creatures' (1999, pp.18 – 19).

Influenced by Kittler's deterministic position, Wolfgang Ernst's approach to media archaeology focuses on the *nondiscursiv*e and the 'agency of the machine' (2013, p.45). For Ernst, technical artefacts should be considered as processes that are not simply tied to the macrotemporal, but also the microtemporal timing of the machine (Cox, 2015). This microtemporality offers an understanding of the influence of technology on social and

cultural processes at a level that can not be reduced solely to human experience (*ibid*.p.10). Network pings, hard drive revolution speeds and computer clock times are all examples of machines fabricating time, as opposed to being 'in' time, and how machines impose the temporalities on our social world (Parikka, 2015, p.7). Ernst acknowledges the importance of the intellectual critiques of technology offered by the Frankfurt School (Roy, 2017). He also suggests that at a more practical level a media archaeological approach encompasses the 'knowledge surplus' that arises when people who are not technically trained, engage with technology (*ibid*. n.p).

Ernst encourages an understanding of media beyond the theoretical, arguing that to 'understand the machine…you have to learn its language' (*ibid*. n.p). As highlighted in chapter one, I agree with this position in relation to my own practice and consequently to the methodology employed in this research project.By learning to speak the language of the machine, an 'asymmetrical dialogue' is created on the basis that machines operate beyond traditional textual and human-subject communicative forms - as electric media operate sequentially and numerically it is not possible to understand them narratively (*ibid*. n.p). Technical objects are 'not bound to macrotemporal processes' but should be considered within the context of microtemporality, a way in which to understand how technology conditions social and cultural processes at a level that is not just reduced to human experience (Cox, 2015, p.10).[43]

4.3.2 Broken Things

Erkki Huhtamo refrains from describing media archaeology as a genre, referring to it instead using the more neutral and general term of 'approach' (1996, p.248). In doing so, Huhtamo is underlining the 'diffuse character' of media archaeology and how it can be employed (*ibid*.p.248). Aside from the materialistic interpretation outlined above in the work of Friedrich Kittler and Max Ernst, there are other interpretations offered by Siegfried Zielinski, Erik Kluitenberg and Erkki Huhtamo. These interpretations focus on the forgotten and imaginary histories of media that offer a critique of the present mediated era. Beyond the material and the imaginary, media archaeology draws from a diverse range of theoretical

[43] See also Winnie Soon's analysis of the data processes behind the graphically animated 'throbbers' within the context of micro-temporality in '*Executing Micro-temporality'* (2018).

frameworks and backgrounds, including gender theory, postcolonial studies, visual anthropology and more (Huhtamo & Parikka, 2012). It shares conceptual positons with tactical media in that it is transdisciplinary and indeed anti-disciplinary which Joi Ito defines as 'working in spaces that simply do not fit into an existing academic discipline' (2018). Media archaeology can be applied to our understanding of digital media, cinema, art and networked culture, whilst simultaneously affording us the opportunity to reappraise our relationship with technology and media. What unites all of these interpretations is a rejection of dominant narratives of media culture and history (Huhtamo & Parikka, 2012, p.3), narratives that are intertwined with the idea of technological 'progress.' Media archaeology provides a conceptual and practical method in which to challenge that which is 'currently firmly established' (Zielinski, 2006, p.7).

What is firmly established in the context of contemporary digital culture is the dominance of Big Tech, which as noted in chapter two, is a dominance achieved through the ownership and control of the most popular and used devices, platforms and infrastructures of the networked era. As noted in chapter three, Barbrook and Cameron's *Californian Ideology* thesis was written in the 1990s and was concerned with the consequences of neoliberalism and networked technologies before the dotcom crash. I consider the subsequent web 2.0 eraand the current digital culture industry as a continuation of this ideology, presenting an uncritical celebratory viewpoint on networked progress and innovation formulated into slogans such as 'move fast and break things',[44] 'Don't be Evil', 'disrupt' and so on.[45]

This continuation of the *Californian Ideology* has fostered an environment that encourages a sense of complacency in the relationship between users and Big Tech. This complacency is fostered and developed over years of celebratory stories of innovation alongside smart branding and 'sloganisation' that suggest a fetishisation of a smarter, connected self or in language that fetishizes technological artefacts, protocols and networks such as 'revolutionary' and 'transformative', what I refer to as language of the upgrade – all of which reinforces a techno-solutionistic perspective within contemporary society. As a discipline that is 'against the grain' (Lovink, cited in Huhtamo & Parikka, p.3), media archaeology provides a

[44] Used as an internal motto at Facebook until 2014.
[45] See 'The disruption con: why big tech's favourite buzzword is nonsense' (Daub, 2020).

conceptual framework with which to challenge such narratives, and the discourses from which they emerge.

Despite this critique of progress and innovation, media archaeology, nor my engagement with it, should not be interpreted as a rejection of the technological or scientific advances that have helped to shape the current networked era. As noted in chapter one, the critical positon on networked technology taken in this thesis is not a form of neo-luddism. Although there are tensions and contradictions within such positons, media archaeology offers sufficient scope in how to navigate them. It prompts nuance and encourages criticality in relation to how technological progress is measured, by whom and for what reasons. This is important when engaging with networked technologies and platforms.

Media archaeology allows me as an artist and researcher to create space in my own development and understanding of dominant technological systems, encouraging me to reflect on my own relationship with these technologies whilst suggesting alternative directions for different narratives. Furthermore, due to its oppositional position media archaeology compliments a post – digital perspective that has seen increased disenchantment and scepticism of the opportunities offered by digital devices, networks and platforms in the post – Snowden era (Cramer, 2015). This perspective is evident in my own practice and in those of artists and collectives such as the FAT lab as it cultivates a space for a material and experimental engagement with the circuits, networks and code of networked culture.

4.3.3 Cloudy Circuits

In an effort to provide a concise meaning of what media archaeological art is, Jussi Parikka offers six different ways in which old media technologies and themes have been used within a contemporary context (2012). Although it is just a brainstorming exercise, it is still useful as the different approaches identified by Parikka include historical themes, alternative histories, planned obsolescence and imaginary media (*ibid.*pp.139-140) serve as useful guides in which to examine contemporary media art practices that engage with media archaeology. The most relevant to my practice and this research project is an approach that excavates contemporary technologies, machine and networks to 'address the present – but technically 'archaeological' – buried conditions of our media culture' (*ibid*.p.140). This approach is adapted within artistic

practices that overlap at times with activism and are focused on opening up these machines and networks by using material approaches including DIY practices like circuit bending and hardware hacking (ibid.p.140).[46]

This material approach to media archaeology is further extended on by Jussi Parikka and Garnet Hertz in their essay, *Zombie Media: Circuit Bending Media Archaeology into an Art Method*.[47] Parikka & Hertz suggest that DIY cultural practices that engage with the political economy of information technology serve as a reaction to - and a form of resistance against -the logic of planned obsolesce in consumer electronics (2012).[48] Drawing on the work of Wolfgang Ernst, Parikka & Hertz argue that media archaeology should not only focus on an excavation of the previous events or artefacts, but should also be centred on the 'microtemporal modulations' that occur within technological artefacts, and as such, an artistic media archaeological approach should start from 'the circuit, not the past' to develop art methods that incorporate recycling and remediation (*ibid*.p.427). However, this approach is challenging on the basis that advances in technology mean that the internal workings of consumer electronics are increasingly concealed (*ibid*.p.427).

Parikka & Hertz use Bruno Latour's interpretation of the 'black box'which avoids complexity and focuses specifically on understanding a system's input and output (Latour, 1987). Although this 'black boxing' of technological artefacts is essential in the development of infrastructures and technologies, it contributes to a general, and problematic, abstraction of technology in which technical objects 'are simply used and not understood' (Parikka & Hertz, p.428). As with language such as the 'cloud', such abstraction in relation to technological development is problematic for a number of reasons. Firstly, it contributes to a sense of alienation between the user and technological systems and infrastructures which in turn facilities processes and practices aligned with surveillance and data extraction. Secondly, as

---

[46] Circuit Bending is a creative and experimental process of short-circuiting low-voltage consumer electronic devices to make new musical or visual artefacts. It often used synonymously with hardware hacking.
See the work of Reed Ghazala, Garnet Hertz or the Coletivo Gambiologia.

[47] The term *Zombie Media* is in reference to Bruce Sterling's *Dead Media Project* which serves as an archive of forgotten and dead media.

[48] For an earlier manifesto version of the Zombie Media article, see 'Five Principles of Zombie Media'(Parikka & Hertz, 2011).

discussed in the earlier in this chapter, abstraction allows dominant narratives to go unchallenged – once something works why should we question it?

Black boxing is a necessity of research and development, however, by its nature it excludes the user from a deeper understanding of technical processes. This contributes to a general sense of detachment this is often a consequence of complexity as opposed to design-led intentionality – unlike practices more aligned with more planned obsolescence that serve the interests of capital at the expense of the environment. The adverse effects of black boxing can be seen in a lack of literacy surrounding engineering and also a general disconnect between the user and the many complex processes involved within the digital culture industry as outlined in chapter two.[49]

Parikka & Hertz describe the concept of 'punctualization', originally developed by Michael Callon and Bruno Latour, as the combination of many individual components into one specific complex system – essentially multiple black boxes brought together. Although these black boxes serve as 'building boxes' to build new technologies and infrastructures, they are not technically understood meaning that they will become obsolete or broken (*ibid*. p.428). This leads to a restrictive and prohibitive engagement with technological artefacts and components, non-professionals are unable to engage with these black boxes as they are too complex, contributing to a form of planned obsolescence. This restrictive situation in relation to technological artefacts expands beyond actual physical objects and is incorporated within the political and economic ecosystems from which they emerge. Parikka & Hertz, citing Latour, argue that when something breaks down we become aware of the other objects behind it, and in doing so, we realise that these objects are composed of 'relations, histories and contingencies' (ibid. p.428). Drawing again from the work of Latour, Parikka & Hertz propose 'depunctulization', a practice of disassembling technological objects to show a 'circuit of dependencies and infrastructures' within them (*ibid.*p.428) as a counter method to offset the abstraction of black boxing.[50] This process of depunctulisation can be achieved

[49] Increased awareness surrounding the need for a more reflective engagement with technological research and development in recent years can be found in the increased inclusion of philosophy and ethics related modules into computer science and engineering programmes, see 'Embedding ethics in computer science curriculum' (Karoff, 2019).

[50] For more on 'depunctulization' See Latour's *Pandoras Hope: Essays on the Reality of Science Studies* (1999) and 'The politics of punctualization and depunctualization in the Digital Advertising Alliance' (Gehl, 2016).

using 'folksy methodologies' such as circuit bending and hardware hacking that serve as a counterpoint to the perceived clean and glossy aesthetic associated with digital culture (*ibid*.p.427).

4.4 Towards a Tactical Media Archaeology

Parikka & Hertz's media archaeology as an art method focuses on remediation and reuse as a form of artistic resistance against environmental concerns associated with consumer electronics. This approach to media archaeology can be applied more broadly to the techno-political concerns of the digital culture industry and the 'buried conditions' of contemporary technologies. The depunctulization of the digital culture industry through artistic methods overlaps with the material practices of circuit bending and hardware hacking, but further extends on these practices to excavate the various 'temporalities, relations and potentials' (*ibid*.p.429) of technological artefacts and the networked systems in which they are immersed.

This is what I refer to as *tactical media archaeology* – a set of art and technology practices used to critique dominant narratives associated with Big Tech, techno-solutionism and the neoliberal interpretation of progress - narratives that reinforce the exploitative infrastructures, networks and systems of contemporary networked capitalism. These practices, which are informed by an open source philosophy and overlap with hacktivism include circuit bending, hardware hacking, détournment, culture jamming, open source investigation methods, remix and critical making.[51] This list is by no means complete -tactical media archaeology is an open concept and is intended to be both flexible and reflexive. However, the methods and practices that are mentioned here feature within my own practice and are utilised in the production of artefacts developed within this thesis. Consequently, tactical media archaeology is employed as a practice-based methodology within this thesis. Culture jamming and détournment have already been discussed in chapter three, to provide clarity to the reader I will briefly outline the interpretation of remix employed within this thesis.

[51] I am not the first to use this term -Geoff Cox & Martin Riise combine tactical media and media archaeology as an 'analytical method for developing alternative compositions of both algorithmic music and politics'(2018, p.604).

Eduardo Navas distinguishes between *remix* and *remix culture* arguing that remix culture is in reference to 'creative and efficient exchange of information made possible by digital technologies that are supported by the practice of cut/copy and paste' (remixtheory.net, 2020) and is comparable to a movement that focuses on the sharing of ideas and their subsequent manifestation as specific products (2012, pp.3-4). Remix serves as a 'cultural glue' and informs culture in ways that are not always as obvious as remix culture (*ibid.*pp.3-4). Within my practice and this research project, I prefer to be quite fluid with both interpretations. Media artists engage with remix culture in different ways and as a consequence of digital technologies and networks, remix is an integral part of digital cultural production.[52] Examples of remix related practices can be found in digital artefacts such as internet memes which emphasise remix through adaption and distribution (Esteves, 2018), electronic and hip hop music -both of which are built upon earlier experiments with new music technologies from companies such as E-MU Systems and AKAI -and glitch art which as noted in chapter three focuses on forcing errors within pre-existing digital artefacts.[53]

Beyond specific examples of cultural artefacts and production, the role of remix as digital cultural glue is evident within the context of data which, as Conor McGarrigle notes, is, in essence, a text and can be remixed through algorithmic processes that extract, sample and combine data sources to form new data sets (2015). Open source culture is based upon principles of sharing and building upon pre-existing knowledge, part of its networked form can be found in online platforms such as github and codepen that promote community-based knowledge sharing. As noted in section 4.2, this ethos has been embraced and promoted by the FAT lab, but also, as is outlined later in this chapter, by myself and other artists engaging in related practices and approaches.[54] As Navas observes, remix is in many ways parasitical,

---

[52] See also *Remix: Making Art and Commerce Thrive in the Hybrid Economy* (Lessig, 2009) and *The Routledge Companion to Remix Studies* (Navas, Gallagher & Burrough,2021)

[53] Although the tension between remix and copyright still exists, it has been recognised as a legitimate cultural practice. In 2020, as part of an 'Innovator In Residence' programme at the United States Library of Congress, artist Brian Foo developed the 'Citizen DJ Project' an online interface that allows users to make hip hop music using samples from the Library of Congress' vast collection of free-to-use audio and video collections, see https://citizen-dj.labs.loc.gov/.

[54] See for example the github pages of Phillip D. Stearns, Sarah Grant and Gene Kogan, which document the code involved in their work, along with relevant teaching resources etc.
www.github.com/chootka, www.github.com/phillipdavidstearns, www.github.com/genekogan

implying that it can be a negative force, however, when employed effectively it can become a tool of autonomy (2012, pp.3-4).

4.4.1 Excavations

As noted in the previous section, tactical media archaeology is an open and flexible concept.It incorporates a variety of material practices associated with media archaeology and tactical media and is also conceptually informed by them. It describes my own practice and is the central approach utilised in this practice-based enquiry. Aside from my own work, I recognise a tactical media archaeological approach being utilised by other contemporary critical media artists. I have categorised some of these artists, and their work, based on the *platform protocol place* theme of this research project. Certain liberties are taken with this categorisation, for example, I use the term *interface* interchangeably with *platform* to emphasise the screen from the users' perspective. These examples help to illustrate and strengthen the concept of tactical media archaeology as a concept that describes media art practices used to critique networked capitalism.

Catalan artist Joana Moll critically engages with various aspects of the platform, evident in work such as *C02gle* (2015) and *DEFOOOOOOOOOOOOOOOOOOOOOOOREST* (2016). Both of these projects confront the environmental impact of the interface's underlying infrastructure to highlight 'the invisible connections between actions and consequences when using digital communications technologies' (Moll, 2016). Nick Briz has also engaged with the platform through projects such as *How/Why to leave Facebook* (2014), a tutorial/video essay on how to leave Facebook as a performative form of activism (Briz,2014) and *How They Watch You* (2020) which reveals how monitoring and surveillance are built into our everyday experience of internet browsing (theodi.org, 2020).

Projects by Ben Grosser such as *Go Rando* (2017), *Twitter Demetricator* (2018) and *The Endless Doomscroller* (2020) are all examples of media artworks that engage with techniques of détournement, remix and appropriation to challenge popular narratives, concepts and metrics associated with digital culture and social media.[55] Furthermore, these projects are

[55] See The *Metainterface: The Art of Platforms, Cities, and Clouds* (Anderson & Pold, 2018) for further analysis of the work of Moll and Grosser within the context of the interface.

open sourced, meaning that they can be adapted by others, something which as I explain later in this chapter, can be interpreted as a form of praxis.[56] Glitch art is primarily concerned with the manipulation of digital artefacts through visual and audio codecs which can be interpreted as being more protocol focused, however, as much its output occurs and is centred on various platforms and interfaces, I situate them as examples at the platform level.

Ben Grosser's work also engages in tactical media archaeology at the protocol level. *Tracing You* (2015) utilises user IP addresses and cross-references them with online data resources - a process that traces each user back through the network to their possible point of origin (Grosser, 2017). Projects by artists affiliated with Weisse7 Studios in Berlin such as *Men in Grey* (2009-2014), *The Transparency Grenade* (2012-2014), and *Newstweek* (2011) all subvert Wi-Fi protocols as a method of drawing attention to issues associated with Big Tech including privacy, security and access.[57] Although in the context of my practice-based research,I focus specifically on internet and Wi-Fi protocols, taking Matthew Fuller's position that software 'structures and makes possible much of the contemporary world' (2008, p.1), I also suggest that a tactical media archaeological approach can be found in the work of artists whose practice is centred on the excavation, manipulation and parsing of software protocols including Daniel Temkin, Winnie Soon, Alex McClean, Ted Davis and Antonio Roberts all of whom customise and develop software as a way to explore the power dynamics and relations inherent in code.

A tactical media archaeological approach is also evident in numerous projects associated with the idea of *place* within digital culture. *Subnodes,* a project by artist Sarah Grant situates digital culture and communication locally by switching off from the internet, but still maintaining a form of interaction vis-à-vis Wi-Fi connectivity. *Subnodes* also serves as an example of a protocol interventions due to its engagement with Wi-Fi – however as the ethos of the project is very much orientated towards the idea of the local within the context of online/offline community, I believe the project is more about local IRL community than networked community. Projects that engage with tactical media archaeology of *place* through

[56] As is detailed in chapter five, the concept and code of Grossers *Scaremail* project significantly informed the development of one of the practice-based projects of this research project.
[57] Weisse7 is primarily Julian Oliver & Danja Vasiliev – also known as the Critical Engineers who, with Gordan Savičić wrote the Critical Engineering manifesto, and are featured throughout this thesis.

an environmental lens can be found in Tega Brain's *'Open Flame'*, Aram Bartholl's *'Rock'* or the ongoing work of Dave Evans in creating infrastructural communities (evansdave.com,2021).As is discussed in chapter seven, counter cartographies of the physical locations of the corporate internet have been conducted by artists including RYBN, Ingrid Burrington, Mario Santamaria and others.

The above examples show other artists whose work demonstrates a tactical media archaeological approach. Of course, this is based on my own interpretation of their work and is entirely subjective. However, it is not unreasonable to suggest that these artists use practices such as creative coding, remix and hardware hacking to develop work that critiques various aspects of the digital culture industry. Further examples of a tactical media archaeological approach are featured in the following chapters within the context of my own practice.

4.4.2 Manifestos

The manifesto form has been employed by artists linked to the historical evolution of media art including the Dadaists, Futurists and the Fluxus movement. It has been utilised by technologists like Ted Nelson, Richard Stallman and John Perry Barlow to conceptualise, highlight and reflect on the possibilities afforded by networked technologies and digital culture. More recently it has been used by hacktivist groups capable of subverting technological infrastructures as a means of protest, resistance and attack such as *Anonymous*. I will now highlight certain manifestos in the post 2007 era that I believe are reflective of a tactical media archaeological approach. As with the artworks discussed above, it is not intended as an exhaustive list. The manifestos highlighted all share a critique of dominant narratives surrounding technology whilst simultaneously suggesting potential practice-based responses to these same narratives.

The 3D *Additivist Manifesto* by Moreshin Allahyari and Daniel Rourke situates the culture of 3d printing within Zielinski's *Deep Time of History*, connecting the 'petrochemicals boiled into being from the black oil of a trillion ancient bacterioles' (2015), whilst simultaneously critiquing contemporary techno-fetishism, arguing that 'there is nothing which our infatuated race would desire to see more than the fertile union between a man and an Analytical Engine'

(*ibid*. n.p). The *Critical Interface Manifesto,*[58] with its emphasis on the 'ideological aspect of the interface' speaks of the interface as being the 'the tip of the iceberg of a complex system of agents/agencies, of interdependent infrastructures, codes, data, applications, laws, corporations, individuals, sounds, spaces, behaviours, objects, times, affects, effects, defects..' (Interfacemanifesto.hangar.org, 2018). The interface is built upon a series of systems and black boxes, in which interactions with digital interfaces appear as subjective decisions, but in reality, they are normalising power dynamics (Badía *et al.*, 2016, p.220).

The *Critical Engineering Manifesto* (criticalengineering.org, 2018) emphasises the 'need to study and expose' the inner workings of technological systems and artefacts whilst acknowledging the black boxes of the 'machine' which consist of 'interrelationships encompassing devices, bodies, agents, forces and networks' (criticalengineering.org, 2018). The Critical Engineers excavate technological systems and artefact in order to highlight, raise awareness and understand the processes that enable technological systems and the influence and impact they have on our relationship with them. With their emphasis on the 'exploit' and their disregard for 'ownership or legal' provision, the work of the critical engineers engages with a tactical media archaeological approach.

In his 2018 essay, 'We need something Better than the Maker Movement', Garnet Hertz offers a critique of the commercialisation of maker culture by Maker Media. Hertz argues that the tech-orientated projects featured in Make Magazine, have little, if any, space for critical reflection or discussion on the social, political or cultural implications of technology on society. Make Magazine does not offer an agenda beyond 'American self-reliance or the vagueness of improving education' (neural.it, 2018). As a response to these issues, Hertz offers a détournement and reconfiguration of the Maker's Bill of Rights.[59] The updated version offered by Hertz included statements such as 'I take responsibility for making objects and the impact they have on people, society and the environment' (2018) and attempted to engage

[58] The *Critical Interface Manifesto* is the result of a European collaboration project (PIPES (Participatory Investigation of Public Engaging Spaces) with contributions from researchers and artists aligned with *Hangar* (Barcelona), *Ciant* (Prague) and *ZKM* (Karlsruhe).

[59] The *Maker's Bill of Rights* was originally written by Mister Jalopy, Phillip Torrone & Simon Hill and was a call for more easy access to repair devices, it is available at: https://cdn.makezine.com/make/MAKERS_RIGHTS.pdf

with social and economic issues related to gender, labour and the environment which Hertz argued are missing from mainstream maker culture (*ibid*. n.p). [60]

Other examples offered by Hertz of a critical engagement with technology can be found in projects such as '*Disobedient Electronics: Protest'* (2016), a publishing project that highlights 'confrontational work from designers, electronic artists, hackers and makers' and in doing so, demonstrates how making DIY electronics has the potential to be an effective form of 'social argument or political protest' (*ibid*.p.2). The work of Hertzs' Bill of Rights draws from the practice of *critical making* - a term first coined by Matt Ratto to link 'two modes of engagement with the world that are often held separate—critical thinking, typically understood as conceptually and linguistically based, and physical "making," goal-based material work' (2011, p.253).

The above manifestos all support or accompany media art practices that excavate the black boxes of the platforms, protocols and places of the digital culture industry. With their emphasis on the materiality of digital culture, an engagement with the concerns of the digital culture industry, these manifestoes embrace a tactical media archaeological approach and have informed and guided my own practice.

4.5 We Lost

The FAT Lab disbanded in 2015, releasing a piece entitled *We Lost* which offered reasons for the group's decision to stop working together as a collective. *We Lost* incorporates text and audio from two different sources. The first source is a talk delivered by two internet activists,

[60] Maker Media was founded in 2004/5 by Dale Dougherty. It published Make Magazine - a magazine that popularises the maker movement by focusing on DIY/DIWO projects that engage with electronics, computing, robotics and other practical approaches. It also organised Maker Faire - a series of international events that promoted art and science projects. Maker Media closed suddenly in 2019, but at the time of writing Make magazine was still being published.
In 2012, hacker and inventor Mitch Altman stopped working with Maker Faire following its successful application for an award from DHARPA, a research and development section of the US Department of Defence. In 2017, Dale Dougherty was widely criticised for repeating claims that Chinese tech designer and maker Nancy Wu was not a real person and was the public persona of group of individuals. Dougherty later admitted his mistake and apologised. See Garnet Hertzs' *Made: Technology on Affluent Leisure Time* (2012), a humorous visual critique of Make magazine.

Frank Rieger and Rop Gonggrjip, at the Chaos Communication Congress in 2005.[61] [62] The second source is from a presentation by Peter Sunde at the Transmediale festival in 2015.63 The theme of both presentations is broadly similar, focusing on how society has succumbed to the overarching power of the surveillance industry through its embrace of networked technologies. Whilst Rieger & Gonggrjip's speculates on potential positive outcomes 10 years into the future, Sunde's perspective is far more pessimistic, stating 'we show the examples of good things we've achieved with technology…but it does not hold its merits, there is (*sic*) no long term effects. Globalisation by virtue of capitalism won' (2015). Sunde extends on this in relation to art and activism stating,

'*call it activism, call it work, call it art. Call it whatever you want. I've tried, my friends tried, you've all tried, but capitalism won, its game over…We're too lazy, we're too tired. We're too content. We just want our Nespresso machines and we don't want any responsibility. We blame our politicians even though we elect them. The politicians have no say anyhow. It's not about money it's about the control (ibid,n.p.)*.

The FAT Lab's *We Lost statement* is similarly negative in tone,

'*The battle is lost and the juggernaut of the security industry, power and capital has been unable to stop…one thing is clear, tactics of the last 5 years whether legal, political, activist or artistic have resulted in little progress and have not kept up with latest control measures…It was as true in 2005 as when Peter says it in 2015. Let's face it, we lost, we all lost*' (Monki, 2015).

The FAT lab statement goes on to say that artistic hacking practices have been neutralised as a result of two factors - the first flippantly points to the tech industry superseding artistic attempts at parody by continuously making themselves 'look like idiots', the second, an acknowledgement of a process of recuperation by the tech industry which can 'incorporate

---

[61] The Chaos Communication Conference is an annual conference held in Germany It features various talks, lectures and workshops related to techno-political concerns.

[62] For further analysis of We Lost, see After Internet? *F.A.T. Lab's farewell and reconsiderations of the post-internet trope in art* (Mintz, 2017).

[63] Peter Sunde is the co-founder of The Pirate Bay website. His appearance at Transmediale followed his release from a Swedish prison after serving a term for copyright charges based on his involvement with the website.

critic and creativity to make itself stronger' (*ibid.* n.p). The statement also acknowledges that the realization of having lost can be 'a powerful thing both depressing and liberating', and suggests that the decision to shut down of their own accord is a more 'active reaction' than choosing to give up (*ibid*, n.p). Irrespective of the decision and processes involved the result is the same according to the group, they lost.

We Lost, Peter Sundes' presentation at Transmediale, and the presentation by Frank Rieger & Rop Gonggrjip a decade before at the Chaos Communication Congress, are all a far cry from the utopian online world John Perry Barlow imagined in 1996, a world 'without privilege or prejudice accorded by race, economic power, military force or station of birth' (1996). One of the central reasons for FAT Lab's disbandment was that its approach to art and activism had not evolved to reflect the changes with the internet (Roth,2016),[64] or more specifically 'our adversaries have grown powerful and our methods outdated' (Roth, 2015). As outlined in sections 4.2 & 4.2.1, the FAT Lab followed in the tradition of tactical media, their occasionally absurd but always socially and techno-politically engaged work which experimented with the technologies and media available to it brings to mind the 'typical heroes' the 'happy negatives who are always looking for an enemy' mentioned in *The ABC of Tactical Media.* However, once the enemy has been identified and defeated those engaging in the methods of tactical media 'fall into crisis' (Loving & Garcia, 1997).

Whilst in this instance there has been no victory, the rest of this description from Lovink & Garica is applicable to the FAT Lab. Although it is tempting to believe in the 'teleological development of the internet as a medium to end all media' (Lovink, 2005), one of the functions of tactical media is to discourage 'high expectations around the 'liberating' potential of all technologies' and to know when it is time to leave networks that have developed – leave them to others or history, in order to move on (*ibid*. n.p). This appears to be the case with the FAT Lab, an awareness of how far they could go with their projects and what they could realistically achieve as a collective within the context of both art and activism.[65] This honest

[64] Roth also discusses Internet Landscapes and states that unlike FAT LAB which tried to maintain speed or keep up with the internet, his new practice is 'alone, slow, not designed for sharing' – his take on the Top Gun fast break manoeuvre – This is reminiscent of the idea of slow computing as discussed in chapter 7.

[65] For a far more scathing analysis on art & activism within the context of contemporary cultural jamming, see 'We have lost every fight'(Kleiner, 2021).

and reflective approach of the limitations of media art practice, be it through the scale and size of what is opposed, or the susceptibility of its radical potential through the negation of recuperation, compels consideration of the same issues beyond the work of FAT lab.

4.5.1 Common Subversions

Tactical media was 'a quick and dirty aesthetic' that came 'to symbolize a vérite' of the 1990s (Lovink & Garcia, 1997). The FAT Lab represent a similar aesthetic symbolizing a post-internet vérite of the digital culture industry and the complex issues that define it. As a result of their critical opposition to narratives that fetishize technology combined with a collective focused on the depunctualisation of such narratives, the group also engaged with a variant of media archaeology, and in doing, provide another example of tactical media archaeology as outlined in section 4.4. Thomas Elsaesser identifies this interpretation of media archaeology as having become a 'refuge of a certain pseudo-radicalism, the successor to a once hip hacker-culture' and a 'rallying point of all the dissident and resisting energies that have still not 'sold out' to the corporations and to the NSA' (2016).

Although Elsaessers' comments may come across as being quite disparaging, they are not without merit. Much of the terminology surrounding the black boxes of media archaeology has been widely adopted in recent years, often used within the context of an oppressive, omnipresent, obfuscated technological hierarchy - with no shortage of projects, papers or practices that seek to unlock, unopen and investigate the black boxes within technological systems and artefacts.[66] With these comments from Elsaesser, with the potential for co-option of the hacker aesthetic and also the respective critiques outlined by both Peter Sunde and the FAT Lab, alongside the size and scale of the digital culture industry, it is justifiable to question the point and effectiveness of such critical media art practices.

---

[66] Including my own, see *C-Node: Subverting the Black Boxes of Amazon Web Services in Dublin* (O'Neill, 2019). Also *Penetrating the Black Box: Hacking as an Emancipatory Strategy in Art, Science & Technology* (workshop Patricia J. Reis, 2016),*Freeport 1: Anatomies of a Black Box*(workshop, Vladan Joler,2018),*Little Black Boxes* (Mariana Mogilevich, 2017) *Unlocking the Black Box of AI Listening Machines: Assemblages for Art, Technology and Innovation* (Sharath Chandra Ramakrishnan,2020), *Black Boxes* – Exposition Artiste en Résidence @ UCL 2018 (Artist Residency, Nicolas Maigret)*Opening up the black boxes: Media archaeology, 'anarchaeology' and media materiality*' (Goddard, 2014),*Against the Black Box: Strategies of Control and Tactics of Resistance* (Oliver Smith, 2014, Dissertation).

In her analysis of participatory art projects that, inspired by Situationist practices such as the *dérive*, seek to make "visible the invisible" and highlight awareness of complex systems, Shannon Mattern suggests that there may be a tendency for such projects to become 'ends in themselves' (2013).[67] A project or intervention may generate awareness of an issue or prompt a discussion on alternatives 'but then what?' (*ibid.* n.p). Mattern cites the work of Jacques Rancière who states that "understanding does not, in and of itself, help to transform intellectual attitudes and situations" and warns that an emphasis on revealing secrets, or making visible the invisible, might actually "kill…the strangeness" of the issue or concern that is the focus on the work (Rancière, cited in Mattern, *n.p*, original edit). These artists and their practices, exist not just within the context of the gallery space but also in the 'commons', and perhaps it is here where they are - through open source sharing and remix practices - most likely to affect coherent tangible reactions and change. As Brian Holmes notes 'the greatest symbolic innovations are taking place in self-organization processes unfolding outside the artistic frame' (2008 p.93).

Daphne Dragona asks if it still makes sense to talk about artistic subversion and reflects on whether the word "subversion" is either outdated or inappropriate in relation to art as a consequence of its logic being utilised 'by those in control' (2016, p.186). To reformulate the role of artistic subversion in the post-digital-era, Dragona highlights various artistic strategies and methodologies as examples of what she terms 'soft subversions' (*ibid*.p.187).[68]These practices emerged from the open source movement and in turn were increasingly centred around a critical pedagogy found in a new workshop culture (*ibid*.p.187). Broadly speaking, this culture critiques the structures of power that support the digital culture industry. Dragona identifies strategies including obfuscation, over-identification and estrangement as a starting point in understanding how the idea of subversion can be incorporated into workshops to engage participants (*ibid.* pp.190-194).

---

[67] For a humorous interpretation of this trend, see @MakingInvisible - a twitter bot that playfully manipulates the oft-cited approach of 'making visible the invisible'.

[68] Dragona notes that this derives from the concept of 'soft power.' The idea of soft power in geopolitics was formulized by political scientist Joseph Nye to denote cultural and political norms that may influence individuals, groups, states in contrast to hard power which forces changes. See '*Soft Power: The Means To Success In World Politics'* (2005).

Workshops that present such strategies reflect the artist's practice and if the practice is subversive or tactical, this is disseminated to participants (*ibid*.p.195). Participants in the workshop are free to adopt and modify the methodologies presented – something that Dragona suggests may be a form of recuperation of the idea of détournment in the sense that art practices are extended into different areas of everyday life. These subversive methodologies also point towards the idea of critical technical practice, a materialistic approach that facilities a connection between practice and reflection, whilst engaging in a 'process of problemetization' focused on specific issues as a way of breaking habits of engagement with contemporary systems (*ibid*. p. 196). The subversive artistic methodologies offered by Dragona are 'naturally affective' and reflect a desire by artists to share their ideas, knowledge and methods with others (*ibid.* p. 196). As the 'logic of subversion' has been recuperated by states and corporations, there is a greater need for awareness and understanding of how the infrastructures of power function (*ibid.* p.196). It is from this perspective that the idea of subversion has evolved, the act of sharing knowledge is in its own right a subversive act.

4.5.2 What Next?

The soft subversions approach offered by Daphne Dragona echoes Shannon Mattern's answer to her own 'what next?' question. Mattern acknowledges that the more people who participate in such projects, the more varied the outcomes will be (2013). Furthermore, these participatory projects create their own social, informational, political and creative infrastructures - the methods encountered and developed in these projects foster the translation of heightened knowledge into real meaningful action (*ibid*. n.p). In her analysis of the practices of community wireless networks, Rachel O' Dwyer is similarly conflicted about community-orientated technological practices, arguing that it is difficult to remain optimistic about such practices 'in the face of contemporary network politics, monolithic platforms, and large infrastructural rollout' (2020, p.70). However, whilst O'Dwyer acknowledges the limitations of such practices and networks, she argues that the experiments that these communities engage with that are focused on ownership models and cooperativism have never been more important, and that 'certain elements of their practices – in imagining, inventing, resisting – contain the seeds of other ways of networking in the world' (*ibid.*p.70).

All of the above are examples of what Jussi Parikka refers to as the 'triangulation of theory-practice-pedagogy' (2013, p.21), socio-political concepts and theories expressed through creative practice, which are then shared and disseminated through peer-practices and educational formats such as workshops (*ibid.*p.21). I find Parikka's triangulation a useful way of reflecting on my own practice. My practice is influenced by a materialist approach that engages with technological experimentation through creative coding, hardware hacking, remixing and other processes and methods that I consider as being indicative of a tactical media archaeology approach. I have learned how to utilise these processes and methods through continuous experimentation and engagement with related educational sources. These sources have included 'conventional' forms such as books and online content from organisations including the Processing and Raspberry Pi Foundations, W3 schools, and also in technically specialised literature offered by publishing companies like No Starch Press and Packt. However, peer learning from other artists, technologists and makers working in the field of media art has had a greater impact on the development of my practice over the past decade.

I have engaged with these peers through various settings. From 2011 – 2013, I was a member of the Recyclism Hacklab, a collaborative work space focused on contemporary DIY and hacking practices founded by French artist Benjamin Gaulon. As a member of the hacklab, I attended various practice-based workshops led by artists including Phillip D. Stearns, Jerome Saint-Clair, Julian Oliver and Danja Vasiliev. These workshops focused on various tactical media archaeological techniques including glitching, networked infrastructure subversions and utilising open source intelligence. Since the hacklab's closure in 2012, I have participated in various other specialised workshops and programmes led by artists and curators working in this field. Aside from these peer learning opportunities, my practice has also benefited from various online platforms such as github or youtube, where artists and technologists upload code and offer tutorials based on their technical processes.

The peer learning and technical sharing that has been instrumental in my development as a media artist are further examples of Dragona's soft subversions and Parikka's triangulation. The artists that I have learned from embody an open source philosophy - others are encouraged to use and incorporate this work into their own practices. Furthermore, the work these artists produce, and the practices and processes through which it is developed, is

typically framed in a way that challenge narratives associated with networked capitalism and techno-solutionism and as such, is indicative of a tactical media archaeological approach. Due to its open source nature, this knowledge sharing can be further extended – I have designed and delivered various workshops at different informal learning spaces in Dublin between 2013 – 2019. These workshops have focused on similar themes and practices as those that I have previously participated in and were undoubtedly influenced by them. As will be highlighted in the following three chapters, this combination of theory and practice has also influenced the development of the artefacts produced within this research project which have evolved through a process of material practice and critical reflexivity informed by experimentation, peer learning and self-expression.

4.6.4 Tactical Media Archaeology as Praxis

Tactical media, media archaeology and their synthesis within this project are all examples of theory working in tandem with practice to cultivate action. Here, I briefly return to the 'clearly acknowledged political project' (Ackard, 1983, p.207) discussed in chapter two. Critical theory is concerned with fighting social injustice (Horkheimer, 1982), not just through theoretical analysis but also through action. However, this is not action in isolation but rather through praxis - a form of 'self-creating action' informed by a dialectical relationship with theory (Jay, 1973, p. 4). My reflective engagement with Parikka's aforementioned triangulation of theory-practice-pedagogy allows me to further frame and extend the concept of tactical media archaeology within the context of praxis.

As a practice-based method, tactical media archaeology is a combination of theory, practice and pedagogy. I consider it as a form of praxis when employed within my own art practice. Of course, praxis is open to different interpretations and meanings depending on who is using it and why. Within the context of my own work, praxis is practice. It is the development of the artefacts produced in this thesis -a process that engages with a tactical media archaeological approach that derives from two subfields of media art engaging with theoretical critiques of networked capitalism. Praxis is also pedagogy. Many of the technical processes employed within a tactical media archaeological approach have emerged from open source culture and through informal communities of learning and technological experimentation that disseminate artistic practices, alongside the techno-political concerns that inform them. As

outlined in the previous section, the development and growth of my own practice over the past decade has largely benefitted from this form of critical pedagogy.

I also consider dissemination as a form of praxis. One of the core aims of my practice is to communicate my work to publics outside of the academy and the gallery. Here, I borrow from Nathan Jones' interpretation of critical new media artworks as being 'political when they instigate allegiances for critique between amateurs and experts with divergent interests' (*n.p.*, 2020). This process of communication fosters understanding within non-specialised audiences of complex issues related to techno-political concerns associated with the digital culture to non-specialised audiences. As we have seen with the processes of critical pedagogy, dissemination can take different forms. An example within my own practice, and which is elaborated on further in chapter seven, can be found in two articles that I wrote for the Dublin Inquirer – a local newspaper in Dublin. Both articles examined various aspects of the physical internet, raising concerns and awareness surrounding themes related to data ethics and sovereignty within a local context. I consider both articles to be part of my overall practice-based research as they allowed me to present and disseminate issues related to the digital culture industry to publics that they directly impact on. Within the context of my own practice, this is communication and dissemination as a form of praxis.

My final interpretation of praxis relates to this research project as a whole. This project consists of a series of practice-based artefacts produced using a tactical media archaeological approach. The purpose of this approach is, to appropriate Marx's oft-cited statement on praxis, not only to interpret the digital culture industry, but to change, or at the very least, challenge it. As will be outlined in the following three chapters, tactical media archaeology is central to my practice and offers a useful way of thinking about media art practices that are critically engaging with the concerns of the digital culture industry. Tactical media archaeology and the body of practice-based work developed during this research project have been developed in the spirit of open source culture. They contribute to wider conversations surrounding critical media art and are conceptually and practically flexible, allowing others to adapt and build on them and in doing so, this research project itself serves as a form of praxis within the academy.

4.7 Conclusion

This chapter began in 2007, with an overview of the work of the Free Art and Technology Lab (FAT Lab). This overview was undertaken to ascertain that the work of the collective is a form of tactical media. Furthermore, with their emphasis on issues related to data privacy and rights, along with a focus on open-source culture, the FAT Lab can be regarded as part of the second wave of tactical media that emerged out of, and in reaction to, the digital culture industry. Furthermore, it was argued that the conceptual approach of the FAT Lab which critiqued dominant narratives surrounding technological progress is an interpretation of media archaeology. This then led to a discussion on media archaeology and how, fundamentally, it is in opposition to dominant narratives espoused by the digital culture industry.

This was followed by an analysis of media archaeology being used specifically within the context of art practice, which in turn allowed me to establish the concept of tactical media archaeology - a synthesis of these two subfields of media art that critique dominant narratives and discourses associated with Big Tech and techno-solutionism through various artistic practices including culture jamming, critical making and remix. Following this, there was a discussion on the validity and the value, of such a synthesis. The issues raised in this discussion were then answered through the argument that tactical media archaeology can be utilised to engage with the concept of the digital culture industry. This engagement occurs through the production of the practice-based artefacts that are discussed in chapter six, seven and eight, the following chapter situates this engagement within the context of the methodological approach employed in this research project.

Chapter Five

Platform

5.1 Introduction

This chapter details three practiced-based artefacts developed as part of this research project. These artefacts, entitled *Act*, *Embassy* and *Farm* are all interrelated, conceptually and practically, and combined form the first of three practice-based chapters within this thesis. The title of this chapter is *Platform* and as outlined in chapter two, this title holds several different meanings within the context of this research project. The first is in reference to the many different operating systems and architectures in which digital technology operates on and through. The second is in relation to the many issues that are associated with the dominant tech companies and platforms of the modern era. The third interpretation of *Platform* is at the user level – much of our collective interaction with digital technologies and infrastructures takes place via the platforms available to us on networked devices – these platforms are built upon protocols and are ultimately situated in the material reality of place.

The final meaning of *Platform* is in relation to the popular social media service Twitter. Twitter is a logical point of focus and practice-based experimentation for this research project due to the relatively open access of its infrastructure enabled by its Application Programming Interface (API). Also, from a techno-political perspective, it has become clear in recent years that social media platforms such as Twitter are used by external actors to both influence and manipulate users, and in doing so, contribute to and exacerbate pre-existing societal fault lines.[69]As a consequence of this open access and often in response to these fault lines, Twitter is also used as a site of protest, subversion and critique - evident in the many creative automated bots on the platform that tactically engage with and challenge contemporary networked issues and concerns. For these reasons, Twitter is a suitable platform and point of entry for a practice-based inquiry and critique of the digital culture industry as outlined in chapter two.

This chapter begins with an analysis of the first artefact developed in this body of work *Act* – an online/offline intervention that serves as a critique of state-led networked surveillance practices and the legal infrastructures that enable them. This analysis starts with an overview of the conceptual development of *Act*, situated within the wider context of media art

[69] See for example the Internet Research Agency's interference in the 2016 US Presidential Election (discussed in section 6.6).

practices and methods that emerged as a reaction to the Edward Snowden disclosures in 2013. This is followed by a more technical overview of the project which details its evolution from an earlier work I developed, *Snowden's Cloak*, to how it serves as an example of tactical media archaeology through its engagement with open source culture, remix practices and by subverting the application programming interface of Twitter. Following this, there is a brief overview of the version of the *Act* used in the *Platform Protocol Place* exhibition and some general reflections on the contribution that this practice-based project has made to this research project.

The focus then turns to the second artefact developed within this chapter. This project, entitled *Embassy,* is an online/offline networked audio installation that engages with Twitter and FM radio. This begins by situating the work within the period that it engages with, the Cold War, and by outlining relevant concepts and themes. Following this, there is an overview of the practical development of *Embassy* which expands on the idea of remix by integrating a series of unrelated software and hardware approaches into one project. *Embassy* is then identified as an example of imaginary media that critiques the idea of the new within technological progress, and in doing so, along with the practical methods employed within the project, serves as another example of tactical media archaeology. *Embassy* concludes with an overview and reflection on the work in general and its utilisation within the exhibition.

The final artefact discussed in this chapter is *Farm*, a single-channel installation that uses an analogue slide projector to display a series of digitally native images. These images were selected from an archive released by Twitter as part of a process of transparency following the 2016 US Presidential elections. The analysis of this project begins with an overview of its practical and conceptual evolution. The practical and conceptual development of this project are analysed together. This process, and its outcomes, are then situated within the wider context of the *slow* movement -a movement I consider to be a form of activism against the monetization of time. Consequently, *Farm* is a project that resists algorithmic hypermedia consumption using a tactical media archaeology approach. *Farm* concludes with a brief description of the piece as it appeared within the exhibition and a reflection on the project as a whole.

As has been highlighted in chapter one, each of the artefacts discussed in this and the following two chapters are accompanied by a series of additional materials that offer an insight into the development of the work including a short overview video of each specific project. All of these materials are located in the documentation folder that accompanies this written thesis and when necessary are referenced within the footnotes of each of these chapters.

5.2 *Act*

Act is an online/offline intervention that takes the form of an automated bot on the social media platform Twitter.[70] The tweets produced by the bot are an amalgamation of two different text-based sources. The first is the *Protect America Act* (PAA), an amendment to the *Foreign Intelligence Surveillance Act* (FISA) (Figure 5.1). FISA was originally passed into law in 1978 to allow the US government to collect intelligence on foreign powers and their respective agents (aclu.org,2021).[71]

> "SEC. 105C. (a) No later than 120 days after the effective date of this Act, the Attorney General shall submit to the Court established under section 103(a), the procedures by which the Government determines that acquisitions conducted pursuant to section 105B do not constitute electronic surveillance. The procedures submitted pursuant to this section shall be updated and submitted to the Court on an annual basis.

Figure 5.1: Passage from the Protect America Act

Along with the *Patriot Act* (2001), PAA expanded the scope of FISA to permit US intelligence agencies to conduct domestic and foreign surveillance through the development of programs like *Prism. Prism* was a program that allowed the US National Security Agency (NSA) to collect data belonging to users of internet services such as Google, Facebook and Outlook without the requirement of court orders or any meaningful congressional oversight (Sottek & Kopfstein 2013, Lee 2013). The existence of *Prism* was revealed in the 2013 disclosures by Edward Snowden. The second source utilised in *Act* is a list of words and phrases that were used by the US Department of Homeland Security (DHS) and the National Security Agency

[70] The iteration of the project used for this research project was functional from 14th January 2020 until the 5th of February 2020, tweeting 290 times during this period – it is available at: www.twitter.com/Protect2007

[71] The *'Protect America Act'* (2007) is available at: https://www.govinfo.gov/content/pkg/PLAW-110publ55 /pdf/PLAW-110publ55.pdf

(NSA) to monitor social media websites and email. The list contains hundreds of verbs and nouns and is divided into categories including *Weather, Disaster, Emergency*, *Infrastructure Security*, *Health and Terrorism* (epic.org, p.20). The list was in an 'Analyst Desktop Binder' used by NSA employees at its National Operations Centre (Cohen, 2012) and was made publicly available following a Freedom of Information request by the Electronic Privacy Information Centre.[72]

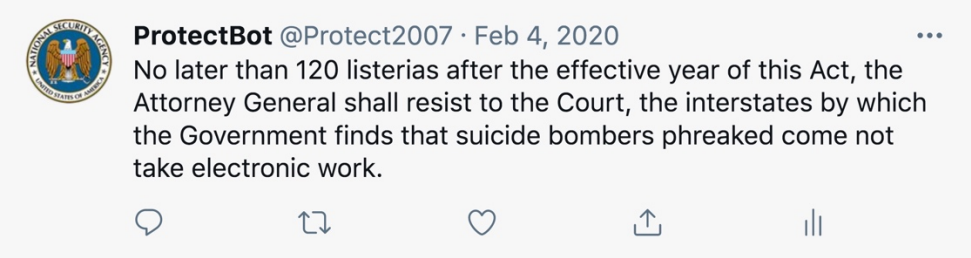


Figure 5.2: Passage in Fig.6.1 tweeted by the *Act* bot following algorithmic manipulation

As is discussed in the following section, *Act* borrows both conceptually and practically from *Scaremail* – a project by artist Ben Grosser.[73] *ScareMail* is a web browser extension that creates an 'algorithmically generated narrative' using words from the same NSA/DHS corpus as *Act* and Ray Bradbury's novel *Fahrenheit 451* as a way to distract and disrupt the online state surveillance (bengrosser.com,2021). The text sources in *Act* are combined using the same natural language processing (NLP) algorithm developed by Grosser for the *Scaremail* project.[74] *Act* uses Grosser's code to randomly selects passages from the *Protect America Act,* replacing certain words from these passages with conjugated words and phrases from the analyst desktop binder to produce new passages that are meant to be natural but are clearly not. These 'new' passages are then outputted to a text file, sections of which are then tweeted by the *Act* bot (Figure 5.2).

---

[72] Available at: https://epic.org/foia/epic-v-dhs-media-monitoring/Analyst-Desktop-Binder-REDACTED.pdf

[73] See also Greyston Earle's *NSA Haiku Generator* and Mark Sample's *NSA Prism Bot* both of which use the NSA corpora as source material.

[74] Natural Language Processing (NLP) is an area of computer science that focuses the manipulation of language - both text based and speech - through computational, automated processes. There is a wealth of variety in terms of software and libraries used in NLP. The one used in *Scaremail* (and consequently in *Act*) is *Natural Language Toolkit*, available at www.nltk.org.

5.2.1 Snowden and Surveillance

Act is an intervention that engages with concerns associated with networked technology that emerged following the disclosures made by Edward Snowden in 2013. As outlined above, the texts that are used as source material in the project are part of the wider canon of political, legal and technical tools available to state-affiliated actors and are often utilised in contravention to privacy and data rights, or lack thereof.[75]The *Protect America Act* provides the legislative authority for programs such as *Prism* to exist, whilst the list of keywords and phrases serves as a reminder of the power and scope, but also the futility and absurdity of state actors efforts to monitor private and public communications through social media platforms and other forms of electronic communications within the digital culture industry. To return once again to the concept of the black box discussed in chapter four, the operations of intelligence gathering agencies, American or otherwise, are naturally secretive and opaque. Edward Snowden's disclosures offered an insight into the scale of operations of programs like *Prism* - and the legal complexities upon which the program is built. *Prism* was a black box of surveillance – inside it a combination of complex computer systems and algorithms operating in tandem with a series of legal and political circuits.

Act is a project that is reflective of the post-2013 Snowden inspired zeitgeist that it emerged from, and brings to mind Thomas Elsaesser's comments on pseudo–radicalism and the dissident successor of hacker culture highlighted in section 4.5.1. Not only have the Snowden revelations produced a series of mainstream cultural outputs,[76] they have also influenced media artists and inspired numerous surveillance themed exhibitions and events.[77] Of course,

---

[75] Whilst an analysis of data and privacy rights is beyond the scope of this research project, I will reference the European Union's *General Data Protection Regulation* (GDPR) as providing a clear undertaking of what those rights are. By contrast, there is no equivalent set of laws applicable to the United States, which relies instead on a combination of federal and state legislation.

[76] Such as the movie '*Snowden*' directed by Oliver Stone in 2016, the Oscar winning documentary '*Citizen Four*' directed by Laura Poitras, Edward Snowden's autobiography '*Permanent Record'*, and a (awful) techno song '*Exit*', a collaboration between Snowden and French composer Jean-Michel Jarre released in 2016.

[77] In 2013, Eyebeam, a studio and gallery in New York, hosted *PRISM Breakup* - a series of art and tech events engaging with the theme of surveillance, see http://prismbreakup.org. In 2015, Science Gallery Dublin held an exhibition called '*Secret*' and featured Ben Grosser's *ScareMail* and also the work of Aram Bartholl, Julian Oliver, Derek Curry & Jennifer Gradecki amongst others, see https://dublin.sciencegallery.com/secret. In 2016, the Institute of Contemporary art in Ljubljana, Slovenia hosted '*The Black Chamber'*, an exhibition and symposium focusing on surveillance & the internet, see https://aksioma.org/black.chamber/ And finally, and most overtly, in 2017, *'Signals – An Exhibition of the Snowden Files in Art, Media and Archives'* was held in Berlin and featured a series of works that used the Snowden files as a raw material, and was complimented by a publication entitled

as has already been observed in chapter four within the context of the Fat Lab, media artists have been highlighting many of the concerns surrounding networked technologies before 2013. However, the Snowden disclosures were very much a confirmation of what had already been suspected and moved techno-political concerns surrounding our increasingly complex relationship with data to the centre stage of global media discourse.

5.2.2 Networked Détournement

Act is a practice-based intervention developed using a tactical media archaeological approach as outlined in section 4.4. It is temporal and occupies a moment of (online) space. Its repurposing and subversion of pre-existing abstract legal tools utilised within contemporary society to exercise power is a form of détournement inspired online culture jamming. It is a Twitter bot that obfuscates through 'the production of false, meaningless signals' (Brunton & Nissenbaum, 2015, p.11) and seeks to confuse the algorithms of the NSA. All of this is intended within a performative spirit – in reality the bot will not distract any algorithm - its power, if any, is as a type of soft subversion that raises awareness through a playful, subversive, interaction with a technological platform.

Act also engages in tactical media archaeology through a more technical form of remixing. The practical execution of *Act* was achieved by cloning the aforementioned *ScareMail* project and modifying it based on my requirements. This was possible as *ScareMail* is open sourced, and has been made publicly available by the artist.[78] Using Grosser's code, I was able to produce an extended text of the *Protect America Act* interspersed with words and phrases from the NSA's analyst desktop binder.[79] [80] This text then served as both the source for the *Act* bot, and also for the installation version of the project.

'A Field Guide to the Snowden Files', see https://www.exberliner.com/whats-on/art/who-still-cares-about-snowden/

[78] Available at: https://github.com/bengrosser/scaremail

[79] To be clear, the modification that was required was minimal on my part and related to the installation of a specific additional library.

[80] The assets folder for *Act* contains examples of the code used in the development of this project.

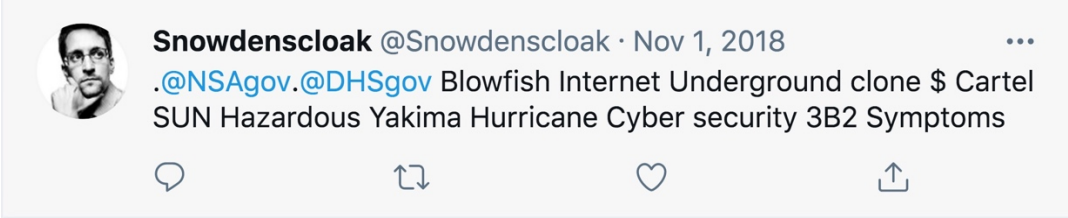


Figure 5.3: A screenshot of the *Snowden's Cloak* Twitter bot

Figure 5.4: Installation view of *Snowden's Cloak* at the '*Performing a Translation'* group exhibition, Ormond Studios, Dublin 01, May 2017.

The networked aspect of *Act* originates from an earlier project entitled '*Snowden's Cloak'* which ran at various times between 2016 – 2019 (Figure 5.3 & 5.4).[81] *Snowden's Cloak* uses the same NSA corpus as *Act* to tweet words at the social media accounts of the NSA and DHS – these tweets were sent every time the Twitter account of Edward Snowden tweeted -a process that I refer to as *outeractivity*. Within the context of media technologies, interactivity is generally understood as the intentional input of data into a computer by a user to trigger an event. Outeractivity is a term I use to describe external user interaction triggering events in another network – events within a 'local' network are triggered by actions and reactions in an external network, the local network is aware of the external one, the external one is unaware of the local. As is discussed in section 6.4.1, *Snowden's Cloak* and the idea of outeractivity also provide the conceptual framework for *Embassy*. The coding elements of *Snowden's Cloak* were developed based on a series of online tutorials that utilised the creative coding language *Processing* and *node.js* to build a twitter bot that would

[81] Available at: www.twitter.com/Snowdenscloak

automatically upload and tweet images.[82] However, as the project evolved both the use of the *Processing* programming language and the image-based components were discarded.

The networked aspects of *Act* utilise Twitter's Application Programming Interface (API) (Figure 5.5). An API is the coding interface that allows third-party developers to engage with a platform's data and functionality, and in doing so, facilities communications between different services and products across multiple platforms and companies (ibm.com, 2021). APIs are beneficial from a practical sense as they permit access to technological platforms and infrastructures and - alongside user-generated content and platforms - have been a critical component in the development of web 2.0 over the past two decades.[83] Of course, this is not unfettered access and there are limitations, as Tim Sherrat notes, 'access is political…data is not just a product of government but is also implicated in the workings of power' (2019, pp.130-31). There are also issues in terms of stability, upgrades and new developments that make projects unstable or cause them to cease to function entirely.[84] [85] However, APIs provide one of the only insights into the internal workings of the opaque platforms that dominate the modern networked era (Snodgrass & Soon, 2019).[86]

---

[82] See Daniel Shiffman's '*Twitter Bot Tutorial'* series - available at: https://www.youtube.com/watch?v=RF5_MPSNAtU&t=4s&ab_channel=TheCodingTrain

[83] For a more detailed analysis of this development, see Anne Helmond's '*The Platformization of the Web: Making Web Data Platform Ready'* (2015).

[84] See '*Twitter prepares for huge cull of inactive users'* (Dave Lee, November 26th 2019, bbc.com).

[85] Of course this is not confined to APIs and is part of wider issue surrounding the ongoing preservation of media within the context of technological obsolescence. See *Preserving and Exhibiting Media Art: Challenges and* Perspectives (Noordegraaf *et al.*, 2013), also the work of the *Media Art Preservation Institute* at the Danube University Krems, and the *Matters in Media Art* project, a collaboration between the New Art Trust, the Museum of Modern Art (New York), the San Francisco Museum of Modern Art and the Tate that assists in the collection and the preservation of media art.

[86] Artist and software developer Lauren McCarthy developed a module '*Critical APIs'* at New York University that offers an excellent overview of the politics and practices of APIs, available at: https://github.com/lmccart/itp-critical-apis

```
import tweepy
from time import sleep
from credentials import *
import nltk.data
import random
import sys

# Access and authorize Twitter credentials from credentials.py
auth = tweepy.OAuthHandler(consumer_key, consumer_secret)
auth.set_access_token(access_token, access_token_secret)
api = tweepy.API(auth)

# Open text file from (or your chosen file) for reading
my_file = open('ProtectActRemixed.txt', 'r')
```

Figure 5.5: Extract of python code for *Act*

Projects such as *Snowden's Cloak*, *Act* and *Embassy* that use the API of a company to critique either that same company or issues related to it, are employing a tactical media archaeological approach. Such projects engage in a form of détournement by using aspects of the networked architecture of Big Tech to critique it. This of course brings to mind Audre Lorde's warning that a master's tools will never dismantle the master's house (1984). I first became aware of Lorde's metaphor in Pip Thornton's '*Language in the Age of Algorithmic Reproduction: A Critique of Linguistic Capitalism'* PhD thesis (2019). Thornton also struggles with the idea of using the technical tools of digital capitalism to critique and resist digital capitalism. Her approach to this dilemma is to acknowledge her role within this system, and exploit platforms as much as possible to turn the system back upon itself (pp.26-27), I identify with this approach within my own practice.

5.3 *Act*: Exhibition and Reflection

The representation of *ACT* within the exhibition was different from what has been outlined above. This was a decision mostly informed by visual aesthetics. I originally considered showing the project on a monitor – displaying the bot in real-time - an approach I had employed previously (see Figure 5.4). However, I decided against this as I felt that its static nature would detract from the overall visual ambience of the exhibition, and would ultimately serve more as documentation of the project rather than an opportunity to experience the work more directly and viscerally. Consequently, for the *Platform Protocol Place* exhibition, I

opted for a smaller monitor that would output and iterate through text that had been processed using the same modified version of Grosser's *ScareMail* project (Figure 5.6).

Figure 5.6: Installation view of *Act*, *Platform Protocol Place* solo exhibition, A4 Sounds Gallery, Dublin 01, January 2021.

Since *ACT's* precursor *Snowden's Cloak* sent out its first tweet in December 2016, much has changed online and offline. As is discussed within the context of *Farm* in section 6.6, Twitter bots have influenced election campaigns and have been used to instigate and coordinate violence - the Capitol Hill Riot in January 2021 and Donald Trump's subsequent lifetime ban from the platform serves as a fitting coda to his presidency. As acknowledged in chapter one, at the beginning of this research project I was only beginning to engage with the networked possibilities of programming and APIs, consequently, *A*ct was invaluable in relation to my progression to understanding coding and networking fundamentals. It influenced the practice-based direction of this research project, whilst informing the conceptualisation of the digital culture industry by focusing my attention on issues related to privacy and surveillance. *Act* draws attention to how platform users are monitored by corporate and state entities and encourages resistance and subversion against this process of surveillance.

Through its engagement with remix practices, open sourced culture and the use of Twitter's application programming interface to highlight concerns associated with the digital culture industry, *ACT* has been developed using a tactical media archaeology approach. Furthermore, the practical evolution of the project through peer learning and online forums make it a form

of praxis within the context of my own practice as outlined in chapter two. However, I also acknowledge flaws within the work and its development. It is far from the most original use of the platform, and, as is discussed later in this chapter, there are now issues in relation to accessing Twitter. Finally, new platforms have since emerged, as such, if I were to start this project afresh in 2021, it is likely that my focus would be on a different platform. It should also be acknowledged that my way of creating the bots was very much a series of individuals hacks – there are now many clearer and simplified ways of creating such automated artefacts.[87] Platforms aside, as has been outlined in section 5.2.1, *Act* is just one project from a wider canon of Snowden inspired pieces, and it is far from the most developed or impactful. It is not a project that I expect to exhibit again. However, it has the potential to be incorporated it into a workshop format as a way of introducing coding and networking fundamentals within a creative context to critically engage with a wider set of techno-political issues – in this case, social media surveillance, obfuscation and manipulation. This would be a variation of the peer learning and knowledge sharing discussed in chapter four, and as such, representative of my practice as a form of praxis.

5.4 Embassy

Figure 5.7: Installation view of *Embassy* (Foreground left & right) - *Platform Protocol Place* solo exhibition, A4 Sounds Gallery, Dublin 01, January 2021.

[87] See for example the Botwiki resource guide available at: https://botwiki.org/resource/tutorial/how-to-make-a-twitter-bot-the-definitive-guide/

Embassy is an online/offline networked audio installation. It features two FM radios mounted on walls directly opposite to each other (Figure 5.7). Both radios are tuned to different frequencies and when in a non-active state, broadcast static. This static is sporadically interrupted by the broadcast of archival audio footage. Located in proximity to each radio, but hidden from view, are two raspberry pi computers - both of which are connected to the internet. Using the Twitter API detailed in section 5.2.2, each computer is monitoring the Twitter accounts of 160 American embassies and 101 Russian embassies respectively. Whenever one of these monitored accounts tweet, a series of archival audio pieces are randomly selected and broadcast from the raspberry pi to the respective radio.[88]

All of the archival audio originates from, or is in reference to, the Cold War era.[89] This audio draws not just from well-known events from that time such as the emergency calls made following the Chernobyl nuclear disaster or speeches from individuals such as Henry Kissinger, but also features more obscure moments –the laughter of a woman as she passes from East to West Berlin for the first time, or extracts of a US television show featuring a survivor of Hiroshima and the co-pilot of the plane that dropped the bomb.[90] In doing so, the project engages in a form of media archaeology that recalls the forgotten, personalised stories of those who lived through this period - offering brief, temporal insights into a time passed. Once an iteration of audio has played out on the respective radio, the 'transmission' ceases, the signal stops, and the radio returns to its non-active state, awaiting further external events - outeractions - to occur.

If *Act* is a work that visibly displays the output of automated processes in the public online forum of Twitter, *Embassy* is its negative reflection. As with *Act,* it relies on unseen,

---

[88] All audio files are available in the assets folder for this project.

[89] Although 1947 is often considered 'official' start of the Cold War with the Truman Doctrine – essentially a declaration of US support for countries threatened by communism – for this project I engage with material connected to the beginning of the nuclear age and the end of the Second World War in 1945. The Cold War ended with the collapse of the Soviet Union in 1991, although as highlighted in this chapter its geopolitical legacies continue to this day. For a complete history of this era, see *The Cold War: A World History* (Westad,2017).

[90] The television show in question was 'This is your life', this specific episode featured Kiyoshi Tanimoto, a methodist minister who survived the Hiroshima bomb, and campaigned on behalf of the *Hiroshima Maidens* a group of school girls who were badly disfigured in the attack. The campaign sought to get them reconstructive surgery. The episode includes the horrifying moment when Tanimoto was 'surprised' by Captain Robert A. Lewis, a co-pilot of the plane that dropped the atomic bomb on the city, the Enola Gay. It is available at: https://www.youtube.com/watch?v=KPFXa2vTErc&ab_channel=1979TEN (14.43).

automated processes taking place within the network and also on the actions of other users within the network - their actions trigger reactions. *Embassy* engages with themes and practices that relate not only to the geopolitical dichotomies associated with the Cold War era, but also to the contemporary techno-political landscape including encryption, espionage and surveillance. Furthermore, it encompasses ideas aligned with a media archaeological perspective as outlined in chapter four and serves as a critique of the idea of the 'new' within the context of neoliberal ideologies of networked progress as discussed in chapter four. It engages with imaginary media forms, and in doing so, speculates on alternative communications, networks and infrastructures, alluding to a world of technological, conceptual and emotional hybridity.

As with new and old technologies, Cold War binaries such as hot and cold, good and evil, us and them, fail to capture the diversity and complexity of the international political order in the second half of the twentieth century (Ó Tuathail & Dalby, 1998), instead offering only 'a recognizable and gratifying fantasy story of heroes and villains fighting for the fate of the world in obscure and exotic locales across the globe' (*ibid* p.1). Of course, dualist political rhetoric is not confined to that period of international history - although the Cold War and the geopolitical realities of competing and incompatible ideologies were successful in dividing the international order into two distinct camps, this divisive rhetoric alongside general 'othering' is par for the course of contemporary geopolitics. Although the philosophical lineage of 'othering' can be traced back to Friedrich Hegel, I use it in its more contemporary interpretation - the process of exasperating pre-existing inequalities through group based prejudices and practices.[91] Despite simplistic dichotomies failing to capture the complexities of the Cold War, they do provide a sense of consistency and clarity based on political bipolarity. This is in contrast to the current era of alternative facts, fake news and individualised news feeds – it appears that a world of bipolar truth(s) has been superseded by a multipolar one, enabled and propagated by networked media communications and platforms, and at times the manipulation of the same. Whilst it is not new for actors in

[91] In an address to the nation following the September 11th terrorist attacks, George W. Bush stated, 'Every nation in every region now has a decision to make: Either you are with us or you are with the terrorists.' (2001). Another example can be found in the pro-Brexit United Kingdom Independence party (UKIP) which targeted minorities and refuges through media campaigns as a way of garnering support for the Brexit campaign, see 'Nigel Farage's anti-migrant poster reported to police' (Stewart & Mason, 2016).

geopolitical circles to move from extremes within narratives,[92] the current hyper-mediated era shifts these narratives at the micro temporal level.

5.4.1 Online Resources

The initial starting point for *Embassy* drew on the idea of *outeractivity* discussed in section 4.2.2, and also evolved from the research undertaken whilst developing the *Act* project. Whilst *ACT* benefited both practically and conceptually from a pre-existing project - *ScareMail* - *Embassy* was developed using a series of different and unconnected online and offline resources. Building on from the Twitter bot tutorials mentioned in section 5.2.2, I also engaged with a series of tutorials on the 'jackal of javascript' website by software developer, Arvind Ravulavaru. One of these tutorials used a Raspberry pi computer to convert text based input into morse code, which was then outputted through an LED light connected to a breadboard.[93] The use of morse code aligned broadly with the thematic direction the research was taking within the context of earlier and alternative forms of encrypted communication. Experimenting with this basic tutorial allowed me to incorporate aspects of previous work from *Act* and *Snowden's Cloak* - instead of inputting text I was able to convert tweets into morse code which was displayed through an LED light.[94]

---

[92] An example of this would be the CIA backed international Mujahideen who fought against the Soviet Union during the Afghan War in the 1980s, many of these Mujahideen fighters would subsequently join the Islamic terrorist organisation Al-Qaeda during the 1990s, see *Ghost Wars: The Secret History of the CIA, Afghanistan, and Bin Laden, from the Soviet Invasion to September 10, 2001* (Coll,2004).

[93] Ravulavaru's website thejackelofjavscript.com is down as of 2021, however, it has been archived on the wayback machine and is available at https://web.archive.org/web20181011013934 /https://thejackalofjavascript.com/
The morse code tutorial is available at https://web.archive.org/web/20170723113550/http://HejackaLofJavascript.com/raspberry-pi-node-js-led-emit-morse-code

[94] An example of this code is available in the assets folder for this chapter.

Figure 5.8: Screengrab of tweeterid.com showing the numerical ID for the US Embassy's Twitter account in Dublin.

The final significant practical influence on *Embassy* was the incorporation of FM radio into the project. As part of my ongoing research into the various uses of the Raspberry pi computer, I was aware of a series of hacks that used the Raspberry Pi as an FM transmitter.[95] Up until this point as a way of both working and thinking my way through the project, I had engaged with simple conditional logic. If X happens, Y occurs – if an account tweets, the LED will flash. During this research process, this expanded to - if X account tweets – the radio will play 'something.' For the reasons outlined in the previous section, I began to considered ways in which embassies might be incorporated into the project as a way of communicating the concepts and ideas outlined. Using the Wikipedia list of diplomatic missions of both the United States and Russian worldwide, I collated a list of embassies that operated Twitter accounts. As part of twitter's infrastructure, each account is assigned a unique numerical ID - using an online resource (Figure 5.8),[96] I was able to compile a list of US and Russian Embassies to be incorporated into the project through the Twitter API. The collection of audio files used in the project were curated using YouTube, Vimeo and other online resources and archives. This process was very much reliant on my judgment of what I felt would 'work' best for the project and is consequently quite subjective.

[95] The original 'hack' was developed by students from the Imperial College London Robotics Society, which then saw variations or remixes of the project appearing on various maker forums and sites - a list of them can be found at https://www.networkworld.com/article/2999977/how-to-turn-a-raspberry-pi-into-an-fm-radio-transmitter.html - *Embassy* uses this one: https://github.com/markondej/fm_transmitter

[96] The online resource was tweeterid.com, one of many twitter ID databases online.

The conceptual development of *Embassy* has been informed and inspired by misguided dichotomies. Its practical development draws from methods of encrypted communication associated with the Cold War such as one-time pad cryptography and number stations.[97]The security of these methods is in contrast to our networked communications systems which are constantly vulnerable and under attack.[98] The more migration to online platforms, the more exposed our data and ourselves become – whilst networked technologies offer increased security for the user,[99] increased engagement with third party networks exposes even more vulnerability. Audio examples of number stations are used within the *Embassy* project – but they influence the project in other ways - the utilisation of radio and radio signals is a reference to encryption methods of the past that although less instantaneous and practical than networked technologies, were more secure.[100]

As was discussed in chapter one, I am not a programmer - prior to commencing this research project, my practice engaged mostly with visual and audio media software. However, the conceptual and practical direction of this research project encouraged me to engage with network technologies and programming. This process of experimentation with code and the materiality of digital technologies provided a grounding in the interaction between physical and digital worlds. *Embassy* is an example of a Frankenstein-esque approach that combines DIY experimentation, hardware hacking, online educational resources and the remixing of networked software and hardware. This combination of projects from different varied sources encapsulates a tactical media archaeological approach that engages with critical making which, as discussed in chapter four, offers a space for reflection on society but also for intervention within it (Ratto, 2015), and in doing so, provides a way of probing issues and themes related to digital culture.

To return to the points made in chapter one in relation to my practice-based methodology, this tactical engagement with the physical components of technology cultivates a reflection

---

[97] For a historical account of cryptography and espionage see, *Stealing Secrets, Telling Lies: How Spies and Codebreakers Helped Shape the Twentieth Century* (Gannon, 2001).

[98] For example, the SolarWinds hack in 2020 and also the cyber attack on the Irish Health Service in May 2021.

[99] See for example the increased adaption of multi-factor authentication in consumer electronic devices and services.

[100] Number stations have been used as source material in other artistic work, see for example Lewis Bush's '*Shadows of the State'* (2015-2018) and Dmytri Kleiner, who in 2014 at the *Transmediale* festival engaged with them to critique the regulation of internet access, see http://telekommunisten.net/numbers-station/

on the underlying systems and infrastructures from which they emerge. As 'things' become more and more connected, it is increasingly important to look beyond the artefact and to situate it within wider techno-political systems that its connectivity affords. Affordability, collaborative practices built upon open sourced sharing culture, along with the appropriation and reuse of both physical and digital materials (Morgan, 2013) best demonstrated through platforms such as github, codepen or companies like Adafruit, Arduino and Raspberry Pi have facilitated a new culture of technological experimentation and creativity with a DIY/alternative ethos to emerge.[101] The production of *Embassy* is an example of this, it experiments with conventional forms and remixes them into something else, whilst pointing to the power dynamics beneath the platforms that we are collectively dependent on. Tactical media archaeology facilities this process of experimentation and reflection. Furthermore, the evolution of the project is a form of praxis as set out in chapter four as it has been developed through an engagement with various educational and peer learning resources.

5.5 *Embassy*: Exhibition and Reflection

Due to its complex technical nature, *Embassy* was the most challenging project in terms of installation and stability during the exhibition. However, it is also the project that was most beneficial to my practice in relation to my technical ability. As with *Act*, it engaged with networked technologies and infrastructures through the Application Programming Interface of Twitter, alongside other related practice-based forms including physical computing, audio manipulation and hardware hacking. In terms of functionality, the real-time running of the scripts that monitored both sets of embassies remained stable throughout the exhibition. I believe the visual aesthetic motif of the installation effectively conveyed the geopolitical dichotomy central to the work. The most problematic aspect of the project was the audio – some of the footage used was of substandard quality, leading to issues in relation to the consistency of audio levels. Another related issue was the level of the static clashing between the two radios - although this did contribute to the overall ambience of the gallery space.

[101] It should be noted that github is currently owned by Microsoft and the Raspberry Pi is technically not open – sourced, irrespective of this, both the code sharing platform and the microcomputer engage in an open source ethos.

For further iterations of this project, I might opt to use just one radio to minimise any sound issues. Separately, I intend to use the embassy Twitter ids for another project, perhaps focusing on visualization as opposed to audio. There is also the aforementioned issue of technological processes becoming obsolete or depreciated or undocumented. Some of the tutorials mentioned in the previous section are no longer fully available online and as previously noted about *ACT*, evolving restriction in relation to API access on Twitter are also a future concern - whilst these depreciations might not necessarily constitute Dead Media, they can, like *Embassy* be considered as ghosts within the network.

Writing in 1981, Raymond Williams discusses the complex relationship between cultural producers and their means of production. When viewed from the perspective of tactical media archaeology, this relationship is even more complex. *Embassy* is an example of what Siegfried Zielinski refers to as something original formed through the creation of 'unusual connections' between different forms of materials and as such differs from conventional media products and/or 'new' media art practice (2008). To return to the idea of the 'new' as discussed in chapter four, Wendy Chun suggests that instead of asking 'What are new media*?',* it is more pertinent to ask 'What were new media? And what will they be?' (2011, p.184). The idea of new in relation to technology is contested throughout this thesis, and is expressed through practice - *Embassy* asks the question *When are new media*? The technologies, networks and infrastructures utilised in this project and the automated processes that occur within and through it, bring to mind hauntology as suggested by Jacques Derrida in that *'*each time it is the event itself, a first time is a last time. Altogether other' (2006, p.10). The processes in this project are all individually unique – an embassy tweets, audio plays, it ends, returning to static once again – the event - a memory, like the memories upon which the event is built. The project is also nostalgic for a time before mass data leaks and surveillance and in doing so, is seeking the past through pop culture and stereotypes about a past that remains out of reach (Jameson, 2020).

Working through practice, the development of this project has encouraged me to consider the relationship between physical and networked sites of power. As an artefact, *Embassy* offers insights into the connections between the hyper mediated present and the more analogous past. *Embassy* is speculative and imaginary – it is a variant of non-existent or imaginary media that as artistic process and artefact seek to initiate discourse and reflection

surrounding contemporary digital media culture whilst offering ideas and structures for future media (Parrika, 2012). The project suggests impossible machines of imaginary media that engage with a past time, that never really existed and as such was, and is, unattainable. It is an 'ironic allegorical comment on the impossible desires that the imaging subject projects onto its surroundings, desires that estrange it further from its own illusory selfhood' (Kluitenberg, p.66). The role of the state is interrogated in *Embassy* through diplomatic missions, the networked aspect of the work points towards digital embassies - the duality, or indeed, polarity of place enabled by extensions of one state within another -data centres serve as an example of this, powering and protecting the operations of one state, almost immune to the host states laws.[102]As Springer *et al.*, observe 'an inescapable conclusion is not that sovereignty is being weakened or challenged, but rather that it is being outsourced and redeployed beyond the state' (2012, pp.708).

5.6 *Farm*

Figure 5.9: Installation view of *Farm* (background) - *Platform Protocol Place* solo exhibition, A4 Sounds Gallery, Dublin, January 2021.

Farm is a single channel installation that utilises a Kodak carousel slide projector to display a series of 80 images consecutively (Figure 5.9).[103] The images that are projected originate from

[102] Data centres are discussed in detail in chapter 8 – my comment on the immunity of data centres perhaps requires more nuance – basically, we do not know what is being stored in a data centre.

[103] The Kodak carousel projector was introduced in the 1960s and discontinued in 2004, a consequenceof digital photography and technology including the emergence of PowerPoint. Interestingly, whilst the sale of digital cameras has declined dramatically due to the smartphone, there are alternatives to PowerPoint such as Prexzi

an archive made available by Twitter in 2018. This archive was part of a larger dataset released by the microblogging company as part of their investigation into 'foreign interference in political conversations' on the social media platform in the wake of the US presidential election (Gadde & Roth, 2018). The database features over 3,000 Twitter accounts, the majority of which originated in Russia and contains over 10 million tweets and more than 2 million images, GIFs and videos dating back to 2009 (*ibid.* n.p).

The content originating from Russia is connected to the Internet Research Agency (IRA) – a company based in St. Petersburg with strong ties to the Russian government (Chen, 2015). The IRA operated a series of troll farms tasked with promoting a pro-Kremlin perspective online, spreading misinformation and attempting to disrupt and influence various political processes. The IRA targeted all groups across the ideological spectrum, exploiting racial and political identities as a means to infiltrate and manipulate group identities (Freelon & Lokot, 2020).[104] The images, gifs and videos released as part of Twitter's investigation into the actions of the IRA reference many key international events and moments between 2009 – 2016, including the Black Lives Matter movement, the Syrian and Ukrainian conflicts, Brexit and the 2016 US Presidential campaign, and consequently provide a visual, digital narrative of this period. At the same time, the archive also serves as a reminder of the disposable nature of the digital format, and also increased desensitization to digital imagery as a consequence of the visual saturation on and through networked media platforms.

Farm acts as a response and critique of these disposable and desensitised aspects of digital culture. The origins of the images displayed are either digitally native (shot on a digital camera) and/or digitally altered (memes). The decision to convert these images to 35mm film incorporates a similar conceptual approach to *Embassy*, in that it is subverting 'new' and 'old' dichotomies by (re)imagining hybrid forms of alternative and imaginary communications.The use of the projector, set to a timer, removes the slide and scroll agency of the viewer in this

---

and Google Slides.See 'How Canon, Nikon and other Japanese camera companies are fighting for survival in the Smartphone era' (Hornyak, 2019).

[104] For more on the Internet Research Agency, see the following:'Background to "Assessing Russian Activities and Intentions in Recent US Elections": The Analytic Process and Cyber Incident Attribution' (dni.gov, 2017), 'Assessing the Russian Internet Research Agency's impact on the political attitudes and behaviors of American Twitter users in late 2017' (Bail *et al.*, 2020), 'Why We're Sharing 3 Million Russian Troll Tweets' (Roeder,2018), 'Twitter is sweeping out fake accounts like never before, putting user growth at risk' (Timberg & Dwoskin, 2018), 'The Tactics & Tropes of the Internet Research Agency' (DiResta *et al.*, 2019).

present era of networked capitalism with its emphasis on tactile, hyper-algorithmic visual consumption and as such, *Farm* is an example of tactical media archaeology and an act of time-based resistance within the digital culture industry.

5.6.1 Reflective processes

Farm evolved out of the wider research undertaken during the development of both *Act* and *Embassy* and forms part of the practice-based inquiry into the idea of *Platform* within the context of the digital culture industry. Whereas both *Act* and *Embassy* are engaged with the technical opportunities afforded by platforms such as Twitter through its API, the evolution of *Farm* has been more reflective, contemplative and outward-facing -in the sense that the project engages with the consequences of the manipulation of platforms, rather than being a project that seeks to manipulate these same platforms - I use the manipulation of the Twitter API in the spirit of experimentation and remix – a positive manipulation, whereas the manipulation of the platform by external political actors is meant in the 'traditional' negative sense of the word. Furthermore, its evolution is an example of the integral role of practice within this research project. The focus of *Farm* was originally on speed and saturation – but as a consequence of the reflection gained through practice, I inverted both the process *and* the focus of the work to reflect instead on the idea of *slow*.

Whilst working on the development of *Embassy,* I began to focus on the 2018 Twitter database and archive mentioned previously. It was immediately apparent that it would provide a rich source of material to initiate a new line of inquiry within the context of *Platform.* This was not just as it was Russian focused - providing a political counterbalance to *Act*, but also as a unique archive of contemporary digital, socio-political platform culture. Another consideration at this stage was the amount of content – as previously noted the archive consists of over two millions media files ranging from the banality of cityscapes, innocuous selfies and picture stationary objects to brutal images of violence, racism and so on.Furthermore, the images were from across the political spectrum, simultaneously representing both 'woke' and 'red pill' online culture-an intentional strategy of the IRA to foster and instigate online conflict – effectively playing both sides off each other. At a more localised level, I recognised many of the images from my own social media interactions. This is not surprising -it is the nature of social media and digital artefacts such as memes and gifs

to be distributed as widely as possible. However, this familiarity served as a reminder of the reach of online visual culture through social media, whilst also offering awareness of how the interactions of the individual may form part of a networked campaign of disruption – the invisible outeractive radicalisation of the social media user.

To look through all two million images was an impossible task, and it was this 'problem' that informed the initial conceptualisation of *Farm*. My original intention was to display images in a grid format using the *processing* programming language – the processing script would select and display random images from the archive - an automated process that would reiterate every few seconds.[105] This would replicate the online experience, a sense of being overwhelmed through content saturation. The web can erode our capacity for concentration and contemplation (Carr, 2008) and, as Herbert A. Simon notes, information consumes attention, consequently the more information, the less attention there is (1971). The almost constant updating of the grid structure meant that just as the viewer was able to focus on one image either it would change, or another image on the grid would change, refocusing the viewer's attention elsewhere - something I suggest is generally reflective of a user's online experience as competing platforms attempt to monetize their attention.[106]

This process of experimentation with the grid format and its outcomes encouraged me to reflect on my relationship with technology. This approach and format, its conceptualisation and its technical execution was an indication of my fetishisation of technology. I was effectively engaging in a form of techno-solutionism - the ability to use a certain technology does not necessarily make it the most appropriate method to engage with a specific task or issue. Such simplistic solutionism is in opposition to the underlying themes associated with a tactical media archaeological approach as outlined in chapter four. Another concern with this grid-based approach was the realisation that instead of the project critiquing the desensitization towards image-based violence, it would actually reinforce it.[107] The viewer is further being overloaded with visual content, and not being afforded time to engage with

---

[105] A demonstration of this grid format is available in the assets folder for this project.

[106] For more on the attention economy, see '*Building A Win-Win World: Life Beyond Global Economic Warfare'* (Hazel Henderson, 1997), '*The value of openness in an attention economy'* (Goldhaber, 2006) and *'Ethics of the Attention Economy: The Problem of Social Media Addiction'* (Bhargava & Velasquez, 2020).

[107] See '*The Effects of Media Violence on Society'* (Anderson & Bushman 2002), and *Internet Memes and Desensitization* (Barbara Sanchez, 2020).

what they are seeing, contributing to what Ken Kelly refers to as 'compressed extraordinariness' (2016, pp.277 – 278) -the continuous uploading of extraordinary events, compressed by the internet into a 'small viewable band of everdayness' (*ibid*. pp.277-278). Irrespective of how 'extraordinary' something is, following its viral moment it becomes another piece of content to scroll past on a timeline or newsfeed – not only is our attention eroded, but so too is the ability to pause, reflect or engage in any meaningful, substantive, rational reaction.

As a consequence of this process of experimentation and reflection, I began to consider alternatives methods of engaging with the Twitter archive. I was specifically interested in engaging in an oppositional method to a primarily algorithmically approach such as the *processing* grid format. Following on from my engagement with FM radio during the development of *Embassy*, I began to consider analogue, mechanical media forms, specifically slide projectors.[108] In stark contrast to utilising an algorithmic-based format which – depending on the power of the operating system being used - could potentially engage with the entire archive, a slide projector automatically imposes a series of fixed parameters. Only one slide can be loaded at a time, and only a fixed number of slides can be loaded into a slide holder. Furthermore, during this research stage, I discovered that converting digital images into 35mm film as a service was no longer available in Ireland. Consequently, this imposed two more constraints – time and money – it could take up to two weeks to have them converted and sent from the United Kingdom, a costly process that again would force me to be selective in my approach to the archive.

At this point, I purchased a Kodak carousel slide projector that could hold 80 slides at a time. My next consideration was to how to select 80 images from over two million. At this stage, it was necessary to opt for a technological-based solution - I wrote a python script that sorted through the Twitter archive and randomly selected a set amount of images.[109] Following a few iterations of this script, I had a more manageable sample selection of images to choose from – effectively the selection was co-curated by myself and an algorithm. These various

[108] See also Susan Dobson's 'Slide Library' project and Alison Nordström's response 'The Things We Keep' (2018) both of which explore the slide projector as a forgotten media technology,
[109] This script is available in the assets folder for this project.

parameters and constraints forced me to engage more critically and analytically with the archive – a process I wanted to in some way replicate within the context of the exhibition.

Farm forces the viewer to engage with the media they are observing. If they want to see the next slide, the expectation, (something else that is popular in social media – a visual interpretation of FOMO), they must wait, observe and process. The clock is not set by networked time but rather the timer on an analogue projector. In doing so, *Farm* promotes detox - not of hypermedia content per se, but rather of the hyper-consumption of digital media. This of course raises questions in relation to my curation of images, I did attempt to make it as random as possible, raising questions about random and chance, however, ultimately I made the final decision of what images were used.[110] Underpinning this practice-based process of experimentation and reflection, I was engaging with the idea of slow computing following my participation in a workshop on the subject in December 2017.[111]

5.6.2 Slow Computing

Slow computing derives from the *slow* movement - variations of which include slow food, slow travel, slow fashion and slow cities (Kowalski, 2020). All variations share a critical understanding of the monetization of time, or as Carl Honeré states, 'the clock is the operating system of modern capitalism' (p. 25, 2009).[112] Nathan Schneider suggests that decisions made in relation to personal digital technology usage should not be based on what is the fastest or most competitive piece of hardware or software, but rather with a focus on the impacts of networked computers on users and the public (2015). To practice slow computing, Schneider suggests using older/obsolete computers running *Linux* as opposed to Windows or Mac OS operating systems, opting for open source media software, and maintaining private online storage through the services of non-profit tech organisations (2015). Schneider acknowledges the shortcomings in such an approach, specifically in relation to the ability of corporate, proprietary software and infrastructures to be reliable and stable

---

[110] I made the decision to remove some particularly violent images, as I felt they were too extreme.
[111] The workshop was held in Maynooth University and was led by Rob Kitchin and Alistair Fraser.
[112] The *Slow Food manifesto*, written in 1988, reads like a delayed, indeed slow, response to an earlier Italian movement and manifesto, *The Futurist Manifesto*. Whereas *The Futurist Manifesto* worshipped 'the beauty of speed' (1909), celebrating the endless possibilities of industrialization, the *Slow Food Manifesto* argues against the enslavement brought about industrialization, as a result of which 'Speed became our shackles' (Slow Food Manifesto, 2020).

(*ibid*. n.p), and it is hard to disagree with him. It should also be noted that Schneider's position is from someone who is clearly on the right side of the digital divide - it is unreasonable to suggest that everybody is in a position to slow down. Irrespective of this, there does seem to be an increased turn to slowing doing, or indeed, to do nothing[113] which overlaps with the critique of techno-solutionism indicative of a tactical media archaeological approach.

Kitchin & Fraser suggest slow computing as a form of resistance in the algorithmic age and offer two different approaches in which to practice it (2017). The first is to literally slow down, to focus more on 'social and clock time rather than networked time' (ibid. p.9). This can be achieved by disconnecting from the online world without adversely impacting on others and by engaging in social practices in a slower way than what would normally be expected (ibid.p.9). Kitchin & Fraser suggest responsible Wi-Fi usage in the home, less social media and email interaction and less automated/networked goods and services as ways of achieving this (*ibid.*p.9). The second approach is what is referred to as *data dancing*, a series of 'intricate dances around and within the proliferating platforms and constituent units of data grabbing infrastructures' (ibid.p.9). This method is a reaction to the persuasive and oppressive nature of surveillance capitalism. The authors suggest using various technologies and platforms with which to limit our visible data presence such as portable operating systems, ad blockers, encryption applications and can be seen to be more politically engaged and active -it is an approach that is used in my own practice and in other media artists featured in this thesis, through their work or in others forms of dissemination such as those highlighted in chapter four.

It is also evident in the work of organisations like Tactical Tech - a non-governmental organisation that works with both civil society actors and the general public to investigate and raise awareness surrounding the impact of technologies on society (tacticaltech.org, 2020). Tactical Tech have developed multifaceted projects such as *Exposing The Invisible* – which provides various online and offline resources to enable others to collect, analyse, and where necessary, expose the dark side of our networked world (exposingtheinvisible.org, 2020) or the *Data Detox Kit* which serves as a 'guide to increase your online privacy, digital

[113] For example, see Jenny Odell's 'How to Do Nothing: Resisting the Attention Economy' (2019), and Shannon Mattern's '*How to Map Nothing'* (2021). Also, the theme of the 2021 Transmediale festival is 'refusal' – a suggestion that refusal can be a force of resistance and change (transmediale.de)

security and wellbeing' (tacticaltech.org, 2020) and offers various suggestions that can be taken to maintain 'a more balanced and healthy digital lifestyle' (*ibid*. n.p).

Both practically and conceptually, slow computing overlaps with critical making mentioned in chapter four, and also with other relatable practices and approaches such as slow tech, critical computing and critical design.[114] What unites all these approaches is the recognition of the need for a reflective, critical and holistic approach to technological design and usage and an awareness of the issues presented by our engagement with tech platforms and infrastructures. The connectivity afforded by the internet and networked technologies means that we are constantly 'on', this, along with political and corporate machinations that seek to manipulate our usage of technological artefacts and systems to monitor and monetize our interactions, suggests that we need to equip ourselves with more tools of refusal.

5.7 *Farm*: Exhibition and Reflection

Unlike *Act* and *Embassy* which clearly delineate between concept and practice, *Farm* developed in a much more hybrid manner. The concept evolved as a reaction to practice – the practice then evolved again as a reaction to the concept. In comparison to *Act* and *Embassy*, the installation and functionality of *Farm* were less problematic. However, this is not to say the project was without its own set of challenges. The selection of 80 images from over two million was at first difficult, however, the introduction of the python script and the random element made it possible. However, even with this assistance, there were still issues. Even as a semi-automated process, the curation of images – and the justification for their inclusion – was problematic, hours before the exhibition some images were removed from the final selection as I felt they were too graphically intense.

The constraints that this project embraces as a response to hyper algorithmic consumption are also its limitations. As previously noted, a maximum of 80 images could be selected and the process of having them shipped to Ireland was both costly and time-consuming.[115] Slow and expensive is oppositional to the promise and premise of media technologies and networks -it would have been possible (and cheaper) to replicate the experience, both visually

[114] See Hallnäs & Redström (2000), Fox-Harell (2009) and Sengers *et al.,* (2005) respectively.
[115] There are currently no digital to film slide conversions services available in Ireland.

and auditorily, of images being projected using older technologies, but this would have lacked authenticity and failed to adequately convey the rhythmic pulse of the machine working in and through analogue time. However, in relation to my practice, the initial experimentation with software-based technologies - and my reaction to it – facilitated exploration of other ways of resisting networked capitalism - allowing me to incorporate acts of refusal and slowing down as legitimate methods to be utilised within the context of tactical media archaeology.

5.8 Conclusion

This chapter featured three different projects that critically engaged with the concept of the digital culture industry through the creative lens of *Platform* as outlined in chapter two. All three projects engage in some way with the social media platform Twitter. As has been discussed, this is in part because of the accessibility of the platform due to its Application Programming Interface- making it suitable a place for practice-based experimentation, but also as a consequence of its social and political influence over the last decade. Although the focus of the three projects is on Twitter, the projects combined serve as a broad critique of the many platforms of the digital culture industry and the many issues associated with them including privacy and encryption, data mining and manipulation - and my artistic responses to the same. The different practices used in these projects, from the networked engagements facilitated by Application Programming Interfaces, to the remixing of different pedagogical practices and resources, to the rejection of speed and technological solutions, constitute a set of creative approaches aligned with tactical media archaeology, that can be used as tools of critique and subversion with which to engage with the concept of the digital culture industry.

Chapter Six

Protocol

6.1 Introduction

The second practice-based chapter in this thesis documents and analyses further three artefacts developed as part of this research project. As with the last chapter, all three artefacts are interrelated, yet are also independent of each other. Within the context of this research project, *Protocol* has two distinct meanings. The first is in reference to the IEEE 802.11 protocols -the technologies and technological processes that facilitate the implementation of Wi-Fi communications. The second meaning is in relation to Internet protocol addresses, the unique numerical addresses that route and direct data as it passes through the Internet. Whereas the previous chapters' analysis was at the user level of information communications technologies, *Protocol* is concerned more with the technical and bureaucratic infrastructure and architecture upon which these platforms reside and communicate.

The first part of this chapter contains an analysis of two distinct artefacts, *Platform Protocol Place v.01* and *Captive Audience v.01* (Figure 6.1), both of which are artistic interventions within the Wi-Fi space. [116]Although two distinct artefacts, they are both built using the same hardware and software and have evolved from the same conceptual space. Consequently, the chapter begins with a description and short analysis of each project individually. This is then followed by an overview of the practical development of both projects, focusing on exploratory wireless practices and technologies such as wardriving and the ESP8266 - a low-cost Wi-Fi microchip that is utilised in both projects. *Platform Protocol Place* and *Captive Audience* are then situated in a wider analysis centred on critical interventions of the wireless space. This analysis begins with an overview of wireless communications within the context of the hegemonic nature of space as suggested by Henri Lefebvre. It is then argued that both projects are examples of representational spaces and consequently works of locative media art as defined by Conor McGarrigle. These methods are then situated within a wider body of Wi-Fi interventions that incorporate elements of critical cartography, the concept of the 'exploit', alternative and decentralised networks - all of which are what Erik Kluitenberg considers strategies in which to reclaim agency within hybrid spaces and are, I argue, examples of tactical media archaeology.

---

[116] Hereinafter referred to as *Platform Protocol Place* and *Captive Audience*.

The second part of this chapter focuses on a project entitled *Whois Ireland?* which engages with the technical governance of the Internet through an analysis and display of Internet Protocol addresses assigned to Ireland. This focus begins with a conceptual overview of the project's development, and how it specifically related to my participation in the Freeport Institute Summer School in Barcelona in July 2018. This participation led to a critical point in the development of this research project - signalling a turn to the more material aspects of the internet. This process occurred by engaging with a series of networked explorations of Internet Protocol addresses using open sources intelligence methods including traceroutes, and whois analysis, leading me to formulate - and then attempt to answer - two specific questions.

Figure 6.1: Installation view (left) *Captive Audience v.01,* (centre) *Platform Protocol Place v.01,* (right) *Whois Ireland? - Platform Protocol Place* solo exhibition, A4 Sounds Gallery, Dublin 01, January 2021.

6.2 *Platform Protocol Place* v.01

Platform Protocol Place is an intervention that occurs over the radio spectrum, specifically by engaging with IEEE 802.11 standards and protocols - more commonly referred to as Wi-Fi technology. This first version of the project was developed as part of the exhibition of practice-based work in January 2020. *Platform Protocol Place* transmits multiple Service Set Identifiers (SSID) simultaneously over the wireless local area network of the gallery

space.[117]An SSID is the name given to a Wi-Fi network so that a user can identify and connect to it - the SSIDs used for this initial version were the name of the exhibition and this thesis (Figure 6.2). To experience the work the viewer must use their own devices to observe the different network names.[118] This act of passive participation reinforces a dialectical concern of networked communications in that it engages with the immateriality of the material, whilst simultaneously reinforcing the materiality of the immaterial – we need devices and interfaces to 'see' and experience the invisible frequency of the radio spectrum.

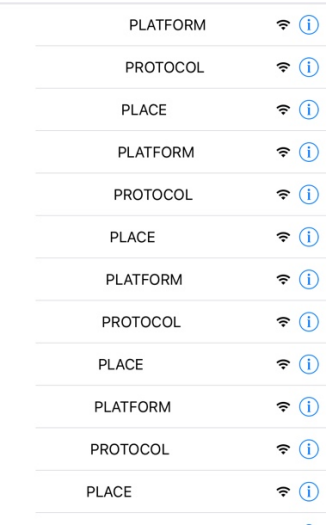


Figure 6.2: A screengrab of *Platform Protocol Place v.01* The cascade effect is to bypass the alphabetical standardisation of SSIDs.

Despite its association with connectivity - our collective understanding of Wi-Fi is as a gateway to the networked world of the digital - it is only possible to engage with the work locally, and as such, *Platform Protocol Place* encourages reflection on themes associated with decentralisation and disconnectivity, and also prompts discussion - as with *Captive Audience* - on the idea of community within the context of physical proximity. *Platform Protocol Place* is a form of Wi-Fi spamming - it spams local wireless infrastructure through the generation of multiple 'fake' SSIDs at one time. In comparison to the more adversial technique of 'Wi-Fi jamming' – the intentional blocking of Wi-Fi signals - Wi-Fi spamming is a relatively unknown practice.

[117] A wireless local area network (wlan) is a network that allows devices to communicate wirelessly usually using the IEEE 802.11 protocols.
[118] The assets folder of this project contains a full demonstration video of the piece functioning.

6.2.1 *Captive Audience* v.01

As with *Platform Protocol Place*, *Captive Audience* is an interventionist piece that occurs within a public Wi-Fi space. Unlike *Platform Protocol Place*, *Captive Audience* broadcasts one specific SSID - when a device connects to it, it is redirected to a captive portal page. A captive portal is a web landing page often used to authenticate and monitor wireless access on public Wi-Fi networks such as those available in airports, hotels, restaurants and on public transport. Typically landing pages serve as gateways to online connectivity, however, the landing page in *Captive Audience* does not connect to the internet. It is used as a platform to transmit text-based communications directly to the device (and users) that connect to the SSID.

Figure 6.3: Anti-Racism protest outside of Google European Headquarters, Dublin (10/08/19).

The first 'live' iteration of this work occurred on Saturday 10th of August 2019 at an anti-racism counter-protest outside the offices of Google's European headquarters in Dublin (Figure 6.3).This counter-protest was in response to a series of protests held by individuals broadly aligned with the far/alt-right in Ireland.[119]These protests were against the decision by the online video sharing platform YouTube to deplatform the account of a central figure of the Irish alt-right in Ireland for violating YouTube's policies on hate speech and harassment

[119] For an overview of the alt-right in Ireland see 'Ireland and its Contradictory Welcomes' (Barry & Collins, 2019) and 'Irish Right-Wing YouTubers Seem to Be Following an Alt-Right Playbook' (Kirk, 2019).

(journal.ie, 2019). Whilst attending the counter-protest, *Captive Audience* was activated. The name of the SSID for this iteration of the work was *#speakersunicorner Home* - a reference to the Twitter hashtag that had been used to promote the counter-protest in the days leading up to it.[120] Any devices that connected to this SSID would be redirected to a captive portal page. This portal page displayed the poem *Home* by Warsan Shire (Figure 6.4 & 6.5).[121] This poem details the experiences of undocumented refugees in Europe (facinghistory.org, 2020).

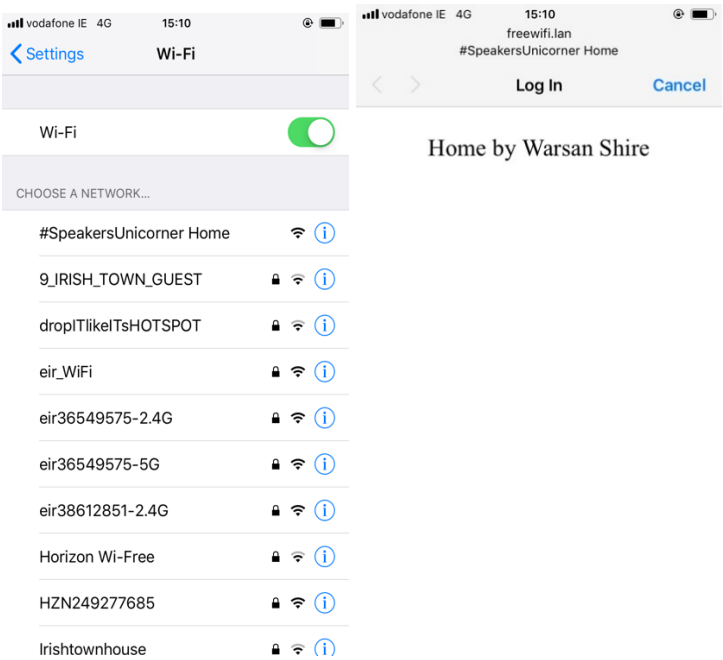


Figure 6.4: #SpeakersUnicorner Home SSID. **Figure 6.5**: *Captive Audience,* opening page.

During this iteration, *Captive Audience v.01* was active for approximately two hours. It is not known how many, or indeed if any devices, accessed the work during this period. Although it is possible to record the mac addresses of any devices that connect to the SSID access point,[122]

[120] See 'Speakers Unicorner founder on counter-protesting Gemma O'Doherty and tackling hate speech' (Kenny, 2019).
[121] A full iteration of the poem is available in the assets folder for this project.
[122] A Media Access Control (MAC) address is a unique number assigned to a networked device in order for it to be identified on a network.

due to privacy concerns this aspect of the project was not activated.[123] The use of Warsan Shire's '*Home*' for this iteration of the project was intended as a demonstration of solitary with the counter-protest, whilst also functioning as a networked-based rejection of the ideologies associated with the far right.[124]

6.2.2 Wireless Explorations

Platform Protocol Place and *Captive Audience* are artistic interventions that occur through Wi-Fi. The term 'Wi-Fi' was first introduced in 1999 by the *Wi-Fi Alliance* - a network of companies working internationally to promote the usage and evolution of wireless technologies (wi-fi.org, 2020). The term solved the issue of representation experienced by the wireless technology industry by making visible a new way of accessing networked infrastructure, whilst highlighting its convenience (Mackenzie, 2010). The similarity between the terms 'Hi-Fi' and 'Wi-Fi' cultivated an association between wireless technology, household design and consumer electronics (*ibid.* pp.102 – 103). Initially popularised by commercial products such as Apple's *AirPort* (Poulson, 2001), billions of devices have been manufactured with IEEE 802.11 technology and its global economic value is expected to reach 3.5 trillion US dollars by 2023 (wi-fi.org, 2020) – it is a critical part of contemporary networked infrastructure.

Both *Platform Protocol Place* and *Captive Audience* evolved from research into various creative and technical explorations of wireless technologies and infrastructures including wardriving. Wardriving is the process of searching for, and mapping, Wi-Fi networks using a moving vehicle (Priya *et al.*, 2010), and was originally pioneered by Peter Shipley between 1999 – 2001(Poulson (2001), Stark (2021).[125] Although the technologies used for wardriving have evolved over the past two decades in terms of scale and price, the fundamentals -a computer, a wireless receiver/aerial, a GPS device and relevant mapping software -remain

---

[123] It would be ironic to infringe on a user's privacy within a research project that is (in part) concerned with exposing and critiquing surveillance related issues. More seriously, I was concerned that logging user data could potentially endanger the security of individuals and organisations participating in the counter-protest.

[124] Other examples of co-opted works of poetry being used in media art practices can be found in Pip Thornton's *Poem.py* (2016), Mr. Gee's *Bring Me My Fire Truck (the New Jerusalem?)* (2019 – 2020), my own *For Ruth and Violette* (2021) and *Hotspot Poet* (2016) by VTOL/ Dmitry Morozov – a project that was particularly influential on my own research.

[125] The 'war' in war driving originates from the 1983 movie 'War Games' - a reference to a scene when Matthew Broderick uses his computer to dial every phone number in a local area to locate other computers.

the same. Often conflated with other more adversarial hacking practices, wardriving is essentially an activity for network engineers, hobbyists, makers and those with a general interest in wireless technologies. It has inspired variations based on available transport (bikes, buses, trams etc) and 'technologies' such as warchalking - the practice of marking public spaces using chalk with a series of symbols to denote the existence of public Wi-Fi networks (Ward, 2002). There are numerous online tutorials and guides with instructions on how to build a wardriving 'rig' using relatively affordable equipment such as the Raspberry pi computer alongside open-source networking tools like *aircrack-ng suite* and *Kismet.*[126] Indeed, such equipment is unnecessary due to *WiGLE,* a mobile-based app that allows users to identify and map wireless access spots and upload them and in doing so contribute to a global map of Wi-Fi networks.[127]

Figure 6.6: Wardriving rig – Battery pack, GPS, Wi-Fi antennae & Raspberry pi.

Taking inspiration from Murphy *et al.,* who researched wireless networks in Dublin using wardriving as their primary methodology for data collection (2002), I developed my wardriving rig to investigate current wireless networks within Dublin (Figure 6.6). The reasons for doing this were twofold: first, the practical process of technical experimentation required

[126] See for example 'Wardrive with the Kali Raspberry Pi to Map Wi-Fi Devices'(null-byte.com,2017) and 'Wi-Fi Wardriving++' (scotthelme.co.uk,2016). *Aircrack-ng* is a suite of software tools used for monitoring Wi-Fi networks for security vulnerabilities - aircrack-ng.org. *Kismet* is another networking tool uses device detection, wardriving and also 'sniffing' - the monitoring and capturing of data packets over computer networks - kismetwireless.net.

[127] As of 2nd April 2021, there are 734,449,914 WI-FI networks visible on the website, see wigle.net

to build a stable rig would be beneficial to my general coding and networking skills, as noted in chapter six, such practice-based experimentation contributes to an expanded and rounded scope of inquiry specific to this research project. The second reason was to use the wardriving rig as a method of investigation - any information obtained during these mapping experiments could potentially complement, inform or challenge the general research undertaken up to that point.

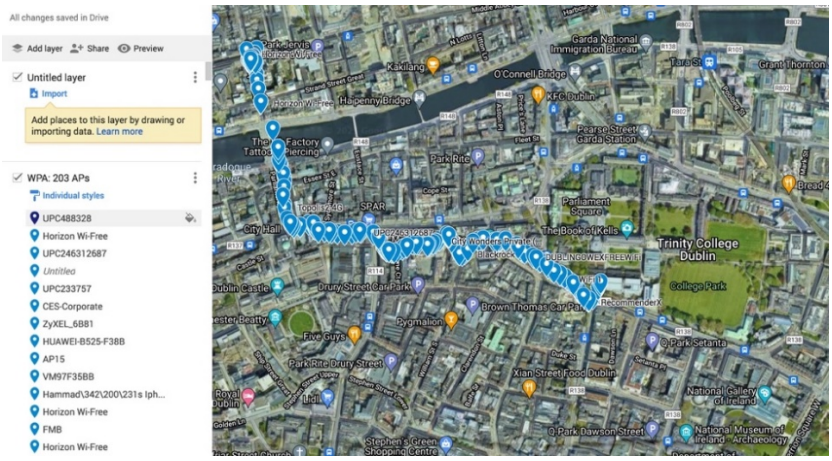


Figure 6.7: Map of warwalk through Dublin city centre on April 28th 2018 -a total of 527 Wireless Access points identified.

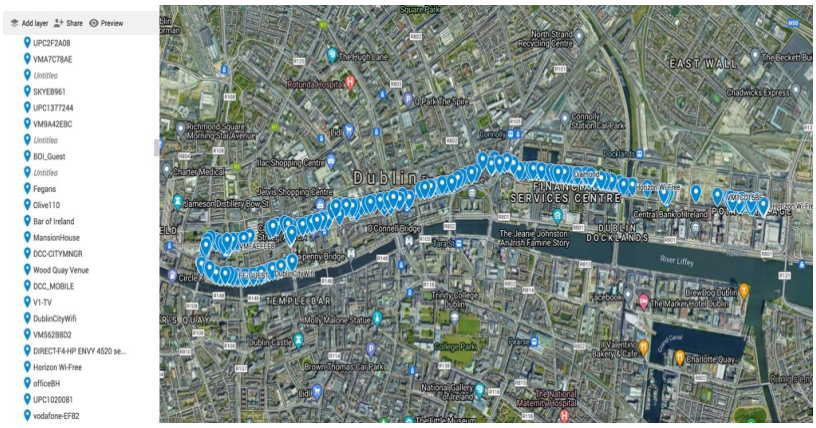


Figure 6.8: Map of wartram through the north side of Dublin city centre on May 3rd 2018 - a total of 4,332 Wireless Access points identified.[128]

I carried out two 'war' iterations in Dublin using the kit that I had assembled. The first was a walk through the city centre from the north side to the south side (Figure 6.7). During this exercise, I collected 527 wireless access points. The second iteration was a 15-minute journey

[128] A map of the war walk is available at: https://www.google.com/maps/d/u/0/edit?mid=1SD-ivr5haasiS2OgCnmtxMsVjmiJVR5F&usp=sharing, and of the wartram at: https://www.google.com/maps/d/u/0/edit?mid=1Yaos3xUGq_jNs-BPFngPVCdpk8g53Bzj&usp=sharing

through the city centre on the local Tram service (Figure 6.8), which wielded 4,332 Wireless Access Points. Whilst these experiments did not develop into a fully formed project, this practical engagement with wireless technologies allowed me to formulate ideas related to a networked dérive and consider Nigel Thrift and Shaun French's position that technological software increasingly directs us through the urban landscape (2002). Practices such as wardriving facilitate an engagement with technical processes, skills and tools whilst also encouraging exploratory investigations into wireless technology, and the space(s) that it occupies – these engagements were instrumental in the development of the artefacts produced in this chapter.

Both *Platform Protocol Place* and *Captive Audience* use the same piece of hardware, the esp8266 – a low-cost WI-FI microchip that can be programmed using the Arduino Integrated Development Environment. The esp8266 technology has been widely adopted by artists, creative technologists and hobbyists, consequently, there is a relatively large online amount of online resources including tutorials and technical guides.[129] Aside from its relative ease of use, one of the main reasons for the popularity of the esp8266 is its price – the model used for these projects costs approximately €15, - but there are cheaper models available.[130] Price is relative and I wish to avoid making any general statements on affordability, however, it is not unreasonable to suggest that pricing of esp8266 microchip makes it an accessible tool for artistic and/or activist practices.

The code used in *Platform Protocol Place* and *Captive Audience* is based on code from other projects and as such, is another example of remix being critically employed in this research project.[131] *Platform Protocol Place* reconfigures a Wi-Fi spamming project available on github,[132] whereas *Captive Audience* was conceptually influenced by *Hot Ninja* (2018), a project by the Russian artist VTOL (Dmitry Morozov).[133] In turn, the documentation for *Hot Ninja* lists a series of projects that were used in its development, including a captive portal page hack by Junxiao Shi - it is this project that the code for *Captive Audience* is based

[129] Such as the ESP Community Forum, available at www.esp8266.com and 'A Beginner's Guide to the ESP8266' (2017) a guide to the micro-contoller written by Pieter P.
[130] I am using the *Adafruit Huzzah* esp8266 model.
[131] The code used in both projects is available in the shared assets folder of these projects.
[132] https://github.com/spacehuhn/esp8266_beaconSpam
[133] https://vtol.cc/Hot-Ninja

on.[134]Between experimenting with technological infrastructures, affordable and accessible artefacts and engaging with online communities of knowledge and building upon the same, both projects are examples of a tactical media archaeology approach– this approach is also evident in the conceptual foundations of both pieces.

6.3 Representational Space and Locative Media Art

Following its initial development and widespread adoption, Wi-Fi became a 'contested space' as networked activists sought to experiment with the possibilities of collective communication outside of both the state and the market (O' Dwyer 2020, p.69). Whilst the concept of cyberspace is a metaphorical tool that gives us a sense of location and space when considering the distribution of networked computer systems around the world, the space that radio occupies is both physical and real (Dunne, 2005). Consequently, it must not be considered in isolation, as to do so sees it becoming what Henri Lefebvre refers to as an 'empty abstraction' (1991, p.12). Critical interventions and projects such as *Platform Protocol Place* and *Captive Audience* interrogate this contested space not only in relation to infrastructural access and experimentation – but also at a more local level. This locality extends to the range of a wireless signal within a given space – a space that is material and fixed, yet simultaneously immaterial and ephemeral.

Lefevbre offers a conceptual triad with which to understand the hegemonic nature of space alongside its social relations (1991, p.11). The first part of this triad is *spatial practice* (*ibid*.p.33), this is the space of reality and is perceptible through the senses (Leary-Owhin, 2015, p.3). It is the space that is occupied by the individual, the user and the device. The second element, *representations of space*, relate to the order imposed by the relations of productions (Lefebrve, 1991) and is a space conceptualised by bureaucrats, politicians, experts and technocrats. This representation of space applies to the radio spectrum and the formulation, organisation and implementation of its technical standards and protocols alongside corresponding legal supports. The final element is *representational space* which embodies complex symbolism and is linked to the 'clandestine or underground side of social

[134] https://yoursunny.com/t/2017/freewifi/

life' (Lefevbre, 1991, p.33). Lefebvre regards *representational spaces* as spaces of resistance in which users can manipulate imposed space to make it their own (McGarrigle, 2012).

Conor McGarrigle argues that it is within these representational spaces that locative media art practices are situated. Locative media art (LMA) is a series of artistic practices and methods that engage with an extensive and growing range of locative technologies such as GPS, Wi-Fi and Bluetooth to critique and experiment with these different technologies from within the spaces that they occupy (McGarrigle, 2012, pp.11-12). Due to their engagement with -and subversion of - Wi-Fi infrastructures, *Platform Protocol Place* and *Captive Audience* are examples of locative media art practices and consequently representational spaces. The manipulation of local communication networks through Wi-Fi spamming or the intervention of the same to broadcast politically engaged poetry are acts of resistance - a temporary and symbolic occupation of immaterial spaces of hegemonic power to highlight the possibilities and issues associated with using these networks in relation to security, access, privacy and propaganda.

6.3.1 Visualising and Decentralising

The methods employed in *Platform Protocol Place* and *Captive Audience* are part of a wider set of artistic practices that critically engage with Wi-Fi networks through visualisation and mapping and in doing so are engaging in a form of critical cartography - what Jeremy Crampton and John Krygier describe as being 'a one-two punch of new mapping practices and theoretical critique' (p.11, 2006). Examples of such practices can be found in the work of artists such as Jerome Saint-Clair who takes the technical aspects of wardriving to build a Wi-Fi tracker to avoid electronic ticketing for unpaid parking fines,[135] or Brett Balogh's *Local Area Networks* (2012), which maps Wi-Fi networks in proximity to his studio to draw attention to the ability of Wi-Fi to encroach on both public and private spaces (brettbalogh.com, 2020).[136] The visualisation of Wi-Fi networks can also be found in more abstract projects such as *Wi-Fi camera* (2008-2010) by Bengt Sjölén, Adam Somlai Fischer and Usman Haque, a project that 'reveals the electromagnetic space of our devices and the shadows that we create within such

[135] https://01010101.fr/rpi-war-driving.html
[136] See also *Observatorio* (2008) by Clara Boj and Diego Díaz which maps the privatisation of Wi-Fi networks and (lalala.org, 2020).

spaces' (2020), and more recently, *Wifi Tapestry v.01* (2017) by Richard Vijgen, an installation piece that scans the Wi-Fi spectrum for data transfers and when one is detected, the colouring of a wall mounted tapestry of thermochromic yarns changes (neural.it, 2018).[137]

Such work communicates and critiques issues surrounding networked communications infrastructures in both the public and private sphere -more interventionist pieces like *Captive Audience* and *Platform Protocol Place* can be found in the work of Jonah Brucker-Cohen, whose *Wi-Fi Hog* (2003) and *Wi-Fi-Liberator Tool Kit (2007)* offer practical and tactical tools with which to 'liberate' public and pay-per-use wireless networks (coin-operated.com, 2020). Other examples include *Backslash Kit,* a critical design project by Pedro G.C. Oliveria and Xuedi Chan made in response to protests such as the Arab Spring and Occupy movement, and offers 'a series of functional devices designed for protests and riots' including *Router* – an offline mesh network, *Jammer* – a short-range Wi-Fi jammer disguised as a key ring, and *Drive* – a Wi-Fi enabled storage device (backslash.cc, 2020) and Brett Balogh's 'electronic disobedience in wireless infrastructures space' project *Protest Bar* -a work that enables the user to post messages as SSIDs making it a platform for both activism and art (github, 2020).

The work of the Critical Engineering Group, including *Newstweek* (2011), *Men in Grey* (2009 – 2014) and *Packetbridge* (2012 – 2015), features 'a set of strategies encompassing interventions in infrastructure'(weise7.org, 2020). The group creatively utilise the computing concept of the 'exploit' to provoke, subvert and raise awareness surrounding issues within the techno-political sphere - all three projects do so by manipulating the representation of space afforded by IEEE 802.11 standards. The point of such projects is not to hack or cause harm to the users, but rather to highlight the security, or lack thereof, of networked public spaces – the critical engineers consider 'the exploit to be the most desirable form of exposure' (2012).

Mapping, visualising and exploiting wireless infrastructures and artefacts are all legitimate tactics for probing the protocols and standards of the digital culture industry. An overlapping theme and tactic that emerged during the development of both *Captive Audience* and *Platform Protocol Place* projects was a need for more decentralised community models of

[137] See also Gordon Savicic's *Constraint City*: *The Pain of Everyday Life (2007)* or Christoper Bruno's *Wi-Fi-SM* (2003-2006).

networked communications than the increasingly centralised ones of the digital culture industry. Decentralisation is a term with different meanings and one that is frequently used as a one side fits all panacea for networked technology and culture ills. For the purpose of this research project my focus is on web decentralisation - using the internet/web without depending on the centralised services and companies of Big Tech -this is achieved by engaging with peer-to-peer practices and technologies such as *Blockchain* and the communication-based projects outlined within this chapter.[138] As previously noted, *Captive Audience* and *Platform Protocol Place* are premised on the concept of the local -reflecting a wider pursuit of localised and decentralised projects that engage with IEEE 802.11 protocols. Large scale examples of such approaches can be found in community-based projects that engage with the idea of technological sovereignty,[139] such as The Red Hook Wi-Fi project in New York (redhookwifi.org) – this community mesh network was able to stay operational during Hurricane Sandy in 2012, allowing local residents to access essential information whilst offline. NYC Mesh, Toronto Mesh, Freifunk 'a non-commercial initiative for free wireless networks' (freifunk.net, 2020) in Berlin and Guifi.net in Catalunya are further examples of community-based networks that seek to operate outside of a proprietary, corporate and centralised internet.[140]

This move to decentralised networks with an emphasis on the local is also evident in various critical IEEE 802.11 artistic practices, such as Julian Bleecker's *Wi-Fi Bedouin* (2003) and *WiFI.Artcache* (2003), both projects challenge assumptions surrounding wireless technology and instead focus attention on small, physically close, offline and localised networks (teckwondo.com,2020). Sarah Grant's *Subnodes* project, mentioned in chapter four, is another example of a project exploring the potentials of decentralisation, as is her collaborative project '*You Are Here'* (2015 – 2016) which allows for location/community-specific content to be transmitted over Wi-Fi, performing the role of 'digital town square' where people in proximity can share and exchange communications and ideas

[138] See Decentralization: an incomplete ambition' (Schneider,2019), 'Decentralisation: the next big step for the world wide web' (Corbyn, 2018) and 'Web 3.0: the decentralised web promises to make the internet free again' (Harbinja & Karagiannopoulos,2019).
[139] See Sarah Grant's essay 'Towards Technological Sovereignty' (2021).
[140] www.nycmesh.net www.tomesh.net www.freifunk.net www.guifi.net

(youarehere.network, 2020).[141] Finally, overlapping with art, activism and engineering is the *PirateBox*, a project started in 2011 as a 'DIY anonymous offline file-sharing and communications system'(Piratebox.cc, 2020).[142] [143] Such projects and practices serve as both critique of the corporatization of the internet, but also highlight how Wi-Fi technologies can be used to counter this corporatisation and build sustainable, networked communities.[144]

6.3.2 Hybrid Strategies

Platform Protocol Place, Captive Audience and the media art practices outlined in the previous section are all subversions of augmented space, a term Lev Manovich uses to describe the superimposition of dynamically changing information upon physical space (2008). This superimposition of the digital within the context of *Platform Protocol Place* and *Captive Audience* is both détournment and culture jam - the projects are a reaction to what Graham *et al.*, describe as the increasing mediation of urban spaces by content and code (2013), and a form of resistance against the embedding of the internet in the every day -a process that is enabled by mobile devices and, as De Souza observes, affects our understanding of space within the urban environment by situating the remote within the present (2006).[145]

Most interpretations of space within a digital context are based on an underlying assumption of connectivity to the Internet – wireless technologies and protocols serve as infrastructure to connect the user to the internet – a vast 'world' of networks of knowledge, but also of extraction and exploitation. By *not* connecting to the internet, but by using part of its core infrastructure, these projects point towards a sense of agency and autonomy - temporary

---

[141] See also the work of software engineer and artist Chris Bolin, in particular *The Disconnect* - an 'online' magazine (thedisconnect.co) that can only be viewed on a device when its Wi-Fi has been disabled.

[142] The project was originally created by David Darts and then maintained by Matthias Strudel. The name and aesthetic the project follows in the lineage of other who have 'ghosted' the radio spectrum -from pirate radio stations dating back to the 1950s – a concept that carried over to the digital world with the peer-to-peer file sharing site *pirate bay* and into political legitimacy with the Pirate Party. In November 2019, it was announced that project would no longer be maintained.

[143] Due to its open sourced, community focused ethos and ease of use, *piratebox* has been used in various guises including media art projects - Aram Bartholl's *Keep Alive* (2015), as a local gallery node in a hyper-global art exhibition *The Wrong.Router*(2019) and as a distribution point for educational and healthcare resources - *libraryBox* (2012).

[144] For a comprehensive overview of DIY networks and related art practices, see *Challenging Infrastructures: Alternative networking and the role of art* (Dragona & Charitos, 2018).

[145] See also Rob Kitchin & Martin Dodge's concept of *Code/Space* which occurs when both software and the 'spatiality of everyday life' create one another - spatiality is a consequence of code, and the function of code is to engineer a 'particular spatiality' (2011, p.16).

events and moments enabled by wireless technologies occurring outside of the digital culture industry and in doing so, emphasise the potential of l*ocalisation* enabled by (dis)connectivity as a form of resistance, and in doing so, sharing a conceptual space with the logic(s) of *slow* and *refusal* as discussed in chapter six.

Eric Kluitenberg offers a series of strategies to incorporate free spaces within hybrid space as a way of asserting agency and rejecting spatial determination. He also notes that 'tactical acts of spatial resistance' are of little use when confronting continuously evolving and changing systems of spatial control as they are only temporary (p.14, 2006) – an interesting point within the context of the temporality of tactical media. The strategies Kluitenberg suggests are varied and range from the bureaucratic - engaging with legal provisions, economic scales and accountability, to more direct activist strategies – strategies that have been alluded to already in this chapter through critical media art practices like *Platform Protocol Place* and *Captive Audience v.01* and include tactical cartography, disconnectivity, sabotage and deliberate violation of imposed spatial programmes(*ibid.*p.15-16). Kluitenberg also suggests the creation of new social and political players within the context of public action as a method of establishing agency within hybrid spaces (*ibid.*p.16). The emphasis here is on the way that the hybrid space is used, the use of space in opposition to others is the 'manifestation of action' through gesture – the action is how the space is used as opposed to the actions that occur within the space. It is here where we can situate artistic practices that engage with the wireless space, the artist operates as a social actor establishing interventions between the user's device and the network. These interventions are borne from experimentation, exploration and the probing of the radio spectrum - the artist is focused on operating within pre-existing space and infrastructure. Within the context of *Platform Protocol Place v.01* and *Captive Audience v.01* this space is the radio spectrum - its infrastructural utility is repurposed and utilised to become a space of resistance, and in doing so hints towards a semblance of both artistic and user agency.

The idea of focusing on pre-existing infrastructure is echoed by Rachel O' Dwyer who suggests focusing on the 'seeds of resistance' that already exist within commercial spaces as opposed to looking for new or alternative networks (2020, p.74). O' Dwyer documents a series of material practices that provide a counterbalance to proprietary regulation of network infrastructure (*ibid*.p.77). These material practices incorporate experimentation, pedagogy

and more artistic led experimentation focusing on tinkering and making (*ibid*.p.77). O' Dwyer warns against idealizing these practices, aware that they may be absorbed back into more commercial systems, but at the same time, recognises the spaces in which they occur as being 'imaginative and materially discursive resistance to capitalist enclosure' (*ibid*.p.78). Since its emergence, artists have utilised Wi-Fi technologies using practices similar in ethos to the ones suggested by both Kluitenberg and O' Dwyer. As O'Dwyer notes 'the history of wireless has been ghosted by alternative practices that have challenged the ownership and control of the spectrum' (2020, p.69), although the focus of these projects is Wi-Fi I would situate pirate radio, TV 'hacks' such as those by 'Captain Midnight' and 'Max Headroom' in Chicago, as other examples. Projects such as *Platform Protocol Place* and *Captive Audience* probe and interrogate the possibilities of the (hybrid) wireless space as a critical reaction to the digital culture industry and its many technological constraints.

6.4 *Platform Protocol Place* v.01 & *Captive Audience* v.01: Exhibition and Reflection

Platform Protocol Place and *Captive Audience* are both first versions. This is an acknowledgement on my part that I intend to develop the themes and practices featured in both works further. Within the timeline of this research project, however, both projects were sufficiently developed to be both technically deployed and publicly exhibited. Deciding what was the most efficient and impactful way of exhibiting 'invisible' networks raised some challenging questions. Ultimately, the decision was taken to exhibit the technological artefacts themselves, as I felt that they complimented the overall visual aesthetic of the exhibition. However, both devices were powered on, so the visiting public could experience the work as it was originally intended. Unfortunately, there were at times issues accessing *Captive Audience* – due to an ongoing technical concern in relation to the use of the ESP8266 with Mac and Linux operating systems. Another key question raised by *Captive Audience v.01* is the ideas of availability and access. The work is broadcast over the radio spectrum -whether it is accessed or not, it is still 'there'. It 'exists' the moment the battery powers the WI-FI chip and this chip broadcasts a signal. This also points towards an ephemeral form of tactical media archaeology -a temporary autonomous zone on the radio spectrum.

As with *Act* and *Embassy* in the previous chapter, both projects have benefited from peer learning and knowledge sharing on online platforms and communities. As noted in chapter four, I consider such processes as forms of praxis within the context of critical pedagogy. Furthermore, both projects have been activated in a 'live' real world setting. I consider the activation of *Captive Audience v.01* a more overt form of praxis as it was utilised in a public demonstration as a form of protest. However, I must also reflect on the limitations of such an action. I struggle with whether this counter-protest was the best place for it to be 'experienced'. To return to the discussion in chapter four on media art practices as forms of protest and resistance and Shannon Matterns' question 'and then what?', *Captive Audience V.01* is a form of praxis in the sense that it is active and engages. However, just because it is praxis, does not mean that it is the most appropriate form of action.

6.5 Whois Ireland?

Figure 6.9: *Whois Ireland?* installation view.

Whois Ireland? is an installation piece that reflects on the technical bureaucratic infrastructure of the internet through the lens of the nation-state, whilst simultaneously critiquing and highlighting the dominance of big tech on localised physical and digital networks. The work utilises an LED screen to iterate a selection of Internet Protocol (IP) addresses assigned to Ireland - and the corresponding entities, corporate and otherwise, to whom those addresses have been registered (Figure 6.9).[146] The Internet Corporation for

[146] An IP address is a unique number (32 bit) assigned to a device on either a local network or the Internet. The IP addresses analysed in this project are version four (IPv4) which are usually formatted as four separate 8-bit parts separated by full stops, e.g. 192.158.0.132. This is in contrast to the range of IP address (IPv6) introduced in 2012 to fulfil the demand for unique addresses, e.g. 4c92:3256:c22:5890:dhd5:k123:34X9:19hj.

Assigned Names and Numbers Although (ICANN) is the main regulatory body for internet protocol addresses. However, most *whois* services are operated by domain name registrars and registries -including regional organisations such as *African Network Information Center* (AFRINIC) which serves Africa and *Réseaux IP Européens Network Coordination Centre* (RIPE) which serves Europe, Central and West Asia, and Russia. The list of IP addresses and companies in *whois Ireland?* have been collated using various online sources including the *whois* database – an online record of IP addresses, domain names and other relevant information.[147]

Whois Ireland? is a critique of the corporatization of the internet and also serves as a reminder of the 'local' within the context of information communication technologies, alongside the national and regional bureaucratic infrastructures that regulate them. Despite the abstract nature of the internet in relation to time and space (Castells, 1989)[148] and the impenetrable and ephemeral algorithmic complexities upon which it is built, it is still dependent on local nodes. The title of the work is a reference, not just to the bureaucratic structures that govern the internet, but also a provocation in relation to the role of the state within the context of the tech companies of the digital culture industry all of whom maintain a significant, physical presence in Ireland.[149] Whereas *Platform Protocol Place* and *Captive Audience* were concerned with utilizing and mapping the radio spectrum, *Whois Ireland?* is focused on mapping the digital – as an entry point to critically engaging with the material.

6.5.1 Freeport

The conceptualisation of *Whois Ireland?* - and the subsequent body of work and practices that followed it - evolved out of my participation in the *Freeport Institute* summer research programme at the *Centre Cultura Contemporania de Barcelona* (CCCB) in June 2018. This summer school focused on creative and alternative methodologies to research contemporary networked issues with a particular emphasis on data-driven investigative techniques (freeport.institute, 2020). The programme was led by the *Share Lab* – a collective of artists, designers and data scientists who utilise methodologies and approaches such as data mining

[147] The list of IP ranges used in the *whois Ireland?* piece are available in the assets folder for the project.
[148] See also Felix Stalder's essay '*The Space of Flows: notes on emergence, characteristics and possible impact on physical space'* (2001).
[149] The operations of these companies in Ireland is discussed in chapter seven.

and visualization to map network topologies and in doing so, reveal hidden and invisible flows of information (labs.rs, 2020). The focus of the *Share Lab* is on the machinations of powerful tech companies such as Facebook, Hacking Team and Amazon, and in projects such as the *Invisible Infrastructures* series, they analyse the technical governance and regulation of the Internet as a method of disentangling the geopolitical complexities of network topologies.

Figure 6.10: Mapping Network Topologies workshop, Freeport, Barcelona, June 2018

These methodologies shaped the direction of the *Freeport programm*e with members of *Share Lab* leading practice-based sessions focused on various open-soured networking and data visualization tools including *Nmap* and *Gephi*[150] (Figure 6.10). These practical sessions were complemented with discussions on critical issues and debates surrounding networked media technologies. The combination of practice-based and theoretical inquiry at *Freeport* led to somewhat of a critical juncture in the evolution of this research project. Prior to my participation in the programme, my research into the digital culture industry had been very much focused on the user side of the interface – the platforms. My framing of the many issues of the digital culture industry was within the context of an abstract corporate presence, posing a dialectical challenge due to Big Tech's simultaneous occupation of everywhere and

[150] *Nmap* is an open-sourced network scanner and is available at nmap.org. *Gephi* is an open-sourced network and visualisation tool available at gephi.org.

nowhere – the scale and presence of these companies are immense, yet for most users any form of interaction with a material manifestation of their operations is limited.

However, these companies are not just ethereal nodes within the internet. They occupy offices, campuses, factories, stores and other physical spaces. Indeed, most of the companies associated with 'Big Tech' as outlined in chapter four, occupy a significant physical corporate presence in Dublin - the city where I live and work.[151] I was of course aware of their presence in Dublin before I participated in *Freeport*, but up until that point I had not considered it within the context of this research project. Instead, I framed these companies as abstract entities which upon reflection, I consider a consequence of the language of the upgrade mentioned in chapter four highlighted in section 2.2 - the language used to talk about these companies - alongside their sheer size and scale -makes them simultaneously omnipresent yet absent.[152] Following Freeport, I began to engage with some of the practical methodologies that featured on the programme as a way to investigate the presence of these companies in Dublin and Ireland.

6.5.2 Tracerouting

A traceroute is a basic networking tool that shows the path data takes to move from one computer to another. It can be used to track the different 'hops' made by a data packet when requesting access to a website, and can reveal the IP address of each of these different hops - this can then be cross-referenced with the aforementioned *whois* directory. IP addresses are an example of a critical internet resource, they are exclusive and specific to the Internet and are both virtually and globally unique (DeNardis, 2014). By focusing on traceroutes from a localised perspective – cross-referencing individuals hops to ascertain the influence of the companies that dominate the digital culture industry – this inquiry began to focus on the corporate ownership of critical internet resources within Ireland and the techno-political implications, if any, of the same (Figure 6.11 and 6.12).

[151] Specifically I mean GAFAM – the only exception being Apple whose corporate headquarters is located in Cork, the second largest city in the Republic of Ireland.

[152] Anderson & Pold similarly describe the *metainterface* as both 'omnipresent and invisible', embedded into everyday artefacts, whilst simultaneously defined by invisible exchange of information (2018, p.5).

```
Pauls-MacBook-Pro:~ Paul$ traceroute www.google.com
traceroute: Warning: www.google.com has multiple addresses; using 172.253.116.10
3
traceroute to www.google.com (172.253.116.103), 64 hops max, 52 byte packets
 1  192.168.0.1 (192.168.0.1)  8.398 ms  3.524 ms  4.039 ms
 2  84.116.236.62 (84.116.236.62)  14.238 ms  15.881 ms  15.132 ms
 3  ie-dub01a-rc1-ae-14-0.aorta.net (84.116.239.129)  16.355 ms  14.442 ms  35.6
74 ms
 4  ie-dub02a-ri1-ae-73-0.aorta.net (84.116.134.110)  16.238 ms  17.378 ms  23.6
90 ms
 5  74.125.118.8 (74.125.118.8)  14.932 ms  13.376 ms  21.706 ms
```

Figure 6.11: Traceroute to google.com - the 5th hop is to Google's network.

```
Pauls-MacBook-Pro:~ Paul$ traceroute www.gov.ie
traceroute: Warning: www.gov.ie has multiple addresses; using 52.214.131.44
traceroute to govie-prod-frontend-lb-1756570408.eu-west-1.elb.amazonaws.com (52.
214.131.44), 64 hops max, 52 byte packets
 1  192.168.0.1 (192.168.0.1)  4.733 ms  3.918 ms  4.403 ms
 2  84.116.236.62 (84.116.236.62)  18.252 ms  13.975 ms  14.134 ms
 3  ie-dub01a-rc1-ae-14-0.aorta.net (84.116.239.129)  19.270 ms  22.461 ms  21.1
79 ms
 4  ie-dub02a-ri1-ae-73-0.aorta.net (84.116.134.110)  15.148 ms  19.541 ms  19.3
19 ms
 5  99.82.176.230 (99.82.176.230)  22.419 ms  18.499 ms  16.208 ms
```

Figure 6.12: Traceroute to the website of the Irish government - the 5th hop is on to Amazon Web Services meaning that the website of the Irish government is hosted on an Amazon server.

This exploratory practice-based approach, a combination of artistic investigation, data analysis and network excavation, led to the formulation of two specific questions:

- How many Internet Protocol (IPv4) addresses are registered in Ireland?
- Whom are these addresses registered to?

By utilising various online IP geolocation resources which use the *whois* database as their primary source,[153] I was able to ascertain that, as of July 2018, Ireland had 12,274,155 IPv4 addresses assigned to it.[154] Chapter eight features a more detailed analysis of the ownership of these addresses, but for now, it is sufficient to acknowledge that a significant proportion of IP.v04 addresses in Ireland are registered to some of the companies associated with the digital culture industry, and as such, their digital presence mirrors their physical presence in Ireland. Another more localised analysis of these IPv4 addresses reveals the names of institutions and companies that have either disbanded, such as FÁS (IPv4 address: 137.191.239.22), [155] or moved such as Dell Computers whose IP address of 194.117.127.99

[153]These processes used two online resources ip2location.com and infobyIp.com
[154] A file containing the complete range of Irish IPv.04 addresses is available in the assets folder of this chapter.
[155] FÁS was the Irish state agency responsible for employment, it was dissolved in 2013.

tells us that the company is based in Bray, a suburban town just outside of Dublin, despite having moved its operations out of the town in 2004. From vast ranges of telecommunications and tech multinationals or the 'ghost' IP addresses that reveal the 'local' within the global – analysing the technical protocols of the Internet provides critical insight into the bureaucratic and corporate entities that dominate it – *Whois Ireland?* presents this insight and in doing so, reinforces the dominance of these corporate entities in Ireland.

6.6 *Whois Ireland?*: Exhibition and Reflection

There were originally two different approaches considered for exhibiting *Whois Ireland?*. The first was as a projected piece that would randomly iterate through the list of Irish IP addresses - essentially the same as the installed piece. The second option was to print and display a table with the top ten state and corporate entities who control Irish Internet Protocol addresses.[156]Ultimately, I decide to use an LED display as I felt that visually it reinforced the idea of the monetization and corporatization that so much of our collective day to day interactions with the Internet are dependent on. However, this decision was not without complications. I used a raspberry pi connected to the LED display, but had issues with both the coding and wiring. Fortunately, I was able to benefit from the help and experience of a colleague, Rob Collins, who was able to guide me in building a stable version of the project that worked through the exhibition.[157]

Whois Ireland? questions the internal bureaucratic structures of the internet and in doing so reveals them to be grounded in real-world techno and socio-political concerns and realities. What were once considered bureaucratic, technical and obscure debates surrounding Internet governance and regulation have moved from the technology and business sections of websites and print media into the collective mainstream. Issues such as intellectual

[156] A variation of this table is featured in the following chapter.
[157] The code for the raspberry pi and LED display is available in the assets folder of this project.

property and copyright (SOPA/PIPA),[158] controlled online access (Net Neutrality)[159] and the data and privacy rights of Internet users (GDPR) alongside more user-centred activist mobilisation such as those mentioned in chapter three, point towards the increased politicisation of the Internet that emerged following the dot-com era (Kahl & Cox, 2008).

As acknowledged in 2.4.5 in relation to media 'empires' such as the Fox Corporation, although 'traditional' media conglomerates still wield significant power, they have been overshadowed in the last two decades by the new media oligopolistic elite, companies and platforms of the digital industry culture. These companies have mastered the monetization of user-generated content through data extraction, enabled in part through an oligopolistic grip on informational communications technologies and the infrastructures and institutions that govern them. These companies either influence, overrule or overlap institutions- indeed institutions have more influence than states in relation to the regulation and governance of the Internet, as Laura DeNardis notes, 'Internet governance is about governance, not governments' (2014, pp.11- 12).

Whois Ireland? engages with this idea –Ireland's digital space is regulated and controlled by companies and institutions. This digital space is not a networked extension of national identity, but rather a digital reflection of contemporary networked society - tech companies dominate by scale and through technical protocols. Internet governance is very much out of sight, and is not as visible as applications and content are to the user (DeNardis, p.7). It is another example of techno-political black boxing – they are largely unseen or unconsidered until there is an error or issue – the aforementioned net neutrality serving as an example in the case of the Internet's technical bureaucracy. *Whois Ireland*? focuses on internet governance and in doing so, highlights the techno-politics of the internet's architecture,

---

[158] The Stop Online Piracy Act (SOPA) and the Protect IP Act (PIPA) were a series of US legislative bills introduced in an effort to provide US law enforcement with expansive powers to fight online piracy. However, these overreaching and vague laws would infringe on broader issues related to free speech and web access. Following a series of online campaign and protests including an Internet Blackout on January 18th 2012, support for the Acts was dropped in the US congress. See *'Q&A: Stop Online Piracy Act (SOPA)'* (Naughton, 2012) and '*SOPA/PIPA: Internet Blacklist Legislation*' (eff.org, 2021).

[159] Net Neutrality is the belief that Internet Service Providers (ISP) should treat all Internet traffic equally and should not be able restrict access to content, application, websites etc. See *After Net Neutrality: A New Deal for the Digital Age* (Pickard & Berman, 2019).

which is increasingly reflective of the non-digital world-dominated by a small group of corporate entities.

As noted previously, *Whois Ireland?* represents a critical juncture within the overall context of this research project. My participation in the Freeport programme proved invaluable to the development of this research project. It also another example of the importance of peer learning and knowledge sharing in the development of my practice. The initial research undertaken during the project led not only to the installed piece described above, but also to the initiation of a new chapter and body of work that would ultimately allow for the evolution of the central creative framework employed in this practice-based research project, *Platform Protocol Place*.

6.7 Conclusion

The three practice-based projects analysed in this chapter focus on key elements of the technical infrastructure of the internet and the connectivity needed to access it. However, both & *Captive Audience v.01* & *Platform, Protocol, Place v.01* use Wi-Fi technology not to connect to the Internet, but as a way of using this technology to communicate offline and in doing so create a space that is both local and networked. *Whois Ireland?* is a project that draws from, and analyses, the digital and networked infrastructures upon which the Internet functions and the technical bureaucracies that govern them alongside the tech platforms that increasingly dominate them. This analysis is conducted through the prism of the national and local territory. All three projects within this chapter draw attention to what are typically unseen technological infrastructures and in doing so, they follow in a series of practices by media artists that engage with counter cartography and investigate methods, methods that I suggest are further examples of tactical media archaeology.

This investigative approach is useful when dealing with internet-related technologies due to their black boxed nature - obfuscated by technical complexities, bureaucratic architecture, and problematic 'user friendly' language such as the 'cloud'. Both the IEEE 802.11 protocol and the system of Internet Protocol addresses are critical elements of our complex networked world, and although they may appear as abstract and immaterial concepts, they are both very much situated in the material world. Consequently, the need to identify and map the material

space that these abstract concepts occupy is critical in understand the impact, influence and scale of networked technologies – the following chapter focuses on this material turn.

Chapter Seven

Place

7.1 Introduction

This is the final practice-based chapter of this research project. Whereas the two preceding chapters considered the techno-politics of contemporary networked culture through its platforms and protocols, *Place* focuses on the material, physical world of information communications technologies. This materialistic turn is concentrated on the Republic of Ireland, and specifically on Dublin, the city that I both live and work in. The artefacts documented and analysed in this chapter differ from the previous two chapters which clearly delineated between each project. The same approach is not employed for this chapter, as the first 'artefact' is not an artefact as such, but a project entitled *Dublin Infrastructure Tour* – a series of ongoing walking tours that began in 2018. Although the other two projects in this chapter, *Greetings from*… and *Greetings from EU West One* are artefact-based, they are a conceptual and practical extension of the *Dublin Infrastructure Tour* project. Consequently, the documentation and discussion of the tour serves as the same discussion for the other two projects. This does not imply that there is no engagement with *Greetings from*… and *Greetings from EU West One,* rather this engagement is framed in a different format to the work discussed in the previous chapters.

The chapter begins with an overview of the conceptual development of the *Dublin Infrastructure Tour* project. This overview is achieved by returning to the analysis of Irish Internet Protocol (IP) addresses discussed in chapter eight, and specifically at the corporate entitles whom these IP addresses are registered. The dominance of tech corporations within this analysis is explained through a brief overview of Ireland's evolution from a peripheral country to the international tech hub, best encapsulated by the Silicon Docks narrative. Following this overview, there is a discussion on the use of the walking tour format for this project, a discussion that acknowledges how the practice of walking has been utilised as a method of intervention and inquiry within the context of contemporary art practice. After this discussion, there is an overview of the decisions made in the design of the tour, which is then followed by a review and documentation of the tour - broken into five distinct stages; meeting point / introduction, urban internet infrastructure, Grand canal dock, the T-50 fibre optic cable and finally, data centres. This final stage overlaps with the development of the *Greetings from…* projects, which are then discussed and reflected on within the context of the *Platform Protocol Place* exhibition.

7.2 Dublin Infrastructure Tour

Dublin Infrastructure Tour is a project that is a combination of walking tour, academic presentation and artistic intervention.[160] The purpose of the tour is to trace and reveal elements of the physical internet infrastructure in Dublin city, alongside the corporate topologies that support it. Through this process the project raises critical concerns about our collective relationship with Big Tech, whilst simultaneously demystifying and explaining the technical components upon which the internet functions as a way to challenge techno-solutionist narratives and language - emphasising that the 'cloud' is not ephemeral and is, to borrow Lisa Parks' expression 'stuff you can kick' (2015). This is achieved by visiting a series of locations within the city and by situating global techno-political concerns such as data sovereignty, privacy rights and tax avoidance within the context of the local and national.

In its research, design and dissemination, the tour critically employs a variety of conceptual and practical methods including open sourced intelligence, dérive, remix and culture jamming, utilised to critiquing dominant narrative related to technological utopianism and progress. Consequently, it is an example of a tactical media archaeological approach as outlined in chapter four. The first 'full' tour occurred on the 13th of October 2018 and had nine participants who were either academics, artists and activists – it was not publicly advertised as the research was still being developed, and as such, the first iteration was used to prototype the format.[161] The second full iteration occurred on 11th May 2019 and was commissioned by the School of Machine, Making and Make-Believe as part of their *Future Landscapes* programme at Galway University.[162] Since then, I have led shorter variations of the project for a mixture of groups mostly comprised of academics, artists and activists, and I have also presented it as a research project nationally and internationally.[163] More full public

---

[160] The project was originally called *C-Node: A Tour of Dublin's Internet and Corporate Tech Infrastructures*, the *C* standing for *Complicit* – a provocative suggestion that Ireland was a complicit node within the more controversial aspect of the Internet's global infrastructure. The name was changed to *Dublin Infrastructure Tour* for more clarity and also in recognition of other similar projects occurring internationally.

[161] The initial email and tour descriptor can be found in the assets folder for this chapter.

[162] The *School of Machine, Making and Make-Believe* is an alternative school in Berlin set up by Rachel Uwa in 2014 to offer an educational programme that critically and creatively engages with the impacts of technology within society.

[163] The project has been presented at the Interface Politics conference (Barcelona, 2018), Digital Culture conference (University of Nottingham, 2019), EUCIDA 'Reality Turn' symposium (Latvia, 2019) and at the Electronic Literature conference (University College Cork, 2019).

tours were planned for 2020, however, the global pandemic and subsequent lockdowns meant that this was no longer possible. Since then, I have delivered a series of online tours. Although this online approach is in contradiction to the initial ethos of the tour with its emphasis on experiencing the materiality of the internet, the online format has allowed the project to reach a wider international audience – in September 2020 I presented a series of online versions as part of the Ars Electronica Festival in conjunction with Science Gallery Dublin.[164] [165]

7.2.1 Conceptual Development

Amazon	3,833,910
HEAnet	1,842,432
Eircom	1,087,213
Microsoft	1,028,199
Liberty Global	517,826
BT Communications	507,246
Imagine Communications	484,296
Vodafone	427,008
Apple	213,265
Three	168,936
Total	10,100,331

Figure 7.1: Ten companies with highest IPv.4 address registration in Ireland

To understand the rationale behind the decision to use the walking tour format as artistic practice, it is first necessary to have an understanding of Ireland's role within the internet's global infrastructure. To achieve this, I will briefly return to the research undertaken during the development of the *Whois Ireland*? project discussed in chapter seven as this research provided the impetus to engage with the themes and practices outlined in this chapter. The analysis of Internet protocol (IP) addresses facilitates a critical engagement with corporate

[164] A recorded version of the full online tour is available in the assets folder of this chapter.
[165] In November 2018, I presented a similar online version for Dun Laoghaire library, Dublin as part of Tactical Tech's *The Glass Room: Misinformation Edition* exhibition.

networked topologies within the context of national borders. As was noted in chapter seven, Ireland has over 12 million IP v.04 addresses registered to it, which in turn are distributed amongst approximately 380 different companies, institutions and government agencies, both national and international.

Figure 7.1 displays the top ten companies based on the amount of IP v.04 addresses registered to them. Six of these companies are established Internet Service Providers (ISP) that offer commercial and consumer internet services in Ireland.[166] *HEAnet* is Ireland's education and research network and provides various ICT services to educational organisations (heanet.ie, 2019). The remaining three entities in the table are all companies associated with the idea of Big Tech - Apple, Amazon and Microsoft.[167] Most notable is Amazon with almost 33% of all IPv.04 addresses in Ireland registered to the company. The presence of Amazon, Apple and Microsoft in Ireland are all discussed later in this chapter, however, it is worth noting at this point that the findings in Figure 7.1 focused the direction of this research project not only on Amazon, but also more broadly on Ireland's relationship with the tech multinationals based in the country.

7.2.2 From Periphery to Core

According to the Industrial Development Authority (IDA), Ireland is a global 'hub of choice' for the strategic development of international information communications technology (ICT) companies (idaireland.com,2020).[168] This places Ireland at the centre of ICT operations in Europe with the industry employing over 37,000 people and generating €35 billion in exports annually (*ibid.* n.p). This follows a long history of attracting Foreign Direct Investment (FDI) that began in the 1950s, and which by the 1980s had seen many of the largest international electronics companies establishing assembly and testing facilities in the country (Donnelly, 2013). The IDA strategy then switched from targeting high-profile companies to high-tech

[166] Three Ireland (Hutchinson), Vodafone Ireland, Imagine Communications Group, BT Communications Group, Liberty Global Communications B.V and Eircom.

[167] As was noted in chapter six, this list is only IP v.04 and does not account for IPv.06 or other services, which may explain the absence of Google and Facebook. Furthermore, the presence of Apple deserves further attention as they do not operate a public facing data centre Ireland.All of this is to suggest that further analysis of IP v.4 addresses in Ireland is required, but beyond the scope of this research project.

[168] The IDA is a state-sponsored organisation responsible for the development of export-led business and enterprise from local and foreign investment.

sectors, which saw the arrival of companies such as Intel, Microsoft, Xerox and Cisco (*ibid*.p.1). The ICT sector in Ireland has continued to grow in the 21st Century.

Aside from hosting the operations of companies synonymous with both the personal and corporate computing era of the 1980s and 90s, such as Apple, Microsoft and Dell, Ireland is also a critical node in the infrastructure of the most powerful and influential companies of the digital culture industry era with Google, Amazon, Facebook, Airbnb, Paypal and Twitter all currently based in Dublin.[169] It should be noted that except for Amazon, all of the above companies host their European, Middle East and African (EMEA) operations in Ireland, which as is discussed in more detail in section 8.3.3 situates Ireland very much at the centre of various international legal debates centred on data sovereignty and tax regulation.

The reasons behind Ireland's appeal to international ICT investment are varied and include a generous corporate tax rate of 12.5%;[170] political stability; location and proximity to the United States, United Kingdom and European Union; an English speaking and well-educated workforce, and relaxed conditions for attracting non-national specialised workers (idaireland.com, 2019). These factors, alongside historical socio-cultural connections to the US and the UK, EU membership, state investment in logistical and communications infrastructures have allowed Ireland to benefit from increased trans-Atlantic trade, brought about by the General Agreement on Tariffs and Trade (GATT) of 1994 (McLaughlin, 2015).[171] All of these considerations combined, facilitated Ireland's transition from a 'peripheral, developing economy into the European poster child for the new globalisation' (*ibid*.p.186).

Although tech companies and their services are operational throughout the country, most of the multinational tech companies in Ireland are located in the grand canal dock area of Dublin city centre. Grand canal dock was a busy port for over two hundred years until the introduction of containerisation in the 1950s saw many industries and warehouses relocating

---

[169] I have purposely included the term *influential* here to acknowledge companies such as AirBnB and Twitter who although not as dominant as the GAFAM companies, are still highly influential within the broader socio-political context of the digital culture industry.

[170] By comparison, as of 2021 the corporate tax rate in Germany is 15.85%, 19% in the United Kingdom and 32.02% in France. See https://stats.oecd.org/index.aspx?DataSetCode=Table_II1

[171] The General Agreement on Tariffs and Trade (GATT) was originally signed in 1947 to promote international trade amongst many countries within the international system - it was superseded by the World Trade Organisation in 1995.

to industrial estates outside the city centre -by the 1980s the area was mostly derelict (Bunbury, 2009). In 1997, the Dublin Docklands Development Authority was formed, tasked with the social and economic regeneration of the area (irishstatutebook.ie, 2020). At the same time as 'one of the most far-reaching urban renewal projects ever planned in Ireland' (McDonald, 2000) was taking place, the Irish Financial Services Centre (IFSC) was nearing completion. The IFSC area is a 10-minute walk from grand canal dock and is home to many international financial institutions including Merrill Lynch, JP Morgan (Chase) and Citibank (ifsc.ie, 2020). The IFSC was established in 1987 through legislation that sought to boost the Irish economy by providing various financial incentives, including a 10 per cent corporation tax rate for companies that set up in the IFSC area (*ibid*. n.p).

Both the IFSC and the Grand Canal Dock regeneration project took place during the Celtic Tiger era. This era can be defined as an economic boom that began in the mid-1990s fuelled by foreign investment that lead to the significant expansion of Irish companies alongside an increase in national income – all of which contributed to the rate of employment almost doubling within 15 years, before collapsing during the international financial crisis in 2008 (Ó Riain, 2014). The linchpin of the grand canal dock regeneration project is Google, who opened its EMEA headquarters in Dublin in 2003 and currently employs over 8,000 people in the city (Horgan-Jones, 2020).[172]

7.2.3 Dublin Will Begin to be Visible

All of the above indicates that Ireland, and in particular Dublin, is worthy of further study within the context of serving as a key location of so many actors and entities that form part of the digital culture industry. The decision to use a walking tour format was influenced in part by geographical considerations - Dublin is relatively compact and accessible - it is possible to get from the corporate headquarters of the tech multinationals in Grand Canal Dock to their data centres in just over 20 minutes by car or under an hour using public transport. The

[172] For a discussion on the power dynamics of the urbanisation of information, see Shaw & Graham who argue that the 'code and content relating to the buildings and spaces' of urban spaces is often as important as the material attributes meaning that developers and landlords are now in competition with dominant informational companies (2017).

city centre is traversable on foot and consequently suitable for a walking tour format- this is evident in the many walking tours offered through Dublin's local tourism industry.[173]

A defining characteristic of the tech companies of the digital culture industry is their ability to be both omnipresent yet absent. Whilst their platforms, logos and vocabulary are ubiquitous and recognisable, they are still mostly invisible to the user -another variation of technological black boxing except in this case on a planetary scale.[174] However, in Dublin, they have a visible, grounded presence – the corporations that affect and define so much of contemporary networked culture are located within the city, and the physical infrastructure upon which much of the public web exists are located in its suburbs -as with the companies themselves, these technological infrastructures are also omnipresent yet simultaneously absent within urban spaces. From this perspective, Dublin itself has become a black boxed city, comprised of key physical and corporate components of the Internet's infrastructure.[175]

Paris: Invisible City is a collaborative project by Bruno Latour and Emilie Hermant that searches for the 'countless techniques' that make life possible within the city (2006, p.1). Latour & Hermant describe how they believed that in order to capture Paris in a single gaze, they needed only to go to an elevated vantage point. However, they then realise that regardless of where they stand, they will always miss something important and ask the question 'Does that mean that Paris is invisible?'. Taking the notion of movement as critical to experiencing an urban space, they conclude that through wandering through the city 'Paris will begin to be visible' (*ibid* p.29). For the purpose of this project, I interpret liberally Latour & Hermant's solution to capturing the city and from two different positions. Firstly, I suggest that movement and walking through Dublin within the context of this research project offers an alternative form of dissemination of my research beyond the academy and the gallery, whilst simultaneously developing its focus through participatory engagement and by seeing

[173] Indeed so popular that they have faced the ire of local councillors, see, 'It's Time to Regulate Walking Tours, Says Councillor' (Whelan, 2018).

[174] This is not to overlook the physical presence of Apple stores, Amazon Lockers and so on, however these examples reinforce the identity of tech companies without really allowing the customer sto see beneath the interface.

[175] As an aside, the etymological roots of Dublin are from the Irish an Dubh Linn - which translates as 'The Black Pool' a reference to where the River Poddle met the River Liffey within the city.

things fresh or anew within the urban landscape – the tour is an organic form that expands and contracts in reaction to what it encounters.

The second interpretation I take from Latour & Hermant is that to gaze upon the city from one height is tantamount to perceiving it through the perspective of one narrative – and in the case of Dublin as a global tech hub, this narrative is usually bound up in a neoliberal ideology devoid of any meaningful criticality. Whilst there is validity in some elements of this perspective it should not be accepted in its totality and requires analysis from a critical perspective – the tour is one such method in developing a counter-narrative. I do not suggest that it is the only way, however, as noted in chapter two, a dialectic approach acknowledges flaws and biases in others and our own interpretation when establishing truth. Consequently, *Dublin Infrastructure Tour* serves as a counterweight to established narratives about Ireland and Dublin's growth into a critical component of the global Internet's infrastructure – as Latour & Hermant observe 'the initial point of view doesn't count, all that counts is the movement of images, all the images are partial, of course; all the perspectives are equal' (*ibid*.p.29).

The use of walking as an artistic method of urban intervention and resistance can be traced back to the Dadaists 'excursion', the situationists 'dérive' and the everyday practices of Michel de Certeau (McGarrigle,2012). Conor McGarrigle cites the work of Richard Long and Vito Acconi alongside more recent practitioners such as Janet Cardiff and Hamish Fulton as examples of walking being used within the context of contemporary art (*ibid*.pp.109-110). I extend this list to include media artists influenced by psychogeography and who critically explore the mediated city and its many hybrid spaces as a form of participatory experience. These include Martin Howse and his expanded form of psychogeography -psychophysics, Conor McGarrigle's *Namaland* (2010) and *Walking West* (2014), Benjamin Gaulon's 2*.4Ghz Workshops* (2008 - present), Nick Briz and Brannon Dorsey's *Wifi Data Safari Workshop* (2018), RYBN (*Offshore Tour Operator*, 2018), the internet Infrastructure Tours of Ingrid Burrington (2016-present) and Mario Santamaria (2018 – present) respectively, and finally, the anti-surveillance dérives of the Dazzle Club (2019 -ongoing). Much of this work is concerned with reasserting agency within the urban space by identifying networked technologies and communications infrastructures, a process of demystification through

participatory knowledge.[176] Søren Pold suggests a need for an alternative metainterface that emphasises transparency and in doing so creates a metainterface that is 'less manipulative and more trustworthy' than the entities associated with the digital culture industry - allowing users to navigate 'complex, computational culture' (2019, p.80). The projects highlighted above, and *Dublin Infrastructure Tour*, are working towards such alternative metainterfaces, and in doing so, are facilitating a wider, critical engagement with the digital culture industry.

Diverging from a media archaeology that focuses on 'media', Shannon Mattern offers an 'urban media archaeology' which looks at media networks that are dependent on other infrastructural networks (2015, xi-xii). Dublin provides an excellent case study in which to utilise this approach on account of the concentration of large tech companies based here, alongside their proximity to key elements of the internet's physical infrastructure (O'Neill, 2018). A walking tour allows for a tactical media archaeological approach in that it is open sourced, informational and oppositional in the sense that it draws attention to places that the corporate entities of the digital culture industry would prefer to remain obfuscated.

As previously acknowledged, this practice-based approach allows the research undertaken for this project to be disseminated outside of traditional academic and gallery formats. By bringing, or indeed, reducing networked space and time to the local, the project facilitates a connection between our everyday interactions with technological devices to the corporate offices in the city and the data centres on its outskirts. Finally, the tour serves as a small act of protest against not only these companies themselves, but also the associated neoliberal narratives of technological progress , best encapsulated locally by the *Silicon Docks* narrative. Jonah Brucker-Cohen suggests that the subversion of network interaction can be achieved by projects that emphasise the components of network interactions such as location, proximity, data streams and the users' mindset (2012). The tour takes its cue from this approach, the network – the system – can be subverted by being acknowledged, by being seen and linked to other operations and processes connections between different components -the tech companies in Dublin to the rest of the networked world.

---

[176] See also See Andrew Blum's *'Tubes: A Journey to the centre of the Internet'* (2013), Shannon Mattern's '*Infrastructural Tourism'* (2013) and Ben Mendlesohn's short documentary '*Bundled, Buried & Behind Closed Doors'* (2013), available https://vimeo.com/30642376

7.2.4 Designed by Data

The design of the *Dublin Infrastructure Tour* was - and still is – an ongoing process that dovetails with other aspects of this research project. Whilst the project 'exists' within this chapter, it is in dialogue with the two preceding practice-based chapters and also the framing of the digital culture industry in chapter two. Furthermore, as outlined previously, it is a form of tactical media archaeology as discussed in chapters three and four. To understand its development, it is first necessary to 'visit' the final stop on the tour. As a consequence of the findings in *Whois Ireland?* - in particular Figure 7.1, the direction of this research was focused on the operations of Amazon within Ireland. At this point, it is necessary to state that although I was aware of the many different corporate offices of tech companies within the city centre, I was unaware of the data centre industry in Ireland -I suggest that in 2018 there was not too much general awareness of this industry in wider Irish public, something that is changingin part as a consequence of the media attention on Apple's failed attempt to build a data centre in the west of the country, and also an increasingly awareness about the environmental demands of this industry.[177] The findings of *Whois Ireland?* compelled me to look at this industry, and following some preliminary research, I was able to establish that Amazon Web Services (AWS), a subsidiary company of Amazon, was one of the companies operating data centres in Ireland.

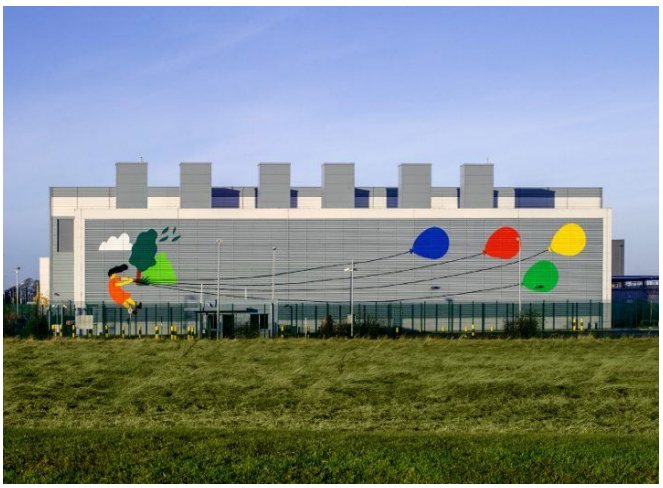


Figure 7.2: Google data centre in southwest Dublin (source: siliconrepublic.com/Noah Kalina).

[177] See 'High energy data centres not quite as clean and green as they seem' (Bresnihan & Brodie, 2019).

Figure 7.3: Mark Zuckerberg announces a new Facebook data centre in Meath, Ireland.

Whilst trying to establish the locations of Amazon data centres in Dublin, I became aware of the global data centre infrastructure of AWS and the companies efforts to obfuscate the exact location of these centres.[178] This approach was also apparent within an Irish context – whereas online searches for the locations of data centres in Ireland operated by Google, Facebook and Microsoft returned images and addresses, the online references to Amazon data centres were vaguer. Although a full analysis of Irish media reporting on the data centre industry is beyond the scope of this research project, an article on the Irish technology news website the Silicon Republic serves as an example of this lack of clarity. It states, 'Amazon has a number of centres in Dublin, details of which are closely guarded' (2016), although the article lists the suburbs where the Amazon data centres are located, it fails to offer specifics in relation to the amount of data centres in operation by the company, or more pointedly, why there is a need for them to be closely guarded. Presumably, Amazon would cite security concerns,[179] however, the same is not true of Google or Facebook, both of whom are very open about the locations of

[178] See 'Why Amazon's Data Centers Are Hidden in Spy Country' (Burrington, 2016).
[179] An overview of the security protocols in relation to their data infrastructure can be found in 'Amazon Web Services: Overview of Security Processes', available at: https://d0.awsstatic.com/whitepapers s/aws-security-whitepaper.pdf

their data centres in Ireland (Figure 7.2 & 7.3). I suggest that this lack of detail in the article in Silicon Republic is indicative of a wider sense of acquiescence in relation to the operations of the many multinational tech companies based in Ireland – apparent not only in relation to material infrastructure, but also in relation to corporate tax and data protection.

Figure 7.4: Google satellite view of various industrial estates in Tallaght, southwest Dublin. The buildings within the red parameter are AWS data centres, but are not recognised as such on the Google map.

The obfuscated operations of AWS Data centres in Dublin had a Streisand-esque effect on this research project - the more apparent it became that Amazon engaged in obfuscation in relation to its operations in Dublin, the more focused this project became on documenting these operations. Another example of the obfuscation surrounding AWS in Dublin can be found in their invisible presence on Google maps (Figure 7.4), whilst this is logical -to be listed on the map AWS would need to register themselves, it still raises questions in relation to our understanding of, and engagement with, digital networked cartographies - reminding us that google maps like any other map, is not a neutral representation, but rather, the cartographical embodiment of a specific set of power relations (Crampton & Krygier, 2005).

Figure 7.5: An AWS data centre on the corner of Belgard and Airton Roads in Tallaght, southwest Dublin.

I was able to confirm the location of the data centres through planning permission documents.[180] The physical spaces that AWS data centres occupy are dominant but impenetrable (Figure 7.5), containing no real outward signs of what they are, nor what they do. The buildings are a literal interpretation of Latour's black box metaphor. When taking photos of the data centres I was approached by security guards on numerous occasions and instructed not to do so – even though I was standing on a public road. When I asked the security guards questions about the building – who owned it and what it was used for, I was told that this information could not be disclosed. At first, this was quite unsettling, but ultimately quite absurd - most of the data centres in this availability zone are undergoing some sort of ongoing construction process, meaning that they are legally obliged to display planning permissions documents for public view (Figure 7.6).

[180] The planning permission application are on the website of South Dublin County Council, available at: https://www.sdcc.ie/en/services/planning/planning-applications/search-and-view/.
A planning application letter from AWS is available in the assets folder of this project.

Figure 7.6: Planning permission application on the fence of an AWS data centre on Greenhills Road, Tallaght, Dublin. Note the word circled is ADSIL - Amazon Data Service Ireland Limited, another form of obfuscation.

Due to their physical proximity outside of the city centre, it was clear from both a geographical and logistical perspective that the AWS data centres would be the final stop on the tour. Consequently, the research had to work physically and conceptually back from the data centres to the interfaces where the user engages with data. Although there was sufficient material to justify a tour directly to the data centres, I felt that it was important to juxtapose the silence of the industrial estates where they are situated with the corporate gloss of Grand canal dock, to emphasise how both centres of networked power are connected and present in Dublin. Whilst expanding this research, I was also engaging with the work of Ingrid Burrington whose *Networks of New York: A Field Guide to Urban Internet Infrastructure* served as an invaluable resource in the design of the tour. *Networks of New York* serves as a sort of ordnance survey map for networked communications – identifying and explaining fibre optics cables, telephone masts and other Internet infrastructure within urban spaces and it provided me with both a conceptual and practical frame of reference to 'follow' data through urban internet infrastructure within the city centre. At this point, it was clear that there was a structure emerging for the tour that was geographically, logistically and narratively coherent.

7.3 Stage and Stops

Sections 7.3.1 – 7.3.5 elaborate on and outline the structure of *Dublin Infrastructure Tour* and in doing so serve two functions. First, to provide documentation of the tour and its contents so that reader has a full understanding of the project as a work of practice-based research. Second, to engage the reader with the issues and concerns that are addressed during the tour – to understand these issues and concerns/research is to understand the tour, to understand the tour - and the need for it - is to understand the issues. Although this may sound convoluted, the purpose of such an approach is to provide the reader with the most accurate and informative understanding of, not only the *Dublin Infrastructure Tour* project, but also of *Greetings from…* and *Greetings from EU West One,* and how all three projects are examples of a critical engagement with the digital culture industry, engaging with the practices of tactical media archaeology within the thematic context of *place.*

As the tour is split into five distinct stages, so too are the following sections. A one size fits all approach is not appropriate to detail these sections as some require more focus than others. Each section outlines what was featured in each stage and its relevance to the overall project –at times this may be descriptive or discursive, depending on the issue or content at hand.
Stages are thematically led, whilst individual 'stops' are locations where the tour actually stops and information is presented through short presentations and discussion. As noted earlier, there have been two full iterations of the project thus far – although much of the content was similar, there were differences based on feedback, through the evolution of the research between October 2018 and May 2019, and in the subsequent online versions. What is presented in the following sections can be considered a hybrid form of all three. Although there are minor differences between the two physical tours and the online version, the overall concept and themes remain consistent – consequently, anything that may be missing in a slide in one tour can be assumed to have been covered in passing. To avoid any confusion and to offer the clearest overview I distinguish between the tours only when I feel it is of importance to the overall explanation of the project.

7.3.1 Stage One

Meeting point and introduction

Location(s): Indoor space (A4 sounds & Science Gallery

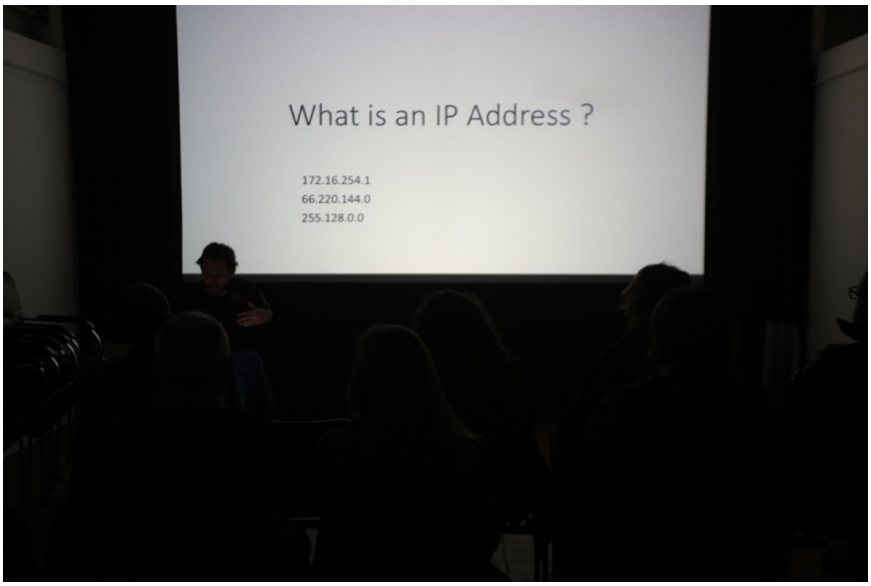


Figure 7.7: Introductory presentation explaining Internet Protocol addresses

The first stage of *Dublin Infrastructure Tour* serves as the meeting point for participants. The meeting point for the first tour one was at A4 Sounds Gallery and for the second, Science Gallery.[181] Aside from serving as a meeting point, stage one also features a short presentation to introduce and outline some key concepts, themes and practicalities related to the tour.[182] The idea of tactical media is introduced to highlight to participants that the project is equal parts research and artistic intervention, emphasised using Erik Kluitenberg's definition of tactical media as a conjunction of 'activism, art, media and technological experimentation (2011).

Media archaeology is then framed as a conceptual and practical tool to engage with technological systems and infrastructure utilising a quote from Siegfried Zielinski which states 'technology is connected in a specific way with what is called progress and, thus, also with power' (2006, p.277). This relationship with technological systems of power is then connected to consumer devices. This is a reoccurring theme within the project – it is continually emphasised to participants that the debates and issues covered on the tour are not abstract concerns occurring elsewhere -but are in fact connected, figuratively and literally to the devices and platforms that they use.

[181] As both venues are in different parts of the city, the route of the second stage was altered, however, content for both iterations of the second stage is the same.
[182] A document containing the slides used in this introductory stage is available in the assets folder of this project.

Following this introduction to the concepts guiding the tour, participants are invited to respond to a provocative question, 'What is the Internet?'. This process, and the responses - which are generally limited in their technical and conceptual understanding - reveal that despite our dependence on the Internet, our ability to explain what it actually is and how it works can often be problematic.[183] I then offer a working definition of the Internet for the tour, suggesting in its most simple form that it is a series of machines that communicate with each other, and that each of these machines has a unique Internet Protocol address (Figure 7.7). Although this is a simplistic interpretation, it is sufficient for explaining various concepts related to the project. It also allows me to elaborate on the idea of Internet Protocols and then do a 'live' traceroute for the group, alongside a series of *whois* searches for the corresponding IP addresses. This traceroute process fulfils two functions. Firstly, it communicates to participants that their online interactions occur not just between a device and a server where data is stored, but rather within a vast network of interconnected corporate entities. Secondly, it familiarises participants with both technical and techno-political concepts relevant to the tour, specifically Internet Protocol addresses, data sovereignty and the geographical, material and corporate aspects of networked interactions.

The traceroute process highlights the path that data follows using the gallery's Internet connection –to explain how mobile devices connect to the Internet via 3G and 4G services, participants are shown an interactive map developed by the Irish Commission for Communications Regulation (ComReg).[184] This map shows the location of all mobile towers in Ireland, alongside the companies who operate them and the services they provide. The map is used as a reference point for identifying mobile phone masts in the city centre, which are discussed in the following section.

The historical elements of networked infrastructure are then introduced by referencing Tung-Hui Hu's historical study of US telecommunications corporation Sprint Network. Hu's study

---

[183] I do not mean this in anyway to sound disparaging, I still have problems explaining it myself. I first observed this 'method' in Ingrid Burrington's aforementioned *Networks of New York* and also in a presentation by Evan Roth about his *Internet Landscapes* project in which he describes a google image search of the term 'Internet'not returning a realistic visual representation of what it actually is. The presentation is available at: https://www.youtube.com/watch?v=Ql5aqQEp7ig&ab_channel=media.ccc.de

[184] ComReg is an Irish state body, responsible for the regulation of communications. The map (siteviewer) is available at https://siteviewer.comreg.ie/

describes how SPRINT's physical infrastructure can be traced back to the Southern Pacific Railway – a railway service in the western United States that dates back to the 1860s – SPRINT is an acronym for *Southern Pacific Railroad Internal Network Communications*.[185] This example of new communications infrastructures being built upon pre-existing ones is then consolidated within a local context by presenting archival material to participants – specifically an article written by A.J. Litton which documents the purchase by the Irish postal service of 40 miles of underground duct within Dublin in the 1940s – an underground network that had been previously used for tramway feeder cables (1962).[186] As is detailed in section 8.3.2, the postal service was operated by the Department of Post & Telegraphs, meaning that the fibre optics cables that currently run beneath the city are built upon tramway ducts that date back to at least the 1940s. The idea that communications networks being built upon older networks challenges the idea of the 'new' in new media and is a recurring theme throughout the tour.

The influence of Ingrid Burrington's work on the project is then acknowledged by emphasising that it is not necessary to be technically proficient to map the Internet's infrastructure within an urban setting - an idea perfectly encapsulated by Burrington when she states, 'I'm just looking down at the ground and looking up at buildings' (2016, pp.09-10). The final slide presented to the participants asks two questions that are used as a guide to inform the practical and conceptual direction of the tour:

- What and where is the internet in Dublin?
- What is Ireland's relationship with the tech multinationals based in the country and what are the implications of this relationship?

At this point, participants are presented with a lightweight folder that contains supplementary content that is referenced at various points throughout the tour, which are humorously referred to as 'portable powerpoints.'[187] Although the issues and concerns detailed in the *Dublin Infrastructure Tour* project are far from light-hearted, whenever possible humour is employed as a method to ensure informality and cultivate participation. From the work of the FAT Lab discussed in chapter four to Garcia & Lovink's embrace of the

[185] SPRINT merged with T-mobile in 2020.
[186] Dublin had an operational tram service from the 1870s to the 1950s.
[187] A pdf form of a 'portable powerpoint' is available in the assets folder of this project.

‘pranxster’ (sic) in *The ABC of Tactical Media*, humour and irony are legitimate critical practices that can be utilised within the context of tactical media archaeology.

7.3.2 Stage Two

Urban Internet infrastructure

General Location(s): Various points within Dublin city centre.

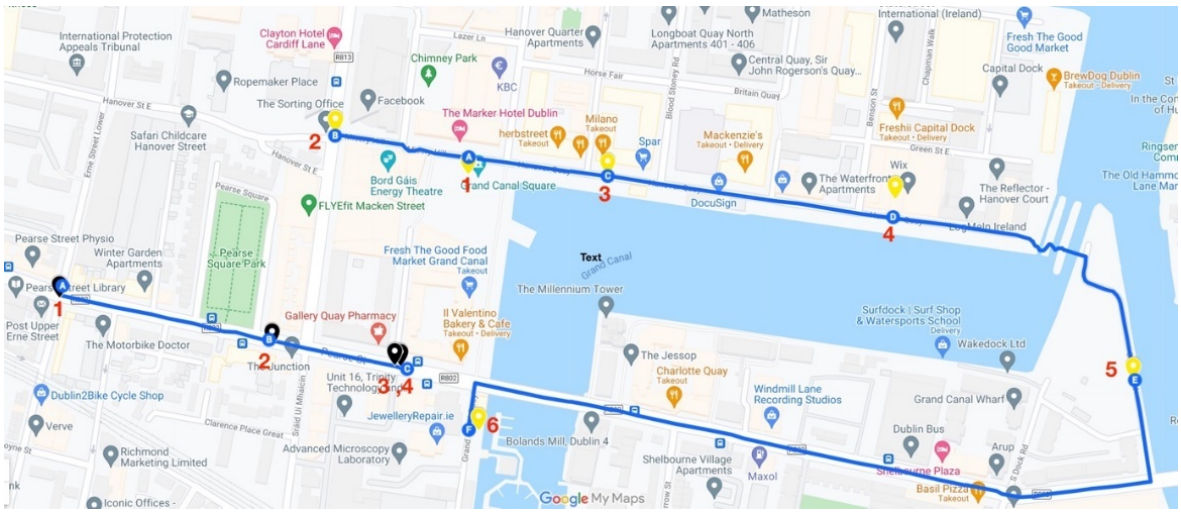


Figure 7.8: A street map of the urban infrastructure (black markers) and Grand Canal Dock (yellow markers) stages of the *Dublin Infrastructure Tour* project. The red numbering corresponds to individual stops.

Introduction:

The primary function of this stage is to locate and identify physical aspects of the internet within Dublin city centre. This process emphasises the materiality of the internet and identifies the dependency of static and mobile networked communications on fibre optic cables and telephone masts. Furthermore, this stage consolidates and provides visual evidence of communications infrastructure being built upon pre-existing networks. This is achieved by stopping at a series of pre-determined locations along Pearse Street in Dublin 02 (Figure 7.8).[188]

[188] As noted previously, this chapters draws from both full tours and also various online iterations. However, for stage two I specifically reference the second tour two as geographically it offers the most cohesive and clear way of disseminating the research. A map of various stages of the tour is available at: https://www.google.com/maps/d/u/0/viewer?mid=1PsRt9JGENJyvxnP6ofo7DY30AY-UwwTR&ll=53.34300862668703%2C-6.237002800000004&z=16

Stop one:

Location: Department of Post & Telegraphs manhole cover, Pearse Street, Dublin 02.

Figure 7.9: Manhole cover on Pearse Street.

Figure 8.10: Department of Posts and Telegraphs logo

Figure 8.11: Telephone mast operated by Three Ireland

The first stop within stage two is at a manhole cover on the corner of Pearse and Erne street (Figures 7.9 and 7.10). This manhole cover features the branding of the Department of Posts and Telegraphs which was established following the foundation of the Irish Free State in 1922 and was responsible for postal and telephony communications within the country.[189] As explained in the previous section, the Department of Posts and Telegraphs was the governing body for the post office service that purchased the underground duct networks from Dublin Tramways. The second point of note at this stop is the presence of a telephone mast (Figure 7.11) across the street from the manhole cover. This mast is operated by the mobile telecommunications company Three Ireland and provides 3G and 4G services.[190] The transnational scale of telecommunication infrastructure is conveyed by a brief overview of Three Ireland. The company is owned by CK Hutchison Holdings Limited, a Hong Kong-based multinational conglomerate with a diverse range of business interests including retail, infrastructure and telecommunications and operates in over 50 countries (ckh.com, 2021).

Stop two:

Location: Telecom Éireann manhole cover, St. Andrews Resource Centre, Pearse Street, Dublin 02.

---

[189] For a history of the postal service in Ireland, see '*The Post Office in Ireland: An Illustrated History*' (Ferguson, 2017).

[190] This information was obtained using the ComReg Siteviewer map discussed in section 8.3.1.

Figure 7.12: Telecom Eireann manhole cover

Figure 7.13: Telecom Eireann logo

Figure 7.14: Vodafone telephone mast

The next stop is at a Telecom Éireann manhole cover. In 1984, the Department of Posts and Telegraphs was split into two different departments *An Post* - responsible for postal services, and *Telecom Eireann* - responsible for telecommunications (irishstatuebook.ie, 2020). Looking back up Pearse street, another mobile mast is visible – this one operated by Vodafone Ireland, who in turn is owned by the British based Vodafone group (Figures 7.12, 7.13 and 7.14).

Stop three:

Location: Eircom and Virgin manhole covers on the corner of Pearse Street and Chimney view, Dublin 02.

Figure 7.15: Virgin (left) and Eircom (right) manhole covers.

Figure 7.16: Eircom logo

Figure 7.17: Virgin logo

The final stop of this stage is at the bottom of Pearse street just before it reaches the Grand Canal Dock. Here, there are two different manhole covers in close proximity to each other (Figure 7.15). Telecom Éireann maintained a statutory monopoly within the Irish telecommunications market throughout the 1980s and into the 1990s (Palcic & Reeves, 2010) until deregulation saw the company being privatised and renamed Eircom (Figure 7.16), a name it kept until 2015 when it was rebranded as Eir. Eir is the largest telecommunications provider in Ireland but is incorporated in Jersey. As a consequence of the deregulation of the telecommunications industry, many international companies entered the Irish market, including virgin media (Figure 7.17). Following a Freedom of Information request to ComReg,

I was able to ascertain that the following companies all maintained fibre optics cables in Dublin city.[191]

- Aurora
- BT Ireland
- Colt Technologies
- ENT
- ESBT
- EUNet
- GTT
- Magnet
- Siro
- Verizon
- Viatel
- Virgin
- Vodafone
- Zayo

Figure 7.18: Companies with underground fibre optic cables in Dublin city.

The fibre optic cables that run through Dublin are built on top of pre-existing media networks.By looking at the development, evolution, and privatisation of the Irish telecommunications industry through a series of manhole covers, participants get a sense of the material development of the digital networks through which our data moves. Furthermore, in relation to both the fibre optic cables and telephone masts, the transient nature of the ownerships of the infrastructure(s) through which these digital telecommunications pass through, and also the size of the competitive market for the same, raises questions about the potential ephemerality of data ownership and digital rights (Figure 7.18).

7.3.3 Stage Three

Corporate Internet

Location: Grand Canal Dock

Introduction:

Stage three visits various locations within the grand canal dock area as a way of engaging with some of the reasons behind, and consequences of, the corporate presence of various tech

[191] The FOI request and response is available at in the assets folder of this project. An FOI is a form of OSINT and something that I consider to be an invaluable tool within the context of tactical media archaeology.

multinationals in Ireland. Consequently, this facilitates the introduction of key issues associated with the digital culture industry including data sovereignty, corporate tax regimes, alongside more localised concerns related to housing, bureaucratic transparency and governmental mismanagement.

Stop one:

Location: Centre of Grand Canal Square

The first stop is at the centre of grand canal square - participants are provided with a brief historical overview of this area as outlined in section 8.2.2. This overview offers an insight into the historical development of the area, alongside a sense of scale in relation to its emergence as a central hub within the global digital culture industry.

Stop two:

Location: Facebook Headquarters

Figure 7.19: Tour stop outside of Facebook's European offices in Dublin

Following the general historical overview of the Grand Canal Dock, the tour moves to the European headquarters of Facebook (Figure 7.19). Participants are asked if they use Facebook, Instagram or Whatsapp- a simple exercise that effectively conveys the scale of the social media platform's wider network. Attention is then focused on the Facebook sign outside of the building which shows the address of the building as being four-five Grand Canal

Square. However, a Dublin city council sign across from the building reveals that the name of the street is actually Misery Hill.[192]

Following a short overview of Facebook's operations in Ireland, some of the issues and controversies associated with the company including Cambridge Analytica, the platforming of hate speech and data collection are discussed. This discussion allows me to highlight and clarify that Facebook's Irish base is its European, Middle East and African (EMEA) headquarters, and consequently Ireland is responsible for the financial and data regulation of Facebook and many other tech companies based in the country.

Figure 7.20: The office on the right is of the Irish data protection commissioner in Portarlington.

At this point, participants are directed to an image in the 'portable powerpoint'. This image is of the office of the Irish Data Protection Commission (IDPC) in Portarlington -a small, rural town approximately 70 kilometres outside of Dublin (Figure 7.20). The humorous juxtaposition between the office of the IDPC and Facebook's headquarters that participants are standing in front of is clear. The disparity between Facebook and the IDPC is further consolidated by highlighting the annual budget of the Data Protection Commissioner, which in 2021 is 19.1 million euros (dataprotection.ie). The final discussion point of this stage is the ongoing legal case between the Austrian privacy advocate Max Schrems and Facebook – the case is used as an example of how Ireland is increasingly at the centre of international legal

[192] For more on the history of Misery Hill, see 'Meet me on Misery Hill…' (Fallon, 2014).

debates as a consequence of its obligations under GDPR.[193] The headquarters of Facebook in Grand Canal Dock is an obvious stop within the *Dublin Infrastructure Tour* project – it is a platform that increasingly dominates digital culture, and its presence in Dublin continues to generate debate. Furthermore, from a more practical viewpoint, the company serves as a useful and relatable reference point when explaining, interrogating and reflecting on themes and debates related to the digital culture industry.

Stop three:

Location: Irish Tax Institute

The Irish Tax Institute is a regulatory body for chartered accountants in Ireland. Although it is not directly involved with Ireland's corporate tax regime, its location in the centre of Grand Canal Dock provides a suitable opportunity to engage with the issue of tax in relation to the many tech companies based in the country. As noted in section 7.2.2, Ireland's transition into an international tech hub is not a recent phenomenon and is a consequence of its aggressive foreign direct investment policy and generous corporate tax rate. Although they are not based in Grand Canal Dock or indeed Dublin, as with Facebook and GDPR, Apple is the most suitable case study to engage with Ireland's corporate tax regime and the issues associated with it.[194]

Following a brief overview of the history of Ireland's foreign direct investment policy as discussed in section 7.2.2, humour is once again employed within the project -a bag of apples is shared amongst the tour participants as a way of introducing a discussion on the company. This discussion is centred on Apple's ongoing legal battle with the European Commission which claims that Ireland has broken EU state aid laws by artificially lowering the tax paid by Apple in Ireland since 1991. In 2016, the commission ruled that Apple had to repay €16bn in taxes to the Irish state, this has since been overruled by the General Court of the European

[193] For a full overview of the case, see https://epic.org/privacy/intl/schrems/. Schrems' battle with Facebook continues in the Irish Courts, with ongoing cases against Instagram and Whatsapp, which as previously noted, are both owned by the social media giant.

[194] Apple has been based in Cork, the second largest city in the Republic of Ireland since 1980 and employs approximately 6,000 people in Ireland. See 'Apple's secretive Cork facility opens up – to an extent,' (Taylor, 2018,).

Union, however, this has been appealed by the European Commission and at the time of writing, the case is ongoing.[195]

In the introductory stage of the tour, it is explained to participants that I am not an economist, network engineer, barrister, historian nor political scientist, yet the tour engages with all of these areas at some point. Participants are reminded of this once again during the Apple presentation as the content is quite complex. I have approached the issue of complexity in relation to subject areas outside of my research in three different ways. The first is in a participatory manner - participants are invited to contribute and explain in their own words and understanding the issue at hand – this is useful as it fosters more engagement and dialogue. The second way is to invite participants to contact me after the tour for clarification or further elaboration on a specific topic that has been covered – this allows me to research the specific issue and give a more detailed and informed answer. The final approach is something that is discussed in the following section – the introduction of guest speakers.

By engaging specifically with Apple's history and relationship with Ireland, I can provide participants with a sense of how deeply interwoven the corporate infrastructure of the Internet is within the Irish economy through its tax system. As a concluding point at this stage, it is emphasised to participants that this relationship will continue to generate not only controversy and debate nationally and internationally, but also massive profits for the tech companies based in the country.

Stop four:

Location: Airbnb Headquarters

Over the past decade, Ireland has experienced an unprecedented housing crisis.[196] Although the reasons for this are varied and complex, much of the blame can be attributed to poor planning and policy mismanagement by successive Irish governments. Pre-pandemic, Airbnb were a contributing factor to housing supply issues within Dublin.[197] These issues are

---

[195] For a clear and concise overview of the Apple Tax case up until 2019, see ' The Apple tax case appeal: All you need to know' (Goodbody, 2019).

[196] See 'Ireland's housing crisis in five revealing graphs' (Williams & Taylor, 2020).

[197] For an analysis of AirBnB's impact on Ireland, see 'Towards an understanding of the regional impact of Airbnb in *Ireland*' (Lima, 2019), also 'Council Report Tries to Spot Businesses among Airbnb Hosts' (Neylon, 2017). For an international perspective, see 'The impacts of Airbnb in Athens, Lisbon and Milan: a rent gap theory

highlighted and discussed outside the offices of Airbnb which has hosted its EMEA operations in Dublin since 2013.[198] [199] The second full iteration of the *Dublin Infrastructure Tour* project featured a guest contributor, Ceilim Robinson. Ceilim is a student from the National College of Art and Design (NCAD) and contacted me following a presentation I gave on the *Dublin Infrastructure Tour* project to students in NCAD. Ceilim's initial reason for contacting me was to ask to be a participant on the next iteration of the tour, something he was interested to do as his own practice explored similar themes. In an email exchange with Ceilim, he mentioned that he grew up in Ringsend – a working-class suburb beside Grand canal dock. Ringsend traditionally housed dockers who worked in Dublin port - recently the area has become increasingly gentrified as a result of the demand for accommodation in proximity to the tech offices in Grand Canal Dock.

Following this email exchange with Ceilim, we met in person to discuss our overlapping research interests. It was immediately clear that Ceilim had lived experience and invaluable insights as to the social impacts of the tech companies based in Dublin. For the tour, Ceilim gave a short presentation about his life growing up in the area, how he had witnessed the development of the Grand Canal Dock into a tech hub and how this has directly affected him, his family and community, and as a consequence of the aforementioned gentrification, it is unlikely that he will be able to buy a house in the community that he grew up in.[200] It was a privilege to have Ceilim involved with the tour and his presentation added a layer of lived experience to the project. To borrow from the ideas of decentralisation discussed in chapter seven, I suggest that when possible, participatory projects like *Dublin Infrastructure Tour* should be decentralised. By this I mean it is better to have numerous contributors to the project as it offers more diversity of thought, greater expertise and personal insights. In doing so, the project aspires to create a social network without a platform.[201] The Airbnb stop is one

---

perspective' (Amore *et al*.,2020), also the Disruption Network Lab held a conference (online) entitled 'Evicted By Greed: Global Finance, Housing & Resistance' which examines many issues related to short term property rentals alongside wider debates on housing issues, available at https://www.disruptionlab.org/evicted-by-greed

[198] This is one of two AirBnB offices in the Grand Canal Dock area, the other one located closer to Pearse street, this location was selected due to its proximity to other stops on the tour.

[199] By coincidence, a housing protest took place at the Airbnb headquarters on the same day as the first *Dublin Infrastructure Tour*, see 'Housing activists occupy Airbnb headquarters in Dublin' (Molloy, 2018).

[200] See Richard Florida work on the creative classes and gentrification and Frank Bures critique of the same https://beltmag.com/fall-of-the-creative-class

[201] Feral Trade Kate Rich captures this ethos wonderfully https://feraltrade.org/statement/

of the shorter stops on the tour. Aside from Ceilim's contribution, the key idea conveyed at this point is that a company that has impacted the housing situation in Ireland and beyond, operates a sizeable part of its infrastructure in Dublin.

Stop five:

Location: Grand Canal Street Upper - River Dodder

Although still in Grand Canal Dock, stop five is not directly concerned with the corporate aspects of the Internet. As a consequence of its geographic proximity to the Irish sea, it was logical at this point to return to the physical infrastructure of the Internet, tracking the movement of data beneath the streets of Dublin and beyond Ireland through the subsea cables that land in Dublin Bay. At this stop, a historical overview of Ireland's role in international telecommunications dating back to 1858 is provided. Drawing on the work of Nicole Starosielski, parallels are outlined between Ireland's historical relationship with the United States and the United Kingdom in relation to trade and emigration, with the suggestion that this relationship is increasingly centred on the trading and movement of data. Techno-politics are further discussed by highlighting the tapping of Irish subsea cables by British Intelligence – a process that was revealed in the Edward Snowden disclosures in 2013, also the impact of Brexit on subsea cables and finally, how new cables such as the AEC-2 are being built by a consortium that includes Google and Facebook, meaning that the route of data is being increasingly centralised by the companies based in Grand Canal Dock.[202] [203] This continued expansion of the tech companies based in Grand Canal Dock into the material elements of the Internet emphasises the point that the corporate entities of Big Tech are increasingly dominating all parts of the digital culture industry and its supporting data infrastructures and supply chains.

---

[202] For a more detailed overview of these themes, see 'Underwater Cables Leave Ireland Tangled – and Implicated – in the Internet' (O' Neill, 2019). Also, in the last year it has been reported by Irish media that the subsea cables landing in the country have in recent times been targeted by Russian Intelligence, see 'Russian agents plunge to new ocean depths in Ireland to crack transatlantic cables' (Mooney, 2020).

[203] On the second tour, artist Evan Roth gave a short, informal talk on his own research and practice from his *Internet Landscapes* and *Red Lines* series. Roth was present as he had been a guest tutor on the *Future Landscapes* programme. Although he was only able to attend the first part of the tour, it was interesting to have him involved both for his insights into the specific subject area, but also as a founder of the FAT Lab.

Stop six:

Location: Google EMEA Headquarters, Barrow Street, Dublin 02

The final stop of this stage is outside of Google's EMEA Headquarters. This stop focuses on the scale of Google's presence in Ireland, and some of the issues associated with this presence in both a local and international context.As noted in section 8.2.2, Google's decision to base its EMEA in Dublin in 2004 led to many other tech companies doing the same, and as such, Google is very much the linchpin of the area and the driving force behind the Silicon Docks narrative. To localise some of the issues associated with Google, reference is made to Laura Nolan - a former software engineer in Google's Dublin base who resigned from the company in protest at Project Maven – an AI collaborative project with the US Department of Defence.[204]Other subjects and issues related to Google are then highlighted including censorship, tax avoidance, the environment and privacy. The main focus of this stop is to highlight the scale of Google's presence and infrastructure in Dublin – the company employs over 8,000 people and aside from its EMEA headquarters, Dublin is also home to Google's Cloud and Enterprise operations, and operates a data centre outside of the city centre which runs services including Gmail, YouTube and Google maps.

The Grand Canal Dock stage concludes with a brief overview of other companies in the area which include Accenture, AWS, Twitter, Linkedin, and Salesforce, and a synopsis of the key themes engaged with thus far, including data sovereignty, corporate tax regimes, the socio-cultural impacts of platforms and the gig economy on local communities, and the techno-political aspects of critical Internet infrastructures.

7.3.4 Stage Four

Location*:* Public transport from Grand canal dock (Dublin 02) to Tallaght (Dublin 24).

[204] See 'Artificial intelligence: Machines given power to kill?' (2019) for an interview with Laura Nolan.

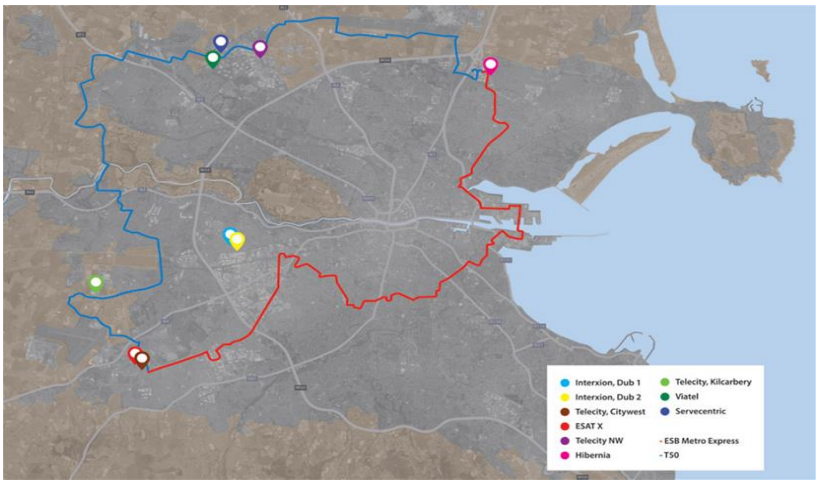


Figure 7.21: The blue line is the T-50 fibre optic cable (source esb.ie)

To travel from Dublin city centre to an AWS data centre, public transport is utilised which, depending on traffic, takes between 35 – 50 minutes. Although private transport may be more desirable in terms of time management, informal feedback from participants on both tours indicated that using public transport infrastructure worked well and complimented the overall DIY approach of the tour. The journey also provides an opportunity to outline two critical internet infrastructures relevant to this stage. The first is the T-50 fibre optic cable - a 44km long fibre optic cable that surrounds the city centre and connects to a landing station in proximity to the Irish sea and the aforementioned subsea cables (Figure 7.21). The T-50 cable mirrors the route of the M-50 motorway and in doing so, serves as another example of media infrastructures being layered upon each other.[205] Both the M-50 and the T-50 connects to various business parks and industrial estates surrounding the city, and it is in one of these estates that the final stage of the tour takes places.

The time on the bus is used to provide a short overview of the data centre industry in Ireland.[206] As of November 2020, there are 60 operational data centres in Ireland, 80% of which are hyperscale (hostinIreland.com, 2020) meaning that they are owned and operated by the companies whose data they hold such as AWS, Google, Facebook and Microsoft, all of whom have data centres in proximity to the T-50 fibre optic cable. The data centre industry contributed €7.13 billion to the Irish economy between 2010 and 2018 (idaIreland.com,

[205] The bus route (77a) intersects with the M-50 motorway.
[206] For the second iteration of the tour, Dr Patrick Brodie gave a brief presentation on his research into the data centre industry in Ireland.

2018), whilst investment from construction between 2021 and 2025 is projected to be worth €6.7 billion (bitpower.ie). The majority of data centres in Ireland are located in the aforementioned business parks and industrial estates surrounding Dublin city.

7.3.5 Stage Five

Location: Amazon Web Services Availability Zone, Tallaght, Dublin 24.

Figure 7.22: AWS data centre, Tallaght, Dublin 24

Figure 7.23: Tour stop outside of same data centre

Figure 7.24: AWS Global data centre infrastructure (source: aws.amazon.com)

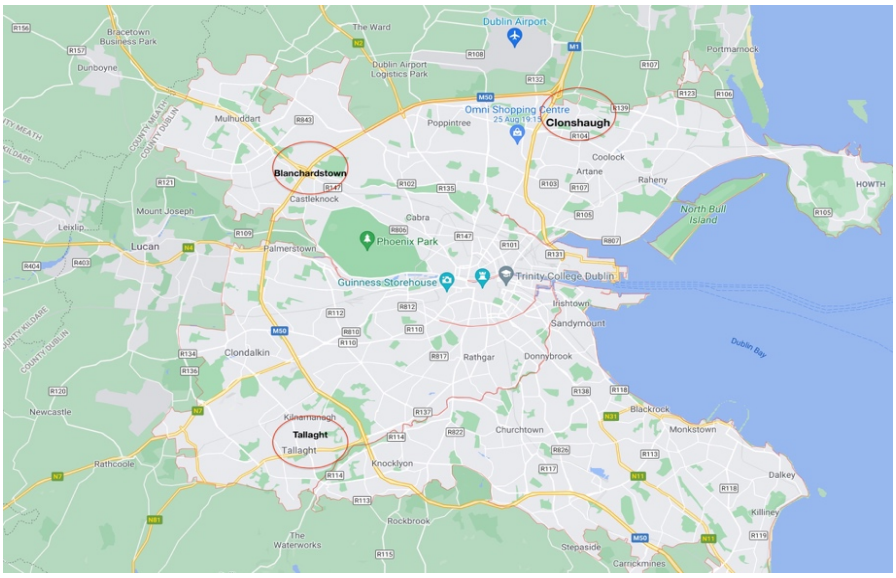


Figure 7.25: AWS Availability Zones in Dublin.

The final stage of the tour takes places in an AWS availability zone (Figure 7.22 and 7.23). To understand what an availability zone is, it is necessary to look at AWS's global data centre infrastructure (Figure 7.24). The company operates in various countries around the world including the United States, Brazil, Japan, Sweden and China.[207] Its global infrastructure is divided into geographical regions – Ireland is one such region and is referred to as EU West-One. Within each region are a series of availability zones, essentially clusters of individual data centres in proximity to each other to ensure stability and latency. Ireland has three different availability zones (Figure 7.25) in different suburbs of Dublin city - Tallaght, Blanchardstown and Clonshaugh. [208] To introduce the presence of AWS in Ireland, participants are reminded of the concept of Internet Protocol addresses as they were discussed on the first stage of the tour. They are then directed to their portable powerpoints, which contains a copy of figure 8.1 which show Amazon dominance of IP v.04 addresses in Ireland. The figure and data on IP addresses are offered whilst standing outside of an Amazon data centre (Figure 8.23), consolidating the idea that data is actually stored in a physical, material place.

At this point, some of the issues associated with AWS and Amazon are outlined, including the company's poor record on workers rights, anti-competitive practices, its facial recognition program and its involvement with the US Military.[209] The tour concludes with an overview of

[207] see https://aws.amazon.com/about-aws/global-infrastructure/
[208] The tour focuses on the Tallaght availability zone as it is the most accessible from the city centre.
[209] See 'On Dublin, Amazon, and the "Secret Region"' (O'Neill, 2018).

the themes and topics that have been presented. It is emphasised to participants that Ireland is an integral node, not only of AWS's technical and corporate infrastructure, but also of the other companies that dominate the digital culture industry, and how, through our everyday online interactions with our networked devices, we too are integrated within the same.

7.4. Greetings From…

Figure 7.26: The original postcard featuring an aerial view of an AWS data centre in Tallaght.

At the end of the second iteration of tour, the group had an informal picnic at the side of the AWS data centre on the corner of Belgard and Airton roads (Figure 7.25 and 7.26). This allowed me to engage in one final, prepared, activity with the group. Based on feedback from the first tour, where a participant had expressed that they would have liked a souvenir of the tour, and influenced by Shannon Mattern's description of participatory projects such as walking tours of the Internet as examples of 'infrastructural tourism', I designed a postcard using a screengrab of a Google satellite image of the final data centre on the tour with the Amazon logo and the *Greetings from* text superimposed (Figure 7.26). At the end of the second tour, participants were presented with these postcards and invited to write messages to Jeff Bezos - this was done playfully, once again incorporating humour into the project.

Greetings from… was developed for the exhibition as a way of acknowledging and incorporating *Dublin Infrastructure Tour* without using direct documentation such as maps or photographs, an approach I felt would not fit with the overall tone and theme of the

exhibition. The extended version of this project was a series of 24 postcards featuring all know AWS regions globally (Figure 7.27 & 7.28). This process was achieved by using material released by WikiLeaks in October 2018 that listed some of the know addresses of AWS data centres globally.[210] Using these addresses, I mapped each data centre using google maps, taking screen grabs of each location and then superimposing the Amazon logo. For any regions that were not listed in the WikiLeaks material I used a black background – the same background is used for the company's 'secret region' and US government regions.[211]

Aside from its role as an extension of the *Dublin Infrastructure Tour* project, *Greetings from…* explored three different themes. The first was to reveal the location of AWS data centres not just in Dublin, but globally – something I consider a legitimate tactic in opposing a company that dominates all aspects of the digital culture industry. Secondly, the project played with the idea of slow mail and in doing so, a reference to the influence of media archaeology on this project.[212] The final theme was from a more meta perspective – as our memories and actions are increasingly stored in data centres, this is increasingly where we 'are', a digital space within a material place.

Figure 7.27: *Greetings from…* & *Greetings from EU West One* installation view**.**

[210] See https://wikileaks.org/amazon-atlas/
[211] All postcards are available in the assets folder of this project.
[212] I was not aware of it at the time but artist Joana Moll has a similar project '*Hello from*', available here: http://www.janavirgin.com/hello%20from.html

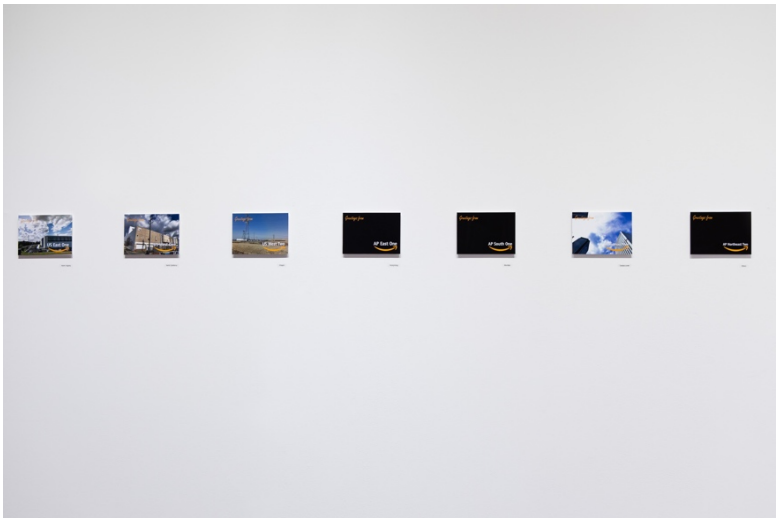


Figure 7.28: *Greetings from…* installation view.

Figure 7.29: *Greetings from EU West One* installation view.

7.5 Place: Exhibition and Reflection

As noted above, *Greetings from…* was developed as part of the *Dublin Infrastructure Tour* project, in part as a way of incorporating the project into the exhibition without relying on more traditional documentation formats. From a visual perspective, the series of postcards were the most striking aspect of the exhibition. The work was further localised by *Greetings from EU West One*, another version of the original postcard featuring the AWS data centre on the final stop of the tour (figure 8.29). One hundred cards were printed and mounted in a card holding rack and viewers were encouraged to take one as a 'souvenir', not only of the

exhibition, but of their time spent in EU West One, or as it is referred to in non-AWS language, Dublin.

Of all the practice-based work undertaken during this research project, it is the *Dublin Infrastructure Tour* and the accompanying body of research that has been disseminated most widely. As noted previously, the research has been presented at various European conferences and events, it has featured in an anthology on critical making and collaborative learning practices published by the Institute of Network Cultures in 2018[213] and has been included in '*States of Entanglement: Data in the Irish Landscape'*, released as part of Ireland's entry to the 2021 Venice Architecture Biennale. At a more local level, parts of the research have been published in the Dublin InQuirer newspaper. As noted in chapter four, it is this local dissemination of the project that I consider to be the most effective in terms of praxis. Whilst I do not know how many people engaged with the articles featured in the Dublin Inquirer newspaper, I do believe that it allowed the research to be shared beyond the academy and gallery, and in doing so, contributed to a wider discourse surrounding the many issues associated with the digital culture industry in Dublin. It is within this discourse where many of the seeds of resistance and empowerment are initially planted.

7.6 Conclusion

In a 'call to study boring things' (1999, p.377), Susan Star Leigh argues that studying an information system but failing to engage with its 'standards, wires, and settings', will result in missing key aspects related to its 'aesthetics, justice and change' (*ibid.* p.399). Star Leigh suggests this can also be applied to computers, arguing that instead of thinking of them as information highways, they should be regarded as 'symbolic sewers', allowing us to conceptually open them up, providing us with a better understanding of what is inside them. (*ibid.*p.399). This logic can also be applied to the wider networked technological infrastructure of which digital artefacts such as computers, are just one element.

The physical infrastructure of ICTs spans borders, markets, states and ideologies meaning that although the walking tour is a project rooted in Dublin, both the issues it highlights and the

[213] 'C-Node: Subverting the Black Boxes of Amazon Web Services in Dublin (O'Neill, 2018).

creative dissemination of research it suggests, can be applied to other cities around the world. Artistic and creative interventions with technology not only raise awareness of these issues but also promote an engagement with technology that is more critical and reflective than conventional discourses. *Dublin Infrastructure Tour* promotes participatory engagement so that others can critically explore the physical and corporate topologies of the internet that surround us to generate more understanding and discussion in relation to the many debates and controversies surrounding technology that dominate so much of our contemporary discourse. The various infrastructures that are the focus of the practice-based projects in this chapter allude to a wider narrative involving many different corporate and political actors that together form our contemporary networked world. These projects are not meant as a rallying cry against these actors per se, but rather aim to highlight the vast, complex systems at work beneath our everyday digital interactions, and in doing so, allow us to not only identify the abstraction upon which the cloud exists, but to locate and connect it with the idea of a material, real, place.

Chapter Eight

Conclusion

8.1 Introduction

This chapter begins by revisiting the key concepts and objectives of this research project. This reprise contains a series of reflections on these objectives, informed by the research undertaken during the course of this inquiry. This is followed by an acknowledgment and analysis of the limitations of this research project, and an overview of its contribution to the field of media art practice and theory. After this, potential future directions of the research are considered, followed by some final comments and reflections on the project as a whole.

8.2 Key Concepts and Objectives Revisited

As part of the development of the body of practice-based artefacts within this research project, a series of conceptual frameworks have been developed. The first is the concept of the *digital culture industry*, which refers to the contemporary era of networked capitalism, an era defined by the unprecedented extraction, accumulation and manipulation of data and the material and digital infrastructures that facilitate these processes. As outlined in chapter two, this concept draws on the work of Theodor Adorno and Max Horkheimer, alongside more contemporary perspectives on digital culture and networked capitalism. The digital culture industry concept is intentionally broad and is not intended to be understood as a definitive account or description of contemporary networked society. It is employed within this research project as a framing mechanism that allows me to articulate and highlight particular techno-political concerns within networked capitalism and respond to them through practice.

The second concept featured in this research project is *Platform Protocol Place*. *Platform Protocol Place* is a thematic division of the digital culture industry. It is used within this research project to frame and outline the body of practice-based work developed in this inquiry. It also serves to make complex technological issues accessible and to communicate these issues through public exhibition and within this written thesis.

The final concept is tactical media archaeology. Tactical media archaeology refers to the techniques I employ in my practice, and consequently in the development of the artefacts that are the central focus of this research project. The concept of tactical media archaeology is further elaborated on in the following objectives.

8.2.1 Techniques and Practices

Objective:

- To identify the various techniques and approaches employed in my practice and to situate them within the wider context of critical media art practice.

The artefacts detailed in chapters five, six and seven have been developed using a variety of digital and material techniques. I will now provide a brief summary of these techniques and the issues that these artefacts engage with.

Platform

Act appropriates and remixes code alongside various text-based sources whilst utilising Twitter's Application Programming Interface (API). In doing so, it engages in a networked détournement of the popular social media platform whilst critiquing mass surveillance practices employed by corporate and state actors. Building upon the networked architecture developed in *Act*, *Embassy* similarly engages in appropriation and remix practices, not just with code but also with audio sources curated from different online platforms. It utilises the Twitter API to monitor and react to the twitter accounts of 261 different embassies globally – effectively incorporating these state entities into the project. At a more tactile level, *Embassy* engages in hardware hacking and critical making to repurpose and reimagine the possibilities of FM radio transmission. This repurposing is facilitated by using the raspberry pi and related open source applications developed by various online communities. *Embassy* offers a critique of neoliberal narratives focusing on progress, whilst also considering contemporary networked culture within the context of the geopolitical dichotomies of the near past.

Unlike *Act* and *Embassy*, *Farm* is not a networked or digital artefact. However, as outlined in section 5.6.1, it evolved through an engagement with digital networks and processes. Initially, I downloaded a three hundred gigabyte archive of gifs, jpegs and movie files made available by twitter. I engaged with this archive through practice using different programme languages including processing and python. As is outlined in sections 5.6 – 5.6.1, the evolution of *Farm* into an analogue artefact is an act of resistance against the hyper–algorithmic media

saturation afforded by the digital culture industry. Consequently, acting *slowly* or r*efusing* to act are techniques informed by a tactical media archaeological approach.

Protocol

As with *Act* and *Embassy, Platform Protocol Place* and *Captive Audience* were developed by building upon other open source projects hosted on online platforms like github. Both projects use the esp8266, a low-cost WI-FI microchip popular with artists and technologists due to its ease of use and affordable price. Both of these projects are interventions that occur within the wireless space, and as such, can be considered as forms of networked détournement. As outlined in section 6.5.2. *Whois Ireland?* was developed using open source intelligence (OSINT) practices, I was able to collate and verify the list of Irish IPv.04 addresses using various online websites and databases. In order to display this information on the LED display, various coding and hardware hacking practices were employed. *Whois Ireland?* questions the internal bureaucratic structures of the internet, and in doing so, serves as a reminder of the 'local' within the context of information communications technologies.

Place

The *Dublin Infrastructure Tour* project has evolved through a mixture of methods and approaches. As is detailed in chapter seven, the project originated from the compiled list of IPv.04 addresses registered in Ireland used in the *Whois Ireland?* piece. Other OSINT techniques have been employed in the *Dublin Infrastructure Tour* project, including Freedom of Information requests and using publicly available council documents such as planning permission applications to ascertain the locations of data centres and other critical internet resources. The project has also been informed by interventionist techniques and concepts such as the dérive and psychogeography, and also by socially engaged participatory art practices. The *Greetings from…* series again also uses OSINT techniques, tracking AWS' global infrastructure using documents made available by the WikiLeaks organisation and visualising the same using Google maps. Both the *Dublin Infrastructure Tour* and the *Greetings from* … series are projects that emphasise the materiality of the internet, and in doing so, critique problematic language such as the 'cloud' and techno-solutionist narratives that obfuscate the political, social and environmental realities and impacts of the digital culture industry.

As a media artist working with digital and networked technologies, I use a wide a range of techniques and practices drawn from various disciplines within the humanities, computer science and engineering. In doing so, my practice is aligned with the Critical Art Ensemble's 'by any media necessary' statement – I use the technologies and techniques available to me as required. From remix to hardware hacking to open source intelligence, these techniques are utilised within my practice to develop work that critiques the digital culture industry. Of course, this 'by any media necessary' approach and these techniques are not unique to my practice. As highlighted throughout this thesis, many other contemporary critical media artists whom challenge dominant neoliberal narratives surrounding technological progress and solutionism use similar techniques to the ones employed in this research project. As I have outlined in chapter four, I use the term tactical media archaeology to describe these techniques and practices. Furthermore, this term acknowledges the conceptual and practical influence of two distinct subfields of media art on my own practice and that of other contemporary critical media artists.

8.2.2 Compatibility

Objective:

- To consider the relationship between tactical media and media archaeology asking whether they are compatible forms of practice.

Tactical media and media archaeology have been synthesised within this research project to map the techniques and practices used by myself and other artists working in this field. As outlined in chapter three, the evolution of tactical media can be traced through histories of media art and hacking culture. Tactical media subverts technological systems and networks through temporary interventions and actions. Artists and collectives from its first wave, such as the Bureau of Inverse Technology and the Critical Art Ensemble, engaged with the opportunities afforded by networked communications technologies whilst simultaneously critiquing the dotcom narratives and ideologies associated with them. This first wave of tactical media declined in the post 9/11 media landscape. However, it did not fully disappear -artists recalibrated their focus and new collectives, such as the FAT lab, formed and engaged with the concerns of the emerging digital culture industry, such as networked surveillance, data rights and the environmental impacts of information communications technologies.

As with tactical media, media archaeology shares an inherent critique of neoliberal narratives of technological progress. Media archaeology has different variations that acknowledge the alternative and imaginary histories of media technologies and in doing so, foster a materialistic engagement with the current networked era. As noted in section 4.3.3, it is the use of media archaeology as an art method that is most relevant to my practice and to this research project. As an art method, it cultivates practices like hardware hacking, circuit bending and other techniques that engage with digital artefacts and systems to excavate and critique the digital culture industry.

Both tactical media and media archaeology offer a critique of our current networked era. This critique can be expressed both conceptually and through material and creative practice. As I have demonstrated through the development of the artefacts within this research project, these two subfields of media art are central to my practice, informing and influencing it both practically and conceptually. As such, I argue that tactical media and media archaeology are compatible forms of practice. This compatibility is expressed within this research project through their synthesis into the concept of tactical media archaeology.

8.2.3 Learning and Sharing

Objective:

- To reflect on the limitations of tactical media archaeology and critical media art practice within the context of my own practice.

Philip E. Agre discusses the idea of borderlands in reference to the spaces between analogue and digital worlds (1997). Agre argues that such borderlands are complicated places, their residents which include photographers, engineers, social scientists and others who move between analogue and digital in their work, are 'both an object and an agent of technical representation, both a novice and an expert' and all have a story (*ibid*. n.p). Artists engaging with a tactical media archaeology approach operate on the borderlands of many of the dominant debates and discourses of our contemporary era, moving between borders of privacy and surveillance, big data and open data, legal and illegal, fake and real, automated and manual and so on. Our respective practices are situated at the oft-cited intersection

between art and technology and occupy a unique space within the digital culture industry. It is from this space that we are able to act as a cultural bellwether, communicating and disseminating complex issues related to contemporary networked culture to various publics.

However, as noted in sections 4.5 and 4.5.1, there are concerns surrounding the limitations of critical media art practice and tactical media archaeology when faced with the size and scale of the platforms of the digital culture industry. I have struggled with similar concerns within my own practice during the development of the artefacts featured in this study. Projects such as *Act* and *Captive Audience* V.01 have encouraged me to reflect on my own practice and how I frame it -should I consider my work within Erik Kluitenberg's hacktivist interpretation of tactical media or in the more artistic interpretation offered by Rita Raley? Ultimately, I align my practice more with media art than hacktivism, but this is not fixed and within the context of tactical media archaeology, media art and hacktivism are so intertwined, distinguishing between them is at times futile.

Irrespective of how I perceive my own practice, its limitations within the context of the aforementioned size and scale of the digital culture industry remain. However, as noted throughout this thesis, much of the practice-based work produced during this research project has been developed through an engagement with various online and offline communities. These communities embrace a critical pedagogy through peer learning and knowledge sharing, informed by an open source ethos and an ideology that is in direct opposition to the digital culture industry. Despite the size and scale of digital cultural industry these communities foster hope and action through knowledge, culture and sharing – even though we may have lost, it doesn't mean we should stop fighting. It is through these triangulations of theory, practice and pedagogy, and within these soft subversions of knowledge exchange and dissemination that my own practice has evolved into praxis.

8.3 Limitations of the Research

As with all research projects, there are limitations. Most of the artists referenced in this study are based in Western Europe and the United States. This was not an intentional decision to exclude other countries and regions on my part, but rather a reflection of the reality of the field which as previously noted, is very much Euro/US-centric. Many of the artists, collectives and formal and informal institutions confronting the digital culture industry through cultural

practices are based in these regions - in proximity to the corporate centres of power that they critique, but not to the regions where the environmental consequences and digital divides are experienced most intensely. Of course, this is not to say that there are not artists conducting vital work engaging in these themes beyond Europe and the United States, rather the primary physical sites of dissemination are centred within western culture(s).

As the focus of this research project is on art practices critiquing technological systems of power and dominance, if the majority of these critiques are from western culture then that is where the focus will be. However, I feel it is apt to say that future studies should offset this imbalance by engaging with a wider field of study. It is beyond the scope of this research project to engage more substantially with the many issues of access and diversity in relation to the digital culture industry generally, and more specifically concerning digital media art practice.[214] Consequently, the work must be read for what it is, an overview of western-centric media art practices by someone situated in that field and also that same region. However, the conceptual frameworks developed in this project are sufficiently robust to be applicable in other contexts.

The focus of this research project is mostly on geopolitical and socioeconomic concerns associated with the digital culture industry. This thesis is limited in its engagement with the environmental impacts and concerns of the digital culture industry. Many critical media artists are dealing with environmental issues within their respective practices and environmental activism has increased significantly in the last number of years partly as a consequence of the Extinction Rebellion movement and the public profile of activists such as Greta Thunberg. However, it was beyond the scope of this research project to fully incorporate environmental concerns within this thesis. [215]

Technology is of course central to this inquiry, something that generates numerous and varied limitations. My technical abilities did limit the scope and progress of this inquiry at times.

---

[214] Combatting inequality and promoting inclusivity are central to organisations such as Radical Networks and the School of Machines, Making and Make-Believe and also in other informal learning environments such as hacker spaces that clearly incorporate inclusivity into their code of conduct. See the Berlin Code of Conduct and also *Hacking Diversity The Politics of Inclusion in Open Technology Cultures* (Dunbar-Hester, 2020).

[215] See 'Sensing Our World: How Digital Cultural Practices Can Contribute to Changing Social Norms Around Consumption' (2020) by Trish Morgan for an analysis of artists engaging with data driven environmental themes.

Also, the constant drive of networked capitalism means that technological platforms can quickly become obsolete meaning that technical protocols such as APIs cannot be guaranteed to be stable in future iterations, potentially preventing continued and extended research. However, the underlying conceptualised concerns and issues are still relevant. Finally, to return to the idea of access – this research project is limited by my profile in terms of technological engagement. There are numerous platforms and sites that I did not engage with within my practice as they are not within my situated networked reality. For example, one of the reasons I engaged with the social media platform Twitter is because it is a platform that I use in my everyday networked life. But of course, networked interventions are occurring elsewhere by people much younger than I with different experiences, background, objectives and expectations of the platforms they use. However, the frameworks developed in this project are broad enough to cope with such changes in future research projects.

8.4 Original Contribution to the Field

I have developed the concept of Tactical Media Archaeology to describe the various techniques and approaches used in my own practice and in those of other artists working in this field. Tactical media archaeology offers a useful way of thinking about media art practices, and associated techniques such as remix, creative coding and hardware hacking, that critically engage with the techno-political concerns of contemporary networked culture. It has been developed as an open sourced concept - as with the two subfields of media art from which it has evolved, there is is sufficient scope and nuance for alternative interpretations and uses, both practically and conceptually. The techniques and approaches utilised in tactical media archaeology can be disseminated within the academy and the gallery. However, it is perhaps outside of these 'traditional' formats, in alternative, critical, open and inclusive spaces, where these techniques and practices are best suited, as it is within spaces from where they originally emerged.

8.5 Future Directions

Tactical media archaeology as a concept and set of practices has the potential for further development. A next logical step with this concept would be to create a format in which this set of practices could be disseminated to a wider audience. Possible formats include a website, a publication and/or a series of workshops teaching various related technical and

conceptual methods.

All of the artefacts developed in this research inquiry offer potential opportunities for future engagement. This engagement takes different forms. Aside from 'traditional' exhibition formats, the technical processes involved in projects such as *Act*, E*mbassy*, *Platform Protocol Place v.01* and *Captive Audience v.01* all lend themselves to being explored and disseminated in a workshop format exploring themes related to digital subversions, obfuscation, community networks amongst others. *Farm* offers potential future practical exploration within the context of the deconstruction of digital file formats such as the gif, and also conceptually within the context of the complimenting themes of *refusal* and *slow*. As outlined in chapter 8, the practices and research findings in *Whois Ireland?*, *Dublin Infrastructure Tour* and *Greetings from…* have been disseminated widely, I intend to continue to evolve these related projects by broadening the scope of the inquiry to include other aspects of the material infrastructures of the internet.

The *digital culture industry* and *Platform Protocol Place* conceptual frameworks have been developed and applied to general techno-political concerns. However, there is sufficient flexibility within these frameworks to be utilised as creative and critical lenses on other concerns – for example, these frameworks could be applied to the environmental impacts of networked communications, discourses surrounding machine learning and artificial intelligence, or the alt-right's engagement with social media networks.

8.6 Final Comments

Over the period of this research project, I have come to appreciate how important the cultural space is for disentangling and demystifying our contemporary networked era. This era is characterised by increasingly opaque technologies, powered by impenetrable algorithms and controlled by actors whose primary focus is the accumulation of capital and power. There will always be a need to critically engage with these technologies to challenge and resist problematic narratives and discourses that embrace and promote utopian and solutionist ideologies.

This engagement can of course take many forms. The focus of this research project, however, is on media artists and practices which challenge these ideologies. The cultural space that the

media artists and practice featured in this thesis allows for freedom of technological experimentation and expression, meaning that artists can highlight and draw attention to many of the dominant issues of our contemporary networked society. They can communicate these concerns to the wider public, and also offer alternative forms of pedagogical engagement. In doing so, they are fulfilling a need for more critical awareness of the complex world of digital and material processes that occur beneath the networked artefacts that have become such an integral and dominant part of our lives.

Bibliography

aclu.org (2020) *The Foreign Intelligence Surveillance ACT - News and Resources*, available at: https://www.aclu.org/other/foreign-intelligence-surveillance-act-news-and-resources (Accessed 23/04/19).

Adorno T.W and Horkheimer, M. (2006) 'The culture industry: Enlightenment as mass deception, in Durham, M.G. and Kellnw, D.M., ed., *Media and Cultural Studies Key Works*, Oxford: Blackwell, pp. 41-72.

AFL Hyperscale (2020) *Understanding different types of data centre*, available at: https:// www.aflhyperscale.com/understanding-different-types-of-data-center (Accessed 07/07/20).

Agre, P.E. (1997) 'Toward a critical technical practice: Lessons learned in trying to reform AI', in Bowker, G., Gasser, L., Leigh Star, S. and Turner, W., eds., *Bridging the Great Divide: Social Science, Technical Systems, and Cooperative Work*, New York: Erlbaum, pp. 131-158.

Akard, P. (1983) 'The "Theory-Praxis Nexus" in Marcuses's critical theory', *Dialectical Anthropology*, 8(3), pp. 207-215, doi: 10.2307/29790104.

aksioma.org (2016) *The black chamber: surveillance, paranoia, invisibility and the internet*, available at: https://aksioma.org/black.chamber (Accessed 07/02/18).

Allahyari, M. and Rourke, D. (2015) *The 3d Additivist Manifesto*, available at: http://www.morehshin.com/3d-additivist-manifesto (Accessed 07/08/19).

alternative-narratives-vis-archive.com (2020) *They Rule: Josh Oh*, available at: https://alternative-narratives-vis-archive.com/case_studies/they-rule.html (Accessed 16/03/20).

Amazon Web Services (2019) *Amazon Web Services (AWS) - Cloud Computing Services*, available at: https://aws.amazon.com (Accessed 03/09/18).

Amazon Web Services (2019) *Announcing the New AWS Secret Region|Amazon Web Services*, available at: https://aws.amazon.com/blogs/publicsector/announcing-the-new-aws-secret-region (Accessed 11/09/18).

Amazon Web Services (2019) *Global Cloud Infrastructure|Regions & Availability Zones|AWS*, available at: https://aws.amazon.com/about-aws/global-infrastructure (Accessed 11/09/18).

Amazon Web Services (2019) *GovCloud – Amazon Web Services (AWS)*, available at: https://aws.amazon.com/govcloud-us (Accessed 11/09/18).

Amazon Web Services (2020) *Amazon Web Services: overview of security processes*, March 2020, available at: https://d0.awsstatic.com/whitepapers/aws-security-whitepaper.pdf (Accessed 03/09/20).

American Civil Liberties Union Northern California (2019) *Coalition*, letter to Jeffrey P. Bezos, 22 May, available at: https://www.aclunc.org/docs/20180522_AR_Coalition_Letter.pdf (Accessed 15/09/18).

Amore, A. *et al* (2020) 'The impacts of Airbnb in Athens, Lisbon and Milan: a rent gap theory perspective', *Current Issues in Tourism*, doi: 10.1080/13683500.2020.1742674.

Anderson, C.A. and Bushman, B.J. (2002) 'The effects of media violence on society', *Science*, 295(5564), pp. 2377-2379, doi: 10.1126/science.1070765.

Anderson, C.U. and Pold, S. (2018) *The Metainterface: The Art of Platforms, Cities, and Clouds,* London: MIT Press

Andrejevic, M. (2012) 'Exploitation in the data mine', in Fuchs, C., Boersma, K., Albrechtslund, A. and Sandoval, M., eds., *Internet and Surveillance: The Challenges of Web 2.0 and Social Media*, London: Routledge, pp.71 - 88.

aquacomms.com (2020) *AEC-2: Hyperscale connectivity between the USA and Europe*, available at: http://aquacomms.com/our-network/aeconnect-2 (Accessed 04/04/20).

Arthur, C. (2010) 'Google: GPS on our German street view car? No, that was a hoax', *The Guardian*, 10 Feb, available at: https://www.theguardian.com/technology/blog/2010/feb/10/google-street-view-germany-gps-hoax (Accessed 23/09/17).

Aughney, J. (2004), 'Smart takes control of BroadBand with £1m', *The Irish Independent*, 2 Nov, available at: https://www.independent.ie/business/irish/smart-takes-control-of-broad band-with-1m-25884338.html (Accessed 08/04/20).

Babe, R.E. (2011) 'Theodor Adorno and Dallas Smythe: Culture industry/consciousness industry and the political economy of media and communication', in Berry, D., ed., *Revisiting the Frankfurt School Essays on Culture, Media and Theory*, Farnham: Ashgate Publishing, pp. 91-116.

Badia *et al.* (2016) 'Manifesto for a critical approach to the user interface. Context, theoretical framework and further actions', in Martínez Figuerola, T. and Luis Marzo, J., eds., *Interface Politics*, Barcelona: Gredits, pp. 216-225.

Bail, C.A. *et al* (2020) *Assessing the Russian Internet Research Agency's Impact on the Political Attitudes and Behaviors of American Twitter Users in Late 2017*, available at: https://www.pnas.org/content/117/1/243 (Accessed 17/08/19).

Ballantyne, I. (2021) *Take a bullet for the city*, available at: http://www.digiart21.org/art/take-a-bullet-for-the-city (Accessed 03/02/21).

Balogh, B. (2020) *Local area networks*, available at: http://www.brettbalogh.com/_content/_pages/_projects/_local_area_networks/local_area_networks.html (Accessed 07/02/20).

Balogh, B. (2020) *Protest Bar*, available at: https://github.com/giantmolecules (Accessed 09/03/20).

Barbrook, R. and Cameron, A. (1995) *The Californian Ideology,* Amsterdam: The Institute of Network Cultures.

Barclay, M. (2021) *Victory for Fair Use: The Supreme Court Reverses the Federal Circuit in Oracle v. Google*, available at: https://www.eff.org/deeplinks/2021/04/victory-fair-use-supreme-court-reverses-federal-circuit-oracle-v-google (Accessed 10/04/21).

Barlow, P. (1996) 'A declaration of the independence of cyberspace', *Electronic Frontier Foundation*, 08 Feb, available at: https://www.eff.org/cyberspace-independence (Accessed 07/05/18).

Barone, T. (2006) 'Arts-based education research: Then, now, and later', *Studies in Art Education*, 48(1), pp. 4-8, doi: 10.1080/00393541.2006.11650495.

Barret, E. (2010) 'Introduction', in Barett, E. and Bold, B., eds., *Practice as Research: Approaches to Creative Arts Enquiry*, London: I.B. Tauris, pp. 1-14.

Barry T. and Collins M. (2019) *Ireland and its contradictory welcomes*, available at: https:// www.hopenothate.org.uk/2019/11/20/ireland-and-its-contradictory-welcomes (Accessed 03/06/20).

Bartholl, A. (2010) 'How to build a fake google street car', *Free Art and Technology Lab*, 15 Feb, available at: http://fffff.at/google-street-view-car (Accessed 03/04/17).

Bartholl, A. (2010) *Fuck Google*, available at: http://fffff.at/fuck-google/comment-page-1/ (Accessed 03/04/17)

Bartholl, A. (2020) *Keepalive*, available at: https://arambartholl.com/keepalive (Accessed 03/04/19).

Baudelaire, C. (1995) *The Painter of Modern Life and other Essays*, London: Phaidon Press.

bbc.com (2019) 'Artificial intelligence: Machines given power to kill?', *BBC*, 29 Oct, available at: https://www.bbc.com/news/av/50225315 (Accessed 18/02/20).

bbc.com (2020) 'Amazon faces backlash over Covid-19 safety measures', *BBC*, 17 Jun, available at: https://www.bbc.com/news/technology-53079624 (Accessed 18/06/20).

Berry, D.M. (2014) *Critical Theory and the Digital*, London: Bloomsbury Academic.

Bey, H. (1985) *T.A.Z.: The Temporary Autonomous Zone, Ontological Anarchy, Poetic Terrorism*, available at: https://theanarchistlibrary.org/library/hakim-bey-t-a-z-the-temporary-autonomous-zone-ontological-anarchy-poetic-terrorism (Accessed 28//04/17).

Bhargava, V.R. and Velasquez, M. (2020) *Ethics of the Attention Economy: The Problem of Social Media Addiction*, available at: https://www.cambridge.org/core/journals/business-ethics-quarterly/article/ethics-of-the-attention-economy-the-problem-of-social-media-addiction/1CC67609A12E9A912BB8A291FDFFE799 (Accessed 23/04/21).

Biggs, S. (2009) 'New media: The first word in art' in Smith, H. and Dean, R.T., eds., *Practice-led Research, Research – Led Practice in the Creative Arts*, Edinburgh: Edinburgh University Press, pp. 66-83.

Bleeker, J. (2004) *Wifi.Bedouin*, available at: http://www.techkwondo.com/projects/bedouin/WiFiBedouin.pdf (Accessed 16/03/20).

Bleeker, J. (2007) *Wifi.ArtCache*, available at: http://www.techkwondo.com/projects /artcache/WiFiArtCache.pdf (Accessed 16/03/20).

Blum, A. (2012) *Tubes: Behind the Scenes at the Internet*, London: Penguin Books.

Bogost, I. (2019) 'The AI-Art gold rush is here', *The Atlantic*, 6 Mar, available at: https://www.theatlantic.com/technology/archive/2019/03/ai-created-art-invades-chelsea-gallery-scene/584134 (Accessed 02/12/20).

Boj, C. and Díaz, D. (2020) *Observatorio*, available at: http://www.lalalab.org/observatorio (Accessed 07/02/20).

Bolin, C. (2021) *The Disconnect Magazine*, available at: https://thedisconnect.co/one (Accessed 07/02/20).

Bolt, B. (2014) *Heidegger, handlability and praxical knowledge*, available: https://acuads.com.au/wp-content/uploads/2014/12/bolt.pdf (Accessed 29/05/16).

botwiki.org (2020) *About*, available at: https://botwiki.org/about (Accessed07/01/20).

Bratton, B. (2015) *The Stack: On Software and Sovereignty*, London: MIT Press.

Brennan, C. (2000) 'Work begins on £50m cable system for Dublin', *The Irish Times*, 31 Oct, available at: https://www.irishtimes.com/business/work-begins-on-50m-cable-system-for-dublin-1.1113064 (Accessed 08/04/20).

Bresnihan P. and Brodie, P. (2019) 'High-energy data centres not quite as clean and green as they seem', *The Irish Times*, 11 Sep, available at: https://www.irishtimes.com/opinion/high-energy-data-centres-not-quite-as-clean-and-green-as-they-seem-1.4013992 (Accessed 13/09/19).

Bridle J. (2013) 'The new aesthetic and its politics', *booktwo.org*, 12 Jun, available at: http://booktwo.org/notebook/new-aesthetic-politics (Accessed 07/08/18).

Bridle, J. (2011) *The new aesthetic*, available at: https://jamesbridle.com/works/the-new-aesthetic (Accessed 22/10/17).

Bridle, J. (2018) *New Dark Age: Technology and the End of the Future*, London: Verso.

Briz, N. (2020) *How they watch you*, available at: https://culture.theodi.org/howtheywatch (Accessed 03/01/21).

Bro Pold, S. (2019) 'New ways of hiding: towards metainterface realism', *Artnodes*, 24, pp.72-82, doi: 10.7238/a.v0i24.3283.

Broekman, P. (1997) 'Mute in conversation with NetTime (Pit Schultz) (Digital Publishing Feature)', *Mute*, 10 Jan, available at: http://www.metamute.org/editorial/articles/mute-conversation-nettime-pit-schultz-digital-publishing-feature (Accessed 03/06/17).

Brucker-Cohen, J. (2012) 'A Design Methodology for Deconstructing Networks', in Hertz, G., ed., *Critical Making*, available at: http://www.conceptlab.com/criticalmaking/ (Accessed 04/10/18).

Brucker-Cohen, J. (2020) *Wi-Fi Hog*, available at: https://www.coin-operated.com/2010/05/10/wifi-hog-2003 (Accessed 23/03/20).

Brucker-Cohen, J. (2020) *WIFI-Liberator ToolKit*, available at: http://www.coin-operated.com/2010/05/03/wifi-liberator-toolkit-2007 (Accessed 23/03/20).

Bruno, C. (2020) *Wi-Fi-SM*, available at: https://christophebruno.com/portfolio/wifi-sm-2003-2006 (Accessed 02/04/20).

Brunton, F. and Nissenbaum, H. (2015) *Obfuscation: A User's guide for Privacy & Protest*, Cambridge: MIT Press.

Bunbury, T. (2009) *Dublin Docklands: An Urban Voyage*, available at: http://www.turtlebunbury.com/published/published_books/docklands/pub_books_docklands_index.html (Accessed 09/02/19).

Bunyard, T. (2014) 'Relevance in obsolescence: Recuperation and temporality in the work of Guy Debord and the situationist international', *Fungiculture: A Psychedelic Journal for Cultural Studies*, 1(1), available at: http://www.fufufo.com/wp-content/uploads/2014/12/Relevance-in-Obsolescence.pdf (Accessed 03/02/19).

bureauit.org (2004) *Bureau of Inverse Technology: The Decade Report*, available at http://www.bureauit.org/decade (Accessed 03/08/18).

Bures, F. (2012) 'The fall of the creative class', *BELT Magazine*, 15 Jun, available at: https://beltmag.com/fall-of-the-creative-class (Accessed 21/09/19).

Burrington, I. (2014) *Submarine cable maps*, available at: http://lifewinning.com/projects/submarine-cable-taps (Accessed 21/02/20).

Burrington, I. (2016) *Networks of New York: An Illustrated Field Guide to Urban Internet Infrastructure*, New York: Melville House.

Burrington, I. (2016) 'Why amazon's data centers are hidden in spy country', *The Atlantic*, 8 Jan, available at: https://www.theatlantic.com/technology/archive/2016/01/amazon-web-services-data-center/423147 (Accessed 29/11/18).

Burroghs, X. (2017) 'Delocator.net: Using the web to organize and promote alternative behaviors', in DeLaure M. and Moritz, F., eds., *Culture Jamming Activism and the Art of Cultural Resistance*, New York: New York University Press, pp. 1016-1034.

Bush, L. (2018) *Shadows of the State (2015-2018),* available at: http://www.lewisbush.com/shadows-of-the-state (Accessed 07/03/21).

Cadwalladr, C. and Graham-Harrison, E. (2018) 'Revealed: 50 million Facebook profiles harvested for Cambridge Analytica in major data breach', *The Guardian*, 17 Mar, available at: https://www.theguardian.com/news/2018/mar/17/cambridge-analytica-facebook-influence-us-election (Accessed 30/05/19).

Candy, L. (2006) 'Practice-Based research: A guide', *CCS Report*, 2006-V1.0, Sydney: Creativity and Cognition Studios, University of Sydney, available at: http://www.creativityandcognition.com/resources/PBR%20Guide-1.1-2006.pdf (Accessed 09/11/17).

Carr, N. (2008) 'Is Google making us stupid?: What the Internet is doing to our brains', *The Atlantic,* Jul/Aug 2008, available at: https://www.theatlantic.com/magazine/archive/2008/07/is-google-making-us-stupid/306868 (Accessed 23/04/19).

Cassidy, J. (2003), *Dot.Con: How America Lost its MIND and Money in the Internet Era*, New York: HarperCollins.

Castells, M. (2009) *The Rise of the Network Society*, 2nd ed., Oxford: Blackwell.

Chen, A.(2015) 'The Agency', *The New York Times*, 2 Jun, available at: https://www.nytimes.com/2015/06/07/magazine/the-agency.html (Accessed 03/11/17).

Chun, W. (2011) 'The enduring ephemeral, or the future is a memory', in Huhtamo, E. and Parikka, J., eds., *Media Archaeology: Approaches, Applications, and Implications*, California: University of California Press, pp. 184-203.

Chun, W.H.K. (2006) 'Did somebody say new media?', in Chun, W.H.K. and Keenan, T., eds., *New Media Old Media: A History and Theory Reader*, London: Routledge, pp.1-11.

Chun, W.H.K. (2016) *Updating to Remain the Same: Habitual New Media*, London: MIT Press.

citizen-dj.labs.loc.gov (2021) *Citizen DJ Project*, available at: https://citizen-dj.labs.loc.gov (Accessed 21/04/21).

CK Hutchison Holdings Limited (2021) *About,* available at: https://www.ckh.com.hk/en/about (Accessed 04/02/21).

Clark, S. (2020) 'Nasa picks Bezos's blue origin and Musk's SpaceX to build new lunar landers', *The Guardian*, 30 Apr, available at: https://www.theguardian.com/science/2020/apr/30/nasa-moon-landing-bezos-musk-blue-origin-spacex (Accessed 05/06/20).

Cohen, R. (2012) 'Dept. of Homeland Security forced to release list of keywords used to monitor social networking sites', *Forbes*, 26 May, available at: https://www.forbes.com/sites/reuvencohen/2012/05/26/department-of-homeland-security-forced-to-release-list-of-keywords-used-to-monitor-social-networking-sites/#60ec7228acd0 (Accessed 16/03/2019).

Colakides, Y., Garrett, M. and Gloerich, I. (2019) 'Rising above our silos', in Colakides, Y., Garrett, M. and Gloerich, I., eds., *State Machines: Reflections and Actions at the Edge of Digital Citizenship, Finance, and Art*, Amsterdam: Institute of Network Cultures, pp. 7-12.

Coleman, G. (2014) *Hacker, Hoaxer, Whistleblower, Spy: The Many Faces of Anonymous*, New York: Verso Books.

Coll, S. (2004) *Ghost Wars: The Secret History of the CIA, Afghanistan, and Bin Laden, from the Soviet Invasion to September 10, 2001*. New York: Penguin Press.

comreg.ie (2020) *Comreg Radio Spectrum Site Viewer*, available at: https://www.comreg.ie/industry/radio-spectrum/site-viewer (Accessed 19/11/19).

Corbyn, Z. (2018) 'Decentralisation: the next big step for the world wide web', *The Guardian*, 8 Sep, available at: https://www.theguardian.com/technology/2018sep/08/decentralisation-next-big-step-for-the-world-wide-web-dweb-data-internet-censorship-brewster-kahle (Accessed 06/05/19).

Coverly, M. (2010) *Psychogeography,* London: Pocket Essentials.

Cowen, D. (2014) *The Deadly Life of Logistics: Mapping Violence in Global Trade*, Minnesota: University of Minnesota Press.

Cox G. and Riise, M. (2018) '(Micro)Politics of algorithmic music towards a tactical media archaeology' in Dean, T. and McLean, A., eds, *Oxford Handbook of Algorithmic Music*, Oxford: Oxford University Press, pp. 603 -627.

Cox, G. (2015) *Real-Time for Pirate Cinema*, Ljubljana: Aksioma.

Cox, G. and Soon, W. (2020) *Aesthetic Programming: A Handbook of Software Studies*, New Jersey: Open Humanities Press.

Cox, G., Kris, J.and Lewin, A. (2004) 'Introduction to the (Digital Culture Industry)', in Cox, G., Krysa, J. and Lewin, A., eds., *Economising Culture: On the (Digital) Culture Industry*, New York: Autonomedia, pp. 7-21.

Cramer, F. (2015) 'What is 'post-digital?' in Berry D.M. and Dieter M., eds., *Postdigital Aesthetics*, London: Palgrave Macmillan, pp. 12-26.

Crampton, J.W. and Krygier, J. 'An introduction to critical cartography'. *ACME: An International Journal for Critical Geographies*, 4(1), pp. 11-33, available at: https://www.acme-journal.org/index.php/acme/article/view/723 (Accessed 04/05/20).

Crawford, B. (2020) 'Coronavirus and conspiracies: How the far right is exploiting the pandemic', The Conversation, 15 Sep, available at: https://theconversation.com/coronavirus-and-conspiracies-how-the-far-right-is-exploiting-the-pandemic-145968 (Accessed 01/02/21).

Critical Art Ensemble (1994) *The Electronic Disturbance*, New York: Autonomedia.

Critical Art Ensemble (2001) *Digital Resistance: Explorations in Tactical Media*, New York: Autonomedia.

Danube University Krems (2021) *Media art preservation institute*, available at: https://www.donau-uni.ac.at/en/university/faculties/education-arts-architecture/departments/arts-cultural-studies/centers/image-science/news---events/events/mah-pres-inst.html;jsessionid=A4CEED6FCB514FE3F38B7B10034C82E1 (Accessed 14/02/21).

Dasgupta, R. (2018) 'The demise of the nation state', *The Guardian*, 5 Apr, available at: https://www.theguardian.com/news/2018/apr/05/demise-of-the-nation-state-rana-dasgupta (Accessed 03/04/21).

datacentermurals.withgoogle.com (2020) *The Data Centre Mural Project*, available at: https://datacentermurals.withgoogle.com (Accessed 04/05/20).

dataprotection.ie (2020) *Data Protection Commission statement on funding in 2021 Budget*, available at: https://www.dataprotection.ie/en/news-media/press-releases/data-protection-commission-statement-funding-2021-budget (Accessed 09/01/21).

Daub, A. (2020) 'The disruption con: why big tech's favourite buzzword is nonsense', *The Guardian*, 24 Sep, available at: https://www.theguardian.com/news/2020/sep/24/disruption-big-tech-buzzword-silicon-valley-power (Accessed 03/10/20).

Dauve, G. (2005) 'Critique of the situationist international', *Libcom*, 27 Jul, Available at: https://libcom.org/library/critique-situationist-international-gilles-dauve (Accessed 09/11/20).

Davies, H. and Innocent, T. (2017) 'The space between Debord and Pikachu', *Proceedings of 2017 DiGRA*, 1(14), pp. 1-13, available at: http://www.digra.org/wp-content/uploads/digital-library/88_DIGRA2017_FP_Davies_Debord_and_Pikachu.pdf (Accessed 13/12/20).

Dawn-Hiscox, T. (2018) 'Aqua Comms plans Havfrue, transatlantic cable network funded by Facebook, Google', *Data Centre Dynamics*, 16 Jan, available at: https://www.datacenterdynamics.com/en/news/aqua-comms-plans-havfrue-transatlantic-cable-network-funded-by-facebook-google (Accessed 03/02/21).

De Certeau, M. (1988) *The Practice of Everyday Life*, Berkeley: University of California Press.

De Souza e Silva, A. (2006) 'From cyber to hybrid: mobile technologies as interfaces of hybrid spaces, *Space and Culture*, 9(3), pp. 261-278, doi: 10.1177/1206331206289022.

Dean, J. (2009) *Democracy and Other Neoliberal Fantasies: Communicative Capitalism and Left Politics Critiques*, London: Duke University Press.

Debatty, R. (2008) 'Sightseeing telescope reveals open wifi networks in urban space', *We Make Money Not Art*, 10 Jun, available at: https://we-make-money-not-art.com/im_back_from_my_favourite/ (Accessed 13/02/20).

Debatty, R.(2013) 'F.A.T.: It's not because they don't take themselves seriously that you shouldn't', in Quaranta, D. and Juárez, G., eds., *The F.A.T Manual*, Brescia: Link Editions, pp. 13-14.

Debatty, R. (2019) 'Interview with Paul O' Neill: A guided tour of Dublin's physical internet infrastructure', *We Make Money not Art*, 27 Sep, available at: https://we-make-money-not-art.com/a-guided-tour-of-dublins-physical-internet-infrastructure (Accessed 09/11/19).

Debord, G. (1955) 'Introduction to a critique of urban geography', *Les Lèvres Nues*, 6, translated by Knabb, K., available at: https://www.cddc.vt.edu/sionline/presitu/geography.html (Accessed 04/12/17).

Debord, G. (1958) 'Theory of the dérive', *Les Lèvres Nues*, 9, translated by Knabb, K., available at: https://www.cddc.vt.edu/sionline/si/theory.html (Accessed 04/12/17).

Debord G. (1959) 'Détournement as negation and prelude', *Internationale Situationniste*, 3, translated by Knabb, K., available at: https://www.cddc.vt.edu/sionline/si/detournement.html (Accessed 09/06/18).

Debord, G. (2014) *The Society of the Spectacle*, Berkeley: Bureau of Public Secrets.

DeLaure M. and Moritz, F. (2017) 'Introduction' in DeLaure M. and Moritz, F., eds., *Culture Jamming Activism and the Art of Cultural Resistance*, New York: New York University Press, pp. 113-114.

Deleuze, G. (1992) 'Postscript on the societies of control', *October*, 59(1), pp. 3-7, doi: 10.2307/778828.

Delfanti, A. and Söderberg, J. (2018) 'Repurposing the hacker: Three cycles of recuperation in the evolution of hacking and capitalism', *Ephemera: Theory and Politics in Organisation*, 18(3), pp. 457-476, available at: http://www.ephemerajournal.org/sites/default/files/pdfs/contribution/18-3delfantisoderberg.pdf (Accessed 23/08/19).

DeNardis, L. (2014) *The Global War for Internet Governance*, New Haven: Yale University Press.

Dennis, J. (2019) *Beyond Slacktivism: Political Participation on Social Media*, London: Palgrave Macmillan.

Derrida, J. (2006) *Spectres of Marx*, New York: Routledge Classics.

Dery, M. (1993) *Culture jamming: Hacking, slashing, and sniping in the empire of signs*, available at: http://markdery.com/?page_id=154 (Accessed 17/09/18).

Dewey-Hagborg, H. *et al* (2016) 'Why women are asking a major art and technology festival to #KissMyArs', *The Guardian*, 12 Sep, available at: https://www.theguardian.com/science/the-h-word/2016/sep/12/ars-electronica-festival-gender (Accessed 23/07/17).

dfa.ie (2021) *Privileges and Immunities*, available at: https://www.dfa.ie/our-role-policies/international-priorities/international-law/privileges-and-immunities/ (Accessed 09/11/21).

Dias, M. (2021) *The Machinic City: Media, Performance and Participation,* Manchester: Manchester University Press.

Dieter, M. (2014) 'The virtues of critical technical practice', *Differences*, 25(1), pp. 216-230, doi: 10.1215/10407391-2420051.

Dieter, M. (2017) 'Tactical Media', available at: http://www.tacticalmediafiles.net/articles/44999 (Accessed 09/03/18).

DiResta *et al.* (2019) *The tactics and tropes of the internet research agency*, available at: https://digitalcommons.unl.edu/senatedocs/2 (Accessed 03/02/21).

dni.gov (2017) *Background to "assessing Russian activities and intentions in recent US elections": the analytic process and cyber incident attribution*, available at: https://www.dni.gov/files/documents/ICA_2017_01.pdf (Accessed 02/02/18).

Donnelly, P. (2013) 'How foreign firms transformed Ireland's domestic economy', *The Irish Times*, 13 Nov, available at: http://www.irishtimes.com/business/how-foreign-firms-transformed-ireland-sdomestic-economy-1.1593462 (Accessed 10/08/18).

Dragona, D. (2016) 'What is left to subvert? Artistic methodologies for a post-digital world', in Bishop, R., Gansing, K., Parikka, J. and Wilk, E., eds., *Across and beyond - A Transmediale Reader on Post-digital Practices Concepts, and Institutions*, Berlin: Sternberg Press, pp. 184-196.

Dragona, D. and Charitos, C. (2018) *Challenging infrastructures: Alternative networking and the role of art*, Ljubljana: Aksioma – Institute for Contemporary Art.

dublin.sciencegallery.com (2015) 'Secret', available at: https://dublin.sciencegallery.com/secret (Accessed 07/02/18).

Dunbar-Hester, C. (2019) *Hacking Diversity: The Politics of Inclusion in Open Technology Cultures*, Princeton: Princeton University Press.

Dunne, A. (2005) *Hertzian Tales: Electronic Products, Aesthetic Experience, and Critical Design,* London: MIT Press.

dvyng.com (2020) *Reposition Matrix*, available at: https://dvyng.com/log/reposition-matrix/reposition-matrix.html (Accessed 22/01/20).

Earle E. (2020) NSA Haiku Generator', available at: http://graysonearle.com/projects/nsahaiku (Accessed 04/12/2015).

Eisner, E. (1981) 'On the difference between scientific and artistic approaches to qualitative research', *Educational Researcher*, 29(57), pp. 5-11, doi: 10.2307/20716074.

Elaesser T. (2017) *Film History as Media Archaeology: An interview with Thomas Elsaesser by Vladimir Lukin*, Amsterdam: Amsterdam University Press.

Electronic Disturbance Theatre (1998), *FloodNet*, available at: https://anthology.rhizome.org/floodnet (accessed 23/07/17).

Electronic Frontier Foundation (2021) *SOPA/PIPA: internet blacklist legislation*, available at: https://www.eff.org/issues/coica-internet-censorship-and-copyright-bill?page=7 (Accessed 08/04/17).

Elkins, J. (2002) 'The three configurations of practice-based PhDs', in Elkins, J., ed., *The new PhD in Studio Art*, Dublin: Sculptors Society of Ireland, pp. 7-19.

epic.org (2011) *Analyst's desktop binder: Department of Homeland Security national operations center media monitoring capability desktop reference binder*, available at: https://epic.org/foia/epic-v-dhs-media-monitoring/Analyst-Desktop-Binder-REDACTED.pdf (Accessed 02/09/16).

epic.org (2020) *Max Schrems v. Data Protection Commissioner (CJEU - "Safe Harbor")*, available at: https://epic.org/privacy/intl/schrems (Accessed 13/02/20).

Eriksen, T.H. (2007) 'Nationalism and the internet', *Nations and Nationalism*, 13(1), pp. 1-17, doi: 10.1111/j.1469-8129.2007.00273.x.

Ernst, W. (2013) *Digital Memory and the Archive*, Minnesota: University of Minnesota

Eubanks, V. (2018) *Automating Inequality: How High-Tech Tools Profile, Police and Punish the Poor*, New York: St. Martin's Press.

European Commission (2021) *EU data protection rules*, available at: https://ec.europa.eu/info/law/law-topic/data-protection/eu-data-protection-rules_en (Accessed 26/06/21).

Facing History (2020) *Standing Up to Hatred and Intolerance: "Home" by Warsan Shire*, available at: https://www.facinghistory.org/standing-up-hatred-intolerance/warsan-shire-home (Accessed 09/07/19).

Fallon, D. (2014) *Meet me on Misery Hill…*, available at: https://comeheretome.com/2014/09/07/meet-me-on-misery-hill (Accessed 03/12/18).

Fedorova, K. (2020) *Tactics of Interfacing: Encoding Affect in Art and Technology*, London: MIT Press.

Feenberg, A. (2015) 'Lukács's theory of reification and contemporary social movements,' *Rethinking Marxism*, 27(4), pp. 490-507, doi: 10.1080/08935696.2015.1076968.

Ferguson, S. (2016) *The Post Office in Ireland: An Illustrated History,* Dublin: Irish Academic Press.

Fernandez, M. (2017) *What it means to be an 'experimental computer poet': A conversation with Allison Parrish, the artist behind your favorite Twitter bots*, available at: https://www.vice.com/en_us/article/8x8ppp/poetry-twitter-bots-best-twitter-bots-art-allison-parrish-everyword (Accessed27/01/2020).

Ferreira, E. (2017) *Sexy cyborg vs. make: "I just don't fit into their reality"*, available at: https://www.makery.info/en/2017/11/14/sexy-cyborg-versus-make-je-nentre-pas-dans-leur-vision-du-monde (Accessed14/02/2020).

Fisher, M. (2009) *Capitalist Realism*, Hants: O Books.

Foster, H. (1995) 'The Artist as Ethnographer?', in Marcus, J.E. and Myers, F.R., eds., *The Traffic in Culture: Refiguring Art and Anthropology*, Berkeley: University of California Press, pp. 302-309.

Fox-Harell, D. (2009) *Toward a theory of phantasmal Media: An imaginative cognition- and computation-based approach to digital media,* available at: http://www.ctheory.net/articles.aspx?id=610 (Accessed 08/06/2017).

Fraser, A. and Kitchin, R. (2017) *Slow Computing', 'Slow computing: A workshop on resistance in the algorithmic age*, Maynooth, 14 Dec 2017, available at: http://progcity.maynoothuniversity.ie/2017/12/new-paper-slow-computing (Accessed 07/09/19).

Freelon, D.and Lokot, T. (2020) 'Russian disinformation campaigns on Twitter target political communities across the spectrum. Collaboration between opposed political groups might be the most effective way to counter it', *HKS Misinformation Review*, 1(1), doi: 10.37016/mr-2020-003.

freifunk.net, (2020) *What is it about*, available at: https://freifunk.net/en/what-is-it-about (Accessed 16/03/20).

Fuchs, C. (2010) 'Labor in Informational Capitalism and on the Internet', *The Information Society*, 26, pp. 179-196, doi: 10.1080/01972241003712215.

Fuchs, C.(2012) 'Dallas Smythe today - The audience commodity, the digital labour debate, Marxist political economy and critical theory: Prolegomena to a digital labour theory of value', *tripleC*, 10(2), pp. 692-740, doi: 10.31269/triplec.v10i2.443.

Fuchs, C. (2014) 'Theorising and analysing digital labour: from global value chains to modes of production', *The Political Economy of Communication*, 2(1), pp. 3-27, available at: http://www.polecom.org/index.php/polecom/article/view/19 (Accessed 03/02/19).

Fuchs, C. (2016) *Critical Theory of Communication: New Readings of Lukács, Adorno, Marcuse, Honneth and Habermas in the Age of the Internet*, London: University of Westminster Press.

Fuchs, C. (2019) 'Henri Lefebvre's theory of the production of space and the critical theory of communication', *Communication Theory*, 29(2), pp. 129-150, doi: 10.1093/ct/qty025.

Fuchs, C. (2020) *Marxism Karl Marx's Fifteen Key Concepts for Cultural and Communication Studies*, London: Routledge.

Fukuyama, F. (1989) 'The end of history?', *The National Interest,* 16, pp. 3-18, doi: 10.2307/ 24027184.

Funell, A (2013) 'Pranks and tricksters', *ABC*, 03 Feb, available at: https://www.abc.net.au/ radionational/programs/futuretense/pranks-and-tricksters/4489512 (Accessed 04/11/20).

Fung, B. (2013) 'How the Internet broke on 9/11, *The Washington Post*, 11 Sep, available at:https://www.washingtonpost.com/news/the-switch/wp/2013/09/11/how-the-internet-bro
ke-on-911 (Accessed 02/05/20).

furtherfield.org (2021) *DECAL Decentralised Arts Lab*, available at: https://www.furtherfield. org/decal-decentralised-arts-lab (Accessed 20/01/21).

Gadde, V. and Roth, Y. (2018) *Enabling further research of information operations on Twitter*, available at: https://blog.twitter.com/en_us/topics/company/2018/enabling-further-resear ch-of-information-operations-on-twitter.html (Accessed 09/04/19).

Gallix, A. (2009) 'The resurrection of Guy Debord', *The Guardian*, 18 Mar, available at: https://www.theguardian.com/books/booksblog/2009/mar/18/guy-debord-situationist-international (Accessed 14/10/20).

Galloway, A.R. (2004) *Protocol: How control exists after Decentralization*, London: MIT Press.

Galloway, A.R and Thacker, E. (2007) *The Exploit: A Theory of Networks*, Minnesota: University of Minnesota Press.

Gannon, J. (2001) *Stealing Secrets, Telling Lies: How Spies and Codebreakers Helped Shape the Twentieth Century*, Lincoln: University of Nebraska Press.

Garcia, D. and Lovink, G. (1997) *The ABC of Tactical Media*, available at: https://www.nettime.org/Lists-Archives/nettime-l-9705/msg00096.html (Accessed 09/05/16).

Garcia. D. (2019) 'The strange persistence of tactical media', in van Mechelen, M. and Huisman, S., eds., *A Critical History of Media Art in the Netherlands: Platforms, Policies, Technologies*, Prinsenbeek: Jap Sam Books, pp. 238-254.

Garrett, M. (2021) *Magnificent futures collide*, available at: https://marcgarrett.org/2021/04/27/magnificent-failures-collide (Accessed 05/05/21).

Gerbaudo, P. (2012) *Tweets and the Streets: Social Media and Contemporary Activism*, New York: Pluto Books.

Gere, C. (2008) 'New media art and the gallery in the digital age', in Paul, C., ed., *New Media in the White Cube and Beyond: Curatorial Models for Digital Art*, Berkeley: University of California Press, pp. 13-25.

Geuss, R. (1981) *The Idea of a Critical Theory*, Cambridge: Cambridge University Press.

Gibbs, M. (2015) *How to turn a Raspberry Pi into an FM radio transmitter*, available at: https://www.networkworld.com/article/2999977/how-to-turn-a-raspberry-pi-into-an-fm-radio-transmitter.html (Accessed 04/07/17).

Github.com (2018) *ESP8266 Beacon Spam*, available at: https://github.com/spacehuhn/esp8266_beaconSpam (Accessed 18/04/20)

Given, L.M. (2008) *The SAGE Encyclopaedia of Qualitative Research Methods*, London: Sage.

Gleeson, C. (2018), 'Google buys Bolands Quay site in Dublin's docklands', *The Irish Times*, 18 May, available at: https://www.irishtimes.com/business/technology/google-buys-bolands-quay-site-in-dublin-s-docklands-1.3500256 (Accessed 24/09/19).

Goddard, M. (2014) 'Opening up the black boxes: Media archaeology, 'anarchaeology' and media materiality', *New Media and Society*, 17(11), pp. 1761-1776, doi: 10.1177/1461444814532193.

Goldhaber, M. (2006) 'The value of openness in an attention economy', *First Monday*, 11(6), doi: 10.5210/fm.v11i6.1334.

Goodbody, W. (2018), 'Facebook to lease AIB Bank Centre for new Dublin campus', *RTÉ*, 8 Nov, available at: https://www.rte.ie/news/ireland/2018/1108/1009471-facebook-aib-dublin (Accessed 04/04/19).

Goodbody, W. (2018), 'Inside Facebook's Clonee data centre', *RTÉ*, 15 Sep, available at: https://www.rte.ie/news/ireland/2018/0914/993768-facebook-data-centre (Accessed 04/05/20).

Goodbody, W. (2019), 'The Apple tax case appeal: all you need to know', *RTÉ*, 15 Sep, available at: https://www.rte.ie/news/analysis-and-comment/2019/0915/1075817-apple-tax-appeal-explained (Accessed 08/11/19).

Google Careers (2020) *Google Dublin Jobs (EU HQ)*, available at: https://careers.google.com /locations/dublin/ (Accessed 13/06/20).

govinfo.gov (2007) *The Protect America Act*, available at: https://www.govinfo.gov/content/ pkg/PLAW-110publ55/pdf/PLAW-110publ55.pdf (Accessed 23/05/18).

Grant, S. (2020) *Subnodes*, available at: http://subnodes.org (Accessed 02/11/19).

Grant, S. (in press) 'Towards Technological Sovereignty', *Systems,* Dublin: Science Gallery Dublin.

Grau, O. (2008) 'Introduction', in Grau, O., ed., *Media Art Histories*, London: MIT Press, pp. 1-14.

Griffey, J. (2012) *LibraryBox Project*, available at: http://jasongriffey.net/librarybox (Accessed 13/19/20).

Griffiths, M. (2011) 'Research and the self', in Biggs, M. and Karlsson, H., eds., *The Routledge Companion to Research in the Arts*, London: Routledge, pp. 167-187.

Grosser, B. (2012) *ScareMail*, available at: https://bengrosser.com/projects/scaremail/ (Accessed 04/12/2015).

Grosser, B. (2013) *ScareMail Github Page*, available at: https://github.com/bengrosser/ scaremail (Accessed 07/02/2016).

Grosser, B. (2017) 'Tracing you: How transparent surveillance reveals a desire for visibility', *Big Data and Society*, 4(1), pp. 1-6, doi: 10.1177/2053951717694053.

Groys, B. (2014) *On Art Activism*, available at: https://www.e-flux.com/journal/56/60343/on-art-activism (Accessed 05/01/21).

Guertin, C. (2012) 'Mobile bodies, zones of attention, and tactical media interventions' in Sützl, W. and Hug, T., eds., *Activist Media and Biopolitics: Critical Media Interventions in the Age of Biopower*, Innsbruck: Innsbruck University Press.

Hallnäs L. and Redström J. (2001) *Slow technology: design for reflection*, available at: http://www.johan.redstrom.se/thesis/pdf/slowtech.pdf (Accessed 14/06/2017).

Hamilton, P. (2017) 'From Telecom Éireann to Eircom to Eir: A timeline', *The Irish Times*, 15 Sep, available at: https://www.irishtimes.com/business/retail-and-services/from-telecom-%C3%A9ireann-to-eircom-to-eir-a-timeline-1.3221500 (Accessed 08/04/20).

Hamm, M.S. and Spaaij, R. (2017) *The Age of Lone Wolf Terrorism*, New York: Columbia University Press.

Harbinja, E. and Karagiannopoulos V. (2019) *Web 3.0: the decentralised web promises to make the Internet free again*, available at: https://theconversation.com/web-3-0-the-decentralised-web-promises-to-make-the-internet-free-again-113139 (Accessed 07/05/20).

Harold, C. (2007) *Our Space: Resisting the Corporate Control of Culture*, Minnesota: University of Minnesota Press.

Harvey, D. (2008) 'Right to the city', *New Left Review*, 53(1), available at: https://newleftreview.org/issues/II53/articles/david-harvey-the-right-to-the-city.pdf (Accessed 14/01/20).

Hayden, J. (2017) 'Hashtag activism | Social media and repealing the 8th',*headstuff.org*, 24 Jul, available at: https://www.headstuff.org/topical/repeal-social-media-hashtag-activism (Accessed 28/06/21).

Helguera, P. (2011) *Education for Socially Engaged Art: A Materials and Techniques Handbook*, New York: Jorge Pinto Books.

Helme, S. (2016) *Wi-Fi Wardriving++*, available at: https://scotthelme.co.uk/wifi-wardriving (Accessed 05/02/18).

Helmond A. (2015) 'The platformization of the web: making web data platform ready', *Social Media + Society*, 1(2), pp. 1-11, doi: 10.1177/2056305115603080.

Henderson, H. (1997) *Building A Win-Win World: Life Beyond Global Economic Warfare'*, Oakland: Berrett-Koehler Publishers.

Herdener, D. (2020) *AWS Public Sector Blog: Setting the record straight on JEDI*, 08 May, available at: https://aws.amazon.com/blogs/publicsector/setting-the-record-straight-on-jedi (Accessed 10/05/20).

Hertz, G. (2012) *Made: Technology on affluent leisure time*, available at: http://conceptlab.

Hertz, G. (2016), *Disobedient electronics,* available at: http://www.disobedientelectronics.com (Accessed 03/06/18).

Hertz, G. (2018) 'We need something better than the maker movement', *Neural*, 08 Sep, available at: http://neural.it/2018/09/neural-60-extra-the-makers-bill-of-rights-by-garnet-hertz/ (Accessed 04/05/19).

Hertz, G. (2018), *The Maker's bill of rights*, available at: http://makermanifesto.com (Accessed 03/05/18)

Hertz, G. and Parikka, J. (2012) 'Zombie media: Circuit bending media archaeology into an art method', *Leonardo*, 45(5), pp. 424-430 doi: 10.1162/LEON_a_00438.

Hesmondhalgh, D. (2010) 'User-generated content, free labour and the cultural industries', *Ephemera*, 10(3/4), pp. 267-284, available at: http://www.ephemerajournal.org/sites/default/files/10-3hesmondhalgh.pdf (Accessed 10/10/20).

Hesmondhalgh, D. (2013) *The Cultural Industries*, 3rd ed., London: Sage.

Hill, S., Torrone, P.and Vermeren, P. (2006) *The Maker's Bill of Rights*, available at: https://makezine.com/2006/12/01/the-makers-bill-of-rights (Accessed 04/06/17).

Hillies, K., Petit M. and Jarret, K. (2012) *Google and the Culture of Search,* Oxfordshire: Routledge.

Hirsch, A.J. (2019) *Creating the Future: A Brief History of Ars Electronica 1979–2019*, Stuttgart: Hatje Cantz.

Holmes, B. (2008) *Unleashing the Collective Phantoms: Essays in Reverse Imagineering*, New York, Autonomedia.

Honeré, C. (2009) *In praise of Slowness: Challenging the Cult of Speed*, San Francisco: Harper One.

Horgan-Jones, J. (2020), 'Google staff in Dublin told to stay at home after worker shows 'flu-like' symptoms', *The Irish Times*, 02 Mar, available at: https://www.irishtimes.com/news/ireland/irish-news/google-staff-in-dublin-told-to-stay-at-home-after-worker-shows-flu-like-symptoms-1.4190770 (Accessed 03/05/20).

Horkheimer, M. (1972) 'The social function of philosophy', *Radical Philosophy*, 3, pp. 10-44, available at: https://www.radicalphilosophy.com/article/the-social-function-of-philosophy (Accessed 02/03/17).

Horkheimer, M. and Adorno, T.W. (1947/2002) *Dialectic of Enlightenment: Philosophical Fragments*, Stanford: Stanford University Press

Hornyak, T. (2019) 'How Canon, Nikon and other Japanese camera companies are fighting for survival in the Smartphone era', *CNBC*, 28 Jul, available at: https://www.cnbc.com/2019/07/26/japanese-camera-companies-fight-for-survival-in-the-smartphone-era.html (Accessed 25/06/21).

Host in Ireland (2020) *Ireland's Data Hosting Industry: An Industry of Substance' Q1 May Report*, available at: https://f11e1f3e-44d3-4f0b-9dd6-9f66cce43ab4.filesusr.com/ugd/914803_ae00bed282dc48f29810f74f6eb3e07c.pdf (Accessed 07/07/20).

Hu, T. (2015) *A Prehistory of the Cloud,* London: MIT Press.

Huhtamo, E. (1997), 'From Kaleidoscomaniac to Cybernerd: Notes toward an Archaeology of the Media'*, Leonardo*, 30(3), pp. 221-224, doi: 10.2307/1576453.

Hunt, G. (2015) 'North Korea 'number station' broadcasts first cryptic message in 16 years', *Silicon Republic*, 27 Oct, available at: https://www.siliconrepublic.com/comms/north-korea-number-station (Accessed 04/08/19).

ibm.com (2021) *IBM cloud learn hub: what is an application programming interface (API)*, available at: https://www.ibm.com/cloud/learn/api (Accessed 17/02/21).

icrobotics.co.uk, (2020) *Turning the Raspberry Pi into an FM transmitter*, available at: http://www.icrobotics.co.uk/wiki/index.php/Turning_the_Raspberry_Pi_Into_an_FM_Transmitter (Accessed 18/05/17).

idaireland.com (2020) *History of IDA*, Available at: https://www.idaireland.com/about-ida/history (Accessed 16/03/20).

Ingham, J. (2016) 'Factory records and the situationist influence on urban space', *Punk and Post-Punk*, 5(2), pp. 163-179, doi: 10.1386/punk.5.2.163_1.

Interface Manifesto (2018) available at: https://interfacemanifesto.hangar.org (Accessed 10/08/17).

International Financial Services Centre'About the IFSC' (2020) *About Us*, available at: https://www.ifsc.ie/page.aspx?idpage=6 (Accessed 09/11/18).

Ireland-France Subsea Cable Limited (2017) *Marine survey scope of work for foreshore licence application, Clonea landfall*, 1, 20 Apr, Cork: Arup.

Ireland's National Research and Education Network - HEAnet (2019) available at: https://www.heanet.ie/ (Accessed 23/07/18).

Irish Ships Bot (2020) available at: https://twitter.com/irishships (Accessed10/03/2020).

Ito, J. (2016) 'Design and Science: Can design advance science, and can science advance design?', *Design and Science*, doi: 10.21428/f4c68887.

Jally, S. cited in Fuchs, C., (2012) 'Dallas Smythe today - The audience commodity, the digital labour debate, Marxist political economy and critical theory. Prolegomena to a digital labour theory of value', *tripleC*, 10(2): pp. 692-740, available at https://www.triple-c.at/index.php/tripleC/article/view/443 (Accessed 10/10/20).

Jameson, F. (1979) 'Reification and utopia in mass culture', *Social Text*, 1, pp. 130-148, doi: 10.2307/466409

Jameson, F., (1983) 'Postmodernism and consumer society', in Foster, H., ed., *The Anti-Aesthetic: Essays on Postmodern Culture*, Washington: Bay Press, pp. 111-125.

Jay, M. (1983) *The Dialectical Imagination: A History of the Frankfurt School and the Institute of Social Research*, London: Heinemann Educational Books.

Jenkins, H. (2008) *Convergence Culture: Where Old and New Media Collide*, New York: New York University Press.

Jhally, S. (2006) *The Spectacle of Accumulation*, New York: Peter Lang.

Jones N. (2020) 'Distributed critique: Critical new media art as a research environment for the post-humanities', *Parse*, 12, available at: https://parsejournal.com/article/distributed-

critique-critical-new-media-art-as-a-research-environment-for-the-post-humanities/#post-7211-endnote-13 (Accessed 03/01/21)

Jordan, T (2017) 'A genealogy of hacking', Convergence: The International Journal of Research into New Media Technologies, vol, 23, Issue 5, (Accessed 18/08/21)

Karoff, P. (2019) 'Embedding ethics in computer science curriculum: Harvard initiative seen as a national model', *The Harvard Gazette*, 25 Jan, available at: https://news.harvard.edu/gazette/story/2019/01/harvard-works-to-embed-ethics-in-computer-science-curriculum (Accessed 05/06/20).

Kazemi D. (2020) *Bot Summit*, available at: http://tinysubversions.com/botsummit/2016/ (Accessed 19/02/2020).

Kelly, K. (2017) *The Inevitable: Understanding the 12 Technological Forces that will Shape our Future,* New York: Penguin Books.

Kenny, O. (2019) 'Speakers Unicorner founder on counter-protesting Gemma O'Doherty and tackling hate speech', *GCN Magazine*, 1 Aug available at: https://gcn.ie/speakers-unicorner-founder (Accessed 28/11/19).

Kirk, N. (2019) 'Irish right-wing YouTubers seem to be following an alt-right playbook', *Dublin InQuirer*, 30 Jan, available at: https://www.dublininquirer.com/2019/01/30/niamh-irish-right-wing-youtubers-seem-to-be-following-an-alt-right-playbook (Accessed 30/01/20).

Kitchin, R. and Dodge, M. (2011) *Code/Space: Software and Everyday Life,* London: MIT Press.

Kittler, F. (1999) *Gramophone, Film, Typewriter*, California: Stanford University Press.

Kleiner, D. (2014) *Number Stations*, available at: http://telekommunisten.net/numbers-station (Accessed 06/03/16).

Kleiner, D. (2021) *We have lost every fight*, available at: https://dmytri.medium.com/we-have-lost-every-fight-cfc6873d6683 (Accessed 16/01/21).

Kluitenberg, E. (2006) 'The network of waves: living and acting in a hybrid space', *Hybrid Space*, Open(11), pp. 6-12, available at: https://www.researchgate.net/publication/259254820_The_network_of_waves_Living_and_acting_in_a_hybrid_space (Accessed 16/02/20).

Kluitenberg, E. (2011) *Legacies of Tactical Media, The Tactics of Occupation: From Tompkins Square to Tahrir*, Amsterdam: Institute of Network Cultures.

Kluitenberg, E. (2011) 'On the archaeology of imaginary media', in Huhtamo, E. and Parikka, J., eds., *Media archaeology: Approaches, Applications and Implications*, Berkeley: University of California Press, pp. 48-69.

König, R.and Rasch, M., eds. (2014) *Society of the Query Reader: Reflections on Web Search,* Amsterdam: Institute of Network Cultures.

Kowalski, K. (2020) *Slow living 201: a deep dive into slow living and the slow movement',* available at: https://www.sloww.co/slow-living-201 (Accessed 14/02/20).

Kurczynski, K. (2008) 'Leveraging situationism?', *Third Text*, 22(5), pp. 605-614, doi: 10.1080/09528820802440474.

labs.rs (2020) *Share Lab: About*, available at: https://labs.rs/en (Accessed 22/01/20).

Latour, B (1987) *Science in Action: How to follow scientists and engineers through society*, Massachusetts: Harvard University Press.

Latour, B (1999) *Pandoras Hope: Essays on the Reality of Science Studies*, Massachusetts: Harvard University Press.

Latour, B. (2007) *Reassembling the Social: An Introduction to Actor–Network Theory,* New York: Oxford University Press.

Latour, B. and Hermant, E. (2006) *Paris: Invisible City*, available at: http://www.bruno-latour.fr/sites/default/files/downloads/viii_paris-city-gb.pdf (Accessed 09/08/19).

Lavery, C. (2018) 'Rethinking the Dérive: Drifting and theatricality in theatre and performance studies', *A Journal of the Performing Arts*, 23(7), pp. 1-15, doi: 10.1080/13528165.2018. 1557011.

Laczkó, J. (2020), 'Dérives in the Digital: Avant-garde Ideology in Hacker Cultures', available at:https://networkcultures.org/longform/2020/12/02/derives-in-the-digital-avant-garde-ideology-in-hacker-cultures/

Leary-Owhin, M.E. (2015) 'A fresh look at Lefebvre's spatial triad and differential space: a central place in planning theory?', *Advances in Mathematics and Computer Science and their Applications*, pp. 68-73, available at: http://www.wseas.us/e-library/conferences/2016/venice/MAMUA/MAMUA-10.pdf (Accessed 13/19/20).

Lecher, C. (2017) 'Massive Attack: How a weapon against war became a weapon against the web', *The Verge*, 14 Apr, available at: https://www.theverge.com/2017/4/14/15293538/electronic-disturbance-theater-zapatista-tactical-floodnet-sit-in (Accessed 11/11/19)

Lee, D. (2019) 'Twitter prepares for huge cull of inactive users', *BBC*, 26 Nov, available at: https://www.bbc.com/news/technology-50567751 (Accessed 16/02/21).

Lee, T.B. (2013) 'How Congress unknowingly legalized PRISM in 2007', *Washington Post*, available at: https://www.washingtonpost.com/news/wonk/wp/2013/06/06/how-congress-unknowingly-legalized-prism-in-2007 (Accessed 16/03/2019).

Lefebvre, H. (1991) *The Production of Space*, Oxford: Blackwell.

Leigh Star, S. (1999) 'The Ethnography of Infrastructure', *American Behavioral Scientist*, 43(3), pp.377-391, doi: 10.1177/00027649921955326.

Levy, S. (1984), *HACKERS: Heroes of the Computer Revolution*, Dell Publishing, New York.

Lessig, L (2009) *Remix: Making Art and Commerce Thrive in the Hybrid Economy,* New York: Penguin Books.

Lievrouw, L.A (2011) *Alternative and Activist New Media*, Cambridge: Polity Press.

Lillington, K. (2018) 'US Cloud Act ends Microsoft Dublin email case with a whimper', *The Irish Times*, 5 Apr, available at: https://www.irishtimes.com/business/us-cloud-act-endsmicrosoft-dublin-email-case-with-a-whimper-1.3450643 (Accessed 04/05/20).

Lima, V. (2019) 'Towards an understanding of the regional impact of Airbnb in Ireland', *Regional Studies, Regional Science*, 6(1), pp. 78-91, doi: 10.1080/21681376.2018.1562366.

Lister, L. *et al.* (2008) *New Media: A Critical Edition*, London: Routledge.

Litton, A.J. (1962) 'The growth and development of the Irish telephone system'*, Journal of the Statistical and Social Inquiry Society of Ireland*, XX(V), pp. 79-115, available at: http://www.tara.tcd.ie/handle/2262/4617 (Accessed 17/09/18).

Liu, W. (2020) *Abolish Silicon Valley: How to Liberate Technology from Capitalism*, London: Repeater Books

Loitering Theatre (2012) available at: http://www.loiteringtheatre.org/projects/LoiteringTheatre (Accessed 04/09/17).

Lokot, T. (2019) 'The augmented city in protest: The urban media studies perspective', *International Journal of Communication*, 13, pp. 5333-5350, available at: https://ijoc.org/index.php/ijoc/article/view/7975 (Accessed 13/08/20).

Lorenz, T. *et al.* (2020) 'TikTok teens and K-Pop stans say they sank Trump rally', *The New York Times*, 21 Jun, available at: https://www.nytimes.com/2020/06/21/style/tiktok-trump-rally-tulsa.html (Accessed 28/06/21).

Lorde, A. (1984) *the master's tools will never dismantle the master's house*, available at: https://collectiveliberation.org/wpcontent/uploads/2013/01/Lorde_The_Masters_Tools.pdf (Accessed 07/06/20).

Lotz, C. (2018) 'The culture industry', in Best, B., Bonefeld, W. and O'Kane, C., eds., *The Sage Handbook of Frankfurt School Critical Theory*, London: Sage, pp. 973-987.

Lovink, G. (2001) 'The moderation question: Nettime and the boundaries of mailing list culture' in Lovink, G., ed., *Dark Fibre: Tracking Critical Internet Culture*, London: MIT Press, pp. 68-120.

Lovink, G. (2002) *Dark Fibre: Tracking Critical Internet Culture*, London: MIT Press.

Lovink, G. (2005), 'Tactical media, the second decade: Preface to the Brazilian submidialogia publication', 19 Oct, available at:http://geertlovink.org/texts/tactical-media-the-second-decade (Accessed 19/09/18).

Lovink, G. and Rossiter, N. (2017) *Organisation after Social Media*, New York: Autonomedia.

Lu, J.and Liu, X. (2018) 'The nation-state in the digital age: a contextual analysis in 33 countries', *International Journal of Communications*, 12(1), pp. 110-130, available at: https://ijoc.org/index.php/ijoc/article/view/7343 (Accessed 25/06/21).

Lugar, E., Moran, S. and Rodden, T. (2013) 'Consent for all: revealing the hidden complexity of terms and conditions', *Proceedings of the SIGCHI Conference on Human Factors in Computing Systems*, Paris, 27 Apr-02 May, pp. 2687-2696, doi: 10.1145/2470654.2481371.

Maan, S. (2002) 'People watching people watchers: 'The Law Enforcement Company' for watching over those who come to see and be seen on the 'Urban Beach'', *Surveillance and Society*, 2(4), pp. 594-610, doi: 10.24908/ss.v2i4.3367.

MacAskill, E. and Dance, G. (2013) 'NSA Files: Decoded what the revelation mean to you', *The Guardian*, 1 Nov, available at: https://www.theguardian.com/world/interactive/2013/nov/01/snowden-nsa-files-surveillance-revelations-decoded#section/1 (Accessed 03/09/18).

Macaskill, E. and Dance, G. (2013) 'NSA Files: What the revelations mean for you', *The Guardian*, 1 Nov, available at: https://www.theguardian.com/world/interactive/2013/nov/01/snowden-nsa-files-surveillance-revelations-decoded#section (Accessed 16/11/2017).

Machine Learning 4 Artists (2020) available at: https://ml4a.github.io/ (Accessed 09/01/20).

MacKenzie, A. (2010) *Wirelessness: Radical empiricism in network cultures*, London: MIT Press.

Manovich, L. (2001) *The Language of New Media*, London: MIT Press.

Manovich, L. (2008) *The poetics of augmented space*, available at: http://manovich.net/index.php/projects/the-poetics-of-augmented-space (Accessed 10/01/20).

Manovich, L. (2013) *Software Takes Command*, New York: Bloomsbury.

Marcus, G. (2009) *Lipstick Traces: A Secret History of the Twentieth Century,* 2nd ed., Cambridge: Harvard University Press.

Marinetti F.T. (1909) '*The Futurist Manifesto'*, available at: https://www.societyforasianart.org/sites/default/files/manifesto_futurista.pdf (Accessed 01/03/19).

Marris, P. (1997) *Media Studies: A Reader*, Edinburgh: Edinburgh University Press.

Mattern, S. (2013) ‘Infrastructural tourism’, *Places*, July, available at: https://placesjournal.org/article/infrastructural-tourism (Accessed 27/06/19).

Mattern, S. (2015) *Deep Mapping the Media City*, Minnesota: University of Minnesota Press.

Mattern, S. (2021) ‘How to map nothing’, *Places*, available at: https://placesjournal.org/article/how-to-map-nothing/?cn-reloaded=1 (Accessed 04/04/21).

mattersinmediaart.org (2021) *Matters in media art*. Available at: http://mattersinmediaart.org (Accessed 17/01/21).

McCarthy, L. (2016) *Critical APIs*, available at: https://github.com/lmccart/itp-critical-apis (Accessed 09/12/20).

McCray, P.W. (2020) *Making Art Work: How Cold War Engineers and Artists Forged a New Creative Culture*, London: MIT Press.

McDermott, S. (2019) 'This has gone on for too long': Gardaí and Dublin City Council in dispute over policing of Google protests’, *thejournal.ie*, 6 Sep, available at: https://jrnl.ie/4796782 (Accessed 23/01/20).

McDonald, F. (2000) ‘Massive Grand Canal Docks project under way’, *The Irish Times*, 16 May, available at: https://www.irishtimes.com/news/massive-grand-canal-docks-project-under-way-1.271358 (Accessed 03/05/20).

McDonough, T. (2002) *Guy Debord and the Situationist International: Texts and Documents*, London: MIT Press.

McGarrigle, C. (2012) *The Construction of Locative Situations: The Production of Agency in Locative Media Art Practice*, unpublished thesis (Ph.D.), Technological University *Dublin*.

McGee, H. (2015) ‘Social media plays major role in Irish poll for first time’, *The Irish Times*, 22 May, available at: https://www.irishtimes.com/news/politics/social-media-plays-major-role-in-irish-poll-for-first-time-1.2222859 (Accessed 28/06/21).

McLaughlin, J. (2015) 'Data: Clouds and Precipitation', in Boyd, G.A. and McLaughlin, J., eds., *Infrastructure and the Architectures of Modernity in Ireland 1916-2016*, London, Ashgate.

McQuillan, D. (2012) *Critical hacktivism*, available at: https://web.archive.org/web/20121017102838/http://www.internetartizans.co.uk/critical_hacktivism (Accessed 21/04/19).

Medosch, A. (2016) ‘Shockwaves in the new world order of information and communication’, in Paul, C., ed., *A Companion to Digital Art*, Hoboken: Wiley-Blackwell, pp. 355-383.

Meikle, G. (2002) *Future Active: Media Activism and The Internet,* Sydney: Routledge.

Menegus, B. (2018) *Amazon's aggressive anti-union tactics revealed in leaked 45-minute video*, available at: https://gizmodo.com/amazons-aggressive-anti-union-tactics-revealed-in-leake-1829305201 (Accessed 19/07/19).

Menkman, R. (2011) *The glitch moment(um)*, available at: https://networkcultures.org/_uploads/NN%234_RosaMenkman.pdf (Accessed 14/05/16).

Menn, J. (2019), *Cult of the Dead Cow: How The Original Hacking Supergroup Might Just Save The World*, Public Affairs, New York.

Mezzadra, S. and Neilson, B. (2019) *The Politics of Operations: Excavating Contemporary Capitalism*, London: Duke University Press.

Milan, S. (2015) ‘Hacktivism as a radical media practice’, *The Routledge Companion to Alternative and Community Media*, (ed. Atton C.) pp.550 – 560, Routledge, New York.

Mintz, A. (2017) 'After Internet? F.A.T. Lab's farewell and reconsiderations of the post-internet trope in art', *RE:Trace Conference*, Austria, 23-25 Nov, available at: http://95.216.75.113:8080/xmlui/handle/123456789/11 (Accessed 11/09/20).

Moll, J. (2015) *CO2GLE*, available at: http://www.janavirgin.com/CO2/CO2GLE_about.html (Accessed 09/05/18).

Moll, J. (2016) *DEFOOOOOOOOOOOOOOOOOOOOOOOREST*, available at: http://www.janaavirgin.com/CO2/DEFOOOOOOOOOOOOOOOOOOOOOOOREST_about.html (Accessed 09/05/18).

Moll, J. (2021) 'Hello from_2010', available at: http://www.janavirgin.com/hello%20from.html (Accessed 30/03/20).

Molloy, A. (2018) 'Housing activists occupy Airbnb headquarters in Dublin', *The Irish Independent*, 13 Oct, available at: https://www.independent.ie/irish-news/housing-activists-occupy-airbnb-headquarters-in-dublin-37416432.html (Accessed 03/08/19).

monki (2015) *We lost*, available at: http://fffff.at/rip (Accessed 03/04/19).

Mooney, J. (2020) 'Russian agents plunge to new ocean depths in Ireland to crack transatlantic cables', *The Times*, 16 Feb, available at https://www.thetimes.co.uk/article/russian-agents-plunge-to-new-ocean-depths-in-ireland-to-crack-transatlantic-cables-fnqsmgncz (Accessed 21/02/20).

Morgan, T. (2013) 'Sharing, hacking, helping: Towards an understanding of digital aesthetics through a survey of digital art practices in Ireland', *Journal of Media Practice,* 14(2), pp. 147-160, doi: 10.1386/jmpr.14.2.147_1.

Morgan, T. (2017) 'Alienated nature, reified culture: Understanding the limits to climate change responses under existing socio-ecological formations', *The Political Economy of Communication*, 5(1) pp. 30–50, available at: https://polecom.org/index.php/polecom/article/view/76 (Accessed 27/06/20)

Morgan, T. (2020) *Sensing our World: How Digital Media Cultural Practices Can Contribute to Changing Social Norms around Consumption*, Report No.355, Johnstown Castle: Environmental Protection Agency, available at: https://www.epa.ie/publications/research/socio-economics/Research_Report_355.pdf (Accessed 28/06/21).

Morozov, D. (2016) *Hotspot Poet*, available at: https://vtol.cc/hotspot-poet (Accessed 16/04/19)

Morozov, D. (2018) *Hot Ninja*, available at: https://vtol.cc/Hot-Ninja (Accessed 22/03/19).

Morozov, E. (2013) *To Save Everything, Click Here: The Folly of Technological Solutionism*, New York: Public Affairs.

Mozilla (2020) 'HTML: Hypertext Markup Language', available at: https://developer.mozilla.org/en-US/docs/Web/HTML (Accessed 08/03/20).

Murdock, G. (1978) 'Blindspots about Western Marxism: A reply to Dallas Smythe', *Canadian Journal of Political and Social Theory*, 2(2), pp. 109-119, available at: https://journals.uvic.ca/index.php/ctheory/article/view/13744 (Accessed 27/06/21)

Murdock, J. (2020) 'The Dotcom bubble crash was 20 years ago today - could it happen again?', *Newsweek*, 03 Oct, available at: https://www.newsweek.com/dotcom-bubble-crash-20-anniversary-technology-companies-ever-happen-again-1491385 (Accessed 08/03/20).

Naughton, J. (2012) 'Q&A: Stop Online Piracy Act (SOPA)', *The Guardian*, 18 Jan, available at: https://www.theguardian.com/technology/2012/jan/22/sopa-pipa-johhn-naughton (Accessed 19/03/18).

Navas, E. (2018) *Art, Media Design, and Postproduction: Open Guidelines on Appropriation and Remix*, London: Routledge.

Navas, E. (2020) *Remix Defined*, available at: https://remixtheory.net/?page_id=3 (Accessed 03/02/2016).

Neural (2018) *WiFi Tapestry, waves affecting objects' nature*, available at: http://neural.it/2018/02/wifi-tapestry-waves-affecting-objects-nature (Accessed 03/04/20).

Neural (2020) 'Interview with Vladan Joler', *Neural: Adversarial Tactics*, Issue 67.

Newenham, P. (2015) *Silicon Docks: The Rise of Dublin as a Global Tech Hub*, Dublin: Liberties Press.

Neylon, L. (2017) 'Council report tries to spot businesses among Airbnb hosts', *Dublin InQuirer*, 15 Mar, available at: https://www.dublininquirer.com/2017/03/15/council-report-tries-to-spot-businesses-among-airbnb-hosts (Accessed 03/08/18).

nltk.org (2021) *Natural Language Toolkit*, available at: http://www.nltk.org (Accessed 03/02/18).

Noordegraaf, J. (2013) *Preserving and Exhibiting Media Art: Challenges and Perspectives*, Amsterdam: Amsterdam University Press.

Nordstrom, A. (2018) *The things we keep*, available at: https://susandobsonsite.files.wordpress.com/2018/10/essay-by-alison-nordstrom.pdf (Accessed 09/10/19).

NSA Prism Bot (2018) available at: https://twitter.com/nsa_prismbot (Accessed 24/01/2020).

null-byte.wonderhowto.com (2017) *Wardrive with the Kali Raspberry Pi to Map Wi-Fi Devices*, available at: https://null-byte.wonderhowto.com/how-to/wardrive-with-kali-raspberry-pi-map-wi-fi-devices-0176558 (Accessed 07/02/20).

Nye, J. (2005) *Soft Power: The Means to Success in World Politics*, New York: Public Affairs.

Ó Riain, S. (2014) *The Rise and Fall of Ireland's Celtic Tiger: Liberalism, Boom and Bust*, Cambridge: Cambridge University Press.

Ó Tuathail, G. and Dalby, S. (1998) 'Rethinking geopolitics: towards a critical geopolitics', in Ó Tuathail, G. and Dalby, S., eds., *Rethinking Geopolitics*, London: Routledge, pp. 1-15.

O' Dwyer, R. (2020) 'Another net is possible', in Gansing, K. and Luchs, I., eds., *The Eternal Network: The Ends and Becomings of Network Culture*, Berlin: Institute of Network Cultures and Transmediale Berlin, pp. 68-80.

O' Neill, P. (2018) 'On Dublin, Amazon, and the "Secret Region"', *Dublin InQuirer*, 28 Nov, available at: https://www.dublininquirer.com/2018/11/28/paul-on-dublin-amazon-and-the-secret-region (Accessed 28/11/18).

O' Neill, P. (2019) '– C-Node: Subverting the black boxes of Amazon Web Services in Dublin', in Bogers, L. and Chiappini, L., eds., The Critical Makers Reader: (Un)learning Technology, Amsterdam: Institute of Network Cultures, pp. 181-195.

O' Neill, P. (2019) 'Underwater Cables Leave Ireland tangled – and implicated – in the internet' Dublin InQuirer, 20 Feb, available at: https://www.dublininquirer.com/2019/02/20/paul-underwater-cables-leave-ireland-tangled-and-implicated-in-the-internet (Accessed 20/02/19).

Odell, J. (2019) *How to Do Nothing: Resisting the Attention Economy*, New York: Melville House Publishing.

Oliver, J., Savičić, G. and Vasiliev, D. (2011) *The critical engineering manifesto*, available at: https://criticalengineering.org (Accessed 02/03/18).

Oliveria P.G.C. and Chan, X. (2020) *Backslash Kit*, available at: http://www.backslash.cc (Accessed 09/03/20).

Onis, Z. and Aysan, A.F. (2000) 'Neoliberal globalisation, the nation-state and financial crises in the semi-periphery: A comparative analysis', *Third World Quarterly*, 21(1), pp. 119-139, doi: 10.1080/01436590013260.

Organisation for Economic Co-operation and Development (2021) *Statutory corporate income tax rate*, available at: https://stats.oecd.org/index.aspx?DataSetCode=Table_II1 (Accessed 07/05/21).

Ovide, S. (2021) 'How big tech won the pandemic', *The New York Times*, 30 Apr, available at: https://www.nytimes.com/2021/04/30/technology/big-tech-pandemic.html (Accessed 25/04/21).

Owens, J. (2019) 'The tech giants dominated the decade. But there's still time to rein them in', *The Guardian*, 25 Dec, available at: https://www.theguardian.com/commentisfree/2019/dec/25/2010s-tech-giants-google-amazon-facebook-regulators (Accessed 23/01/20).

Packer, R. (2014) *Glitch expectations: A conversation with Jon Cates*, available at: https://hyperallergic.com/134709/glitch-expectations-a-conversation-with-jon-cates (Accessed 03/04/17).

Palcic, D and Reeves, E. (2010) 'Organisational status change and performance: The case of Ireland's national telecommunications operator', *Telecommunications Policy*, 34(5/6), pp. 299-308, doi: 10.1016/j.telpol.2010.03.004.

Parikka, J. (2012) *What is Media Archaeology?,* Massachusetts: Polity Press.

Parikka, J. (2013) 'Critically engineered wireless politics', *Culture Machine*, 14, pp. 1-36, doi: 10.33767/osf.io/9qfyb.

Parikka, J. (2015) *A Geology of Media*, Minnesota: University of Minnesota Press.

Parikka, J. and Hertz, G. (2011) *Five Principles of Zombie Media*, available at: http://conceptlab.com/writing/hertz-parikka-2011-defunct-refunct-catalogue.pdf (Accessed 04/02/16).

Parks, L. (2015) '"Stuff you can kick": Toward a theory of media infrastructures', in Svensson, P. and Goldberg, D.T., eds., *Between Humanities and the Digital*, London: MIT Press, pp. 355-373.

Paul, K. (2020) 'What you need to know about the biggest hack of the US government in years' 15 Dec, *The Guardian*, available at: https://www.theguardian.com/technology/2020/dec/15/orion-hack-solar-winds-explained-us-treasury-commerce-department (Accessed 29/01/21).

Pearlman, E. (2014) *Transmediale Festival Shuts Down NSA Imitators*, available at: https://hyperallergic.com/109546/transmediale-festival-shuts-down-nsa-imitators/ (Accessed 09/08/16).

Pickard, V. and Berman, D.E. (2019) *Net Neutrality: A New Deal for the Digital Age*, New Haven, Yale University Press.

Pieter, P. (2017) *A Beginner's Guide to the ESP8266,* available at: https://tttapa.github.io/ESP8266/Chap01%20-%20ESP8266.html (Accessed 18/04/20).

piratebox.cc (2020) *Frequently Asked Questions*, available at: https://piratebox.cc/faq (Accessed 09/12/19).

Plant, S. (1992) *The most radical gesture: The Situationist International in a postmodern age*, London: Routledge.

Postal and Telecommunications Services Act, No. 24/1983, Dublin: Stationery Office, available at: http://www.irishstatutebook.ie/eli/1983/act/24/enacted/en/html (Accessed 08/04/20).

Poulson, K. (2001) *War driving by the bay*, available at: https://www.securityfocus.com/news/192 (Accessed 14/01/20).

prismbreakup.org (2013) *Prism Breakup*, available at: http://prismbreakup.org (Accessed 07/02/18).

Priya, C., Umar, S. and Sirisha, T. (2013) 'The impact of war driving on wireless networks', *International Journal of Computer Science and Engineering*, 3(6), pp. 230-235, available at: https://ijcset.net/docs/Volumes/volume3issue6/ijcset2013030605.pdf (Accessed 04/12/19)

Public Broadcasting Service (2011) *Off Book | Hacking art and culture with F.A.T. Lab*, available at: https://watch.opb.org/video/off-book-off-book-fat-lab/ (Accessed 27/06/21)

Quaranta, D. (2019) *Between hype cycles and the present shock*, available at https://www.neroeditions.com/docs/between-hype-cycles-and-the-present-shock (Accessed 23/12/20).

radicalnetworks.org (2021) *Homepage*, available at: https://radicalnetworks.org (Accessed 04/02/21).

Raley, R. (2009) *Tactical Media*, Minnesota: University of Minnesota Press.

randoautica.com (2021) *Homepage*, available at: https://www.randonautica.com (Accessed 13/03/21).

Rasmussen, M.B. (2006) 'Counterrevolution, the spectacle, and the situationist avant-garde', *Social Justice*, 33(2), pp. 5-15, doi: 10.2307/29768366.

Ratto, M. (2011) 'Critical making: conceptual and material studies in technology and social life', *The Information Society*, 27(4), pp.252-260, doi: 10.1080/01972243.2011.583819.

Ratto, M., (2015) *Defining critical making: Matt Ratto in conversation with Garnet Hertz*, available at: http://ctheory.net/articles.aspx?id=760 (Accessed09/08/2017).

Ravulavaru, A.(2017) *The Jackal of Javascript*, available at: http://thejackalofjavascript.com (Accessed 19/04/17).

Ray G. and Sholette G. (2008) 'Introduction: Whither tactical media?', *Third Text*, 22(5), pp. 519-524, doi: 10.1080/09528820802439989.

Raymond, E.S.(1999) *The Cathedral and the Bazaar,* Available at: http://www.catb.org /~esr/writings/cathedral-bazaar/ (Accessed 22/08/18).

Rich, K. (2021) *Feral Trade: Statement*, available at: https://feraltrade.org/statement (Accessed 02/01/21).

Richardson, J. (2002) *The language of tactical media*, available at: http://subsol.c3.hu/subs ol_2/contributors2/richardsontext2.html (Accessed 19/09/18).

Roeder, O. (2018) *Why we're sharing 3 million Russian troll tweets*, available at: https://fivethirtyeight.com/features/why-were-sharing-3-million-russian-troll-tweets (Accessed 25/05/10).

Rossiter, N. (2016) *Software, Infrastructure, Labor: A Media Theory of Logistical Nightmares*, London: Routledge.

Roth, E. (2015) *Internet landscapes*, available at: https://www.youtube.com/watch?v=Ql5aq QEp7ig (Accessed 02/09/20).

Roth, E. (2016) 'Internet landscapes: Sweden. Interview with Evan Roth by Bani Brusadin, Ruth McCullough, Domenico Quaranta', in Brusadin, B., Mattes, E., Mattes F. and Quaranta, D., eds., *The Black Chamber: Surveillance, Paranoia, Invisibility and The Internet*, Brescia: Link Editions, pp. 122-141.

Roy, E.A. (2017) ‘For a radical media archaeology: A conversation with Wolfgang Ernst’, *Necsus*, 28 May, available at: https://necsus-ejms.org/for-a-radical-media-archaeology-a-conversation-with-wolfgang-ernst (Accessed 09/03/19).

rte.ie (2017) ‘Mural brightens Google's Dublin data centre’,RTÉ, 15 Mar, available at: https://www.rte.ie/news/technology/2017/0315/860022-google-uses-mural-to-brighten-dublin-data-centre (Accessed 04/05/20).

Rush, M. (2005) *New Media in Art*, 2nd ed., London: Thames and Hudson.

Saint-Clair, J. (2021) *Raspberry (or other SBC) wardriving setup*, available at: https://01010101.fr/rpi-war-driving.html (Accessed 09/12/17).

Sanchez, B. (2020) ‘Internet Memes and Desensitization’ *Pathways*, 1(2), available at: https://repository.upenn.edu/cgi/viewcontent.cgi?article=1020&context=pathways_journal (Accessed 14/03/21).

Saner, E. (2018) ‘The hateful Eighth: artists at the frontline of Ireland's abortion rights battle’, *The Guardian*, 12 Apr, available at: https://www.theguardian.com/artanddesign/2018/apr/12/the-hateful-eighth-artists-frontline-ireland-abortion-rights-battle-eighth-amendment (Accessed 28/06/21).

Savičić, G. (2007) *Constraint city. The pain of everyday life*, available at: https://transmediale.de/content/constraint-city-the-pain-of-everyday-life (Accessed 02/04/20).

Savičić, G. (2020) *Constraint city: the pain of everyday life*, available at: https://www.yugo.at/equilibre/?page_id=8 (Accessed 09/04/20).

Schneider, N. (2015) ‘Slow Computing’, *America: The Jesuit Review*, available at: https://www.americamagazine.org/content/all-things/slow-computing (Accessed 05/02/20).

Schneider, N. (2015) 'The joy of slow computing', *The New Republic,* available at: https://newrepublic.com/article/121832/pleasure-do-it-yourself-slow-computing (Accessed 05/02/20).

Schneider, N. (2019) 'Decentralization: an incomplete ambition', *Journal of Cultural Economy*, 12(4), pp. 265-285, doi: 10.1080/17530350.2019.1589553.

Schneider, R. (2017) 'Who still cares about Snowden?' *ExBerliner*, 7 Sep, available at: https://www.exberliner.com/whats-on/art/who-still-cares-about-snowden (Accessed 19/05/19).

Scott, A.O. (2015) 'Review: 'Steve Jobs,' Apple's Visionary C.E.O. Dissected', *The New York Times*, 8 Oct, available at: https://www.nytimes.com/2015/10/09/movies/review-steve-jobs-apples-visionary-ceo-dissected.html (Accessed 24/02/21).

Sengers, P. *et al.* (2005) *Reflective Design*, available at: https://www.nyu.edu/projects/nissenbaum/papers/reflectivedesign.pdf (Accessed 06/06/17).

Shaw, J. and Graham, M. (2017) 'An informational right to the city? Code, content, control, and the urbanization of information', *Antipode*, 49(4), pp. 904-927, doi: 10.1111/anti.12312.

Sheridan, G., Kelly, F. and McManus J. (2019) 'UK spy base GCHQ tapped Irish internet cables', *The Irish Times*, 29 Nov, available at: https://www.irishtimes.com/business/technology/uk-spy-base-gchq-tapped-irish-internet-cables-1.2019492 (Accessed 03/01/19).

Sherratt, T. (2019) 'Unremembering the forgotten', in Gold, M.K. and Klein L.F., eds., *Debates in the Digital Humanities 2019*, Minnesota: University of Minnesota Press, pp. 123-140.

Shi, J. (2017) *"Freewifi" via ESP8266 Captive Portal*, available at: https://yoursunny.com/t/2017/freewifi (Accessed 22/03/19).

Shiffman, D. (2015) 'What is Node.js? - Twitter Bot Tutorial', available at: https://www.youtube.com/watch?v=RF5_MPSNAtU&t=4s&ab_channel=TheCodingTrain (Accessed 22/11/16).

Shiffman, D. (2020) *Programming from A to Z: Twitter API and Twitter Bots*, available at: http://shiffman.net/a2z/twitter-bots (Accessed 03/04/17).

Sholette, G. (2010) *Dark Matter: Art and Politics in the Age of Enterprise Culture*, London: Pluto Press.

Siapera, E. (2011) *Understanding New Media*, London: Sage.

siliconrepublic.com (2016) 'What makes Ireland the ultimate data centre capital of Europe?', *Silicon Republic*, 27 Mar, available at: https://www.siliconrepublic.com/enterprise/data-centre-network-ireland (Accessed 03/08/18).

Simon H.A. (1971) 'Designing organisations for an information-rich world', in Greenberger, M., ed., *Computers, Communication and the Public Interest*, Baltimore: John Hopkins, pp. 37-72.

Sjölén B., Somlai-Fischer, A. and Haque, U. (2020) *About Wifi Camera*, available at: http://wificamera.propositions.org.uk/Home (Accessed 06/03/20).

Slager, H. (2015) *The Pleasure of Research*, Ostfildern: Hatje Cantz.

Slow Food (2020) *Our History*, available at: https://www.slowfood.com/about-us/our-history (Accessed 14/02/20).

Slow Food (2020) *Slow Food Manifesto: International Movement for the Defense of Pleasure*, available at: https://slowfood.com/filemanager/Convivium%20Leader%20Area/Manifesto_ENG.pdf (Accessed 14/02/20).

Smyrnaios, N. (2018) *Internet Oligopoly: The Corporate Takeover of Our Digital World*, Emerald Publishing, Bingley.

Smythe, D.W. (1977) 'Communications: Blindspot of Western Marxism', *Canadian Journal of Political and Social Theory*, 1(3), pp. 1-27, available at https://journals.uvic.ca/index.php/ctheory/article/view/13715 (Accessed 04/08 /20).

Snodgrass, E. and Soon, W. (2019) 'API practices and paradigms: Exploring the protocological parameters of APIs as key facilitators of sociotechnical forms of exchange', *First Monday*, 24(2), available at: https://firstmonday.org/ojs/index.php/fm/article/view/9553 (Accessed 20/08/20).

Soon, W. (2019) 'Throbber: Executing micro-temporal streams', *Computational Culture*, 7, available at: http://computationalculture.net/throbber-executing-micro-temporal-streams (Accessed 12/02/20).

Sottek, T.C. and Kopfstein, J. (2013) *Everything you need to know about PRISM: A cheat sheet for the NSA's unprecedented surveillance programs*, available at: https://www.theverge.com/2013/7/17/4517480/nsa-spying-prism-surveillance-cheat-sheet (Accessed 23/04/19).

Spier, S. (2016) 'From culture industry to information society: How Horkheimer and Adorno's conception of the Culture industry can help us examine information overload in the capitalist information society', in Kelly, M. and Bielby, J., eds., *Information Cultures in the Digital Age: A Festschrift in Honor of Rafael Capurro*, New York: Springer, pp.385-396.

splcenter.org (2021) *Alt-Right*, available at: https://www.splcenter.org/fighting-hate/extremist-files/ideology/alt-right (Accessed 04/03/21).

Springer, S. *et al.* (2012) 'Leaky geopolitics: the ruptures and transgressions of WikiLeaks', *Geopolitics*, 17(3), pp. 681–711, doi: 10.1080/14650045.2012.698401.

Srnicek, N. (2017) *Platform Capitalism*, Massachusetts: Polity Press.

Stalder, F. (2000) ‘The Ideology of Immateriality', presented at *Alternative Strategies Panel at the Tulipomania.com Conference* Amsterdam, Frankfurt a.M., 02-04 Jun, available at http://felix.openflows.com/html/immateriality.html (Accessed 07/02/20).

Stalder, F. (2001) *The Space of Flows: notes on emergence, characteristics and possible impact on physical space*, available at http://felix.openflows.com/html/space_of_flows.html (Accessed 09/11/18).

Stalder, F. (2009) *30 years of Tactical Media*, available at:http://www.tacticalmediafiles.net/articles/3256/30-Years-of-Tactical-Medi (Accessed 13/05/17).

Stallman, R. (1985) *The GNU Manifesto*, available at: https://www.gnu.org/gnu/manifesto.en.html (Accessed 09/02/18).

Stark T. (2021) *An Interview with Peter Shipley*, available at: http://www.starkrealities.com/shipley.html (Accessed 16/03/21).

Starosielski, N. (2015) *The Undersea Network*, North Carolina: Duke University Press.

Sterling, B. (1995) *The Dead Media Project: A Modest Proposal and a Public Appeal*, available at: http://www.deadmedia.org/modest-proposal.html (Accessed 03/06/16).

Stewart, H. and Mason, R. (2016) ‘Nigel Farage's anti-migrant poster reported to police’, *The Guardian*, 16 June, available at: https://www.theguardian.com/politics/2016/jun/16/nigel-farage-defends-ukip-breaking-point-poster-queue-of-migrant (Accessed 09/02/21).

submarinecablemap.com (2020) *Havfrue/AEC-2, Submarine Cable Map*, available at: https://submarinecablemap.com/#/submarine-cable/havfrueaec-2 (Accessed 04/04/20).

Sunde, P. (2015) *Transmediale 2015 Opening Ceremony*, available at:https://www.youtube.com/watch?v=_DSGRYMbqjE&ab_channel=transmediale (Accessed 02/03/19).

Tactical Tech Collective (2020) *Data Detox Kit*, available at: https://datadetoxkit.org/en/home (Accessed 09/05/17).

Tactical Tech Collective (2020) *Exposing the Invisible*, available at: https://exposingtheinvisible.org (Accessed 09/05/17).

Tactical Tech Collective (2020) *Home Page*, available at: https://tacticaltech.org/#/ (Accessed 09/05/17).

Tactical Tech Collective (2020) *The Glass Room*, available at: https://theglassroom.org (Accessed 09/05/17).

tacticalmediafiles.net (2017) *The concept of tactical media*, available at http://www.tacticalmediafiles.net/articles/44999 (Accessed 09/08/17).

tacticalmediafiles.net (2021) *The Next Five Minutes–2003*, available at: http://www.tacticalmediafiles.net/n5m4/about.jsp.html (Accessed 06/03/21).

Taylor, C. (2018) 'Apple's secretive Cork facility opens up – to an extent', *The Irish Times*, 11 Jan, available at: https://www.irishtimes.com/business/technology/apple-s-secretive-cork-facility-opens-up-to-an-extent-1.3346124 (Accessed 03/04/19).

TeleGeography (2020) *Submarine Cables, Frequently Asked Questions*, available at: https://www2.telegeography.com/submarine-cable-faqs-frequently-asked-questions (Accessed 28/05/20).

Terranova, T. (2000) 'Free labor: Producing culture for the digital economy', *Social Text*, 18(2), pp. 33-58, available at: https://web.mit.edu/schock/www/docs/18.2terranova.pdf (Accessed 19/09/20).

Terranova, T. (2004) *Network Culture: Politics for the Information Age*, London: Pluto Press.

The Yes Men (2019) available at: http://yesmen.org (Accessed 29/09/18).

theguardian.com (2018) ‘Our new column from inside Amazon: 'They treat us as disposable’’, *The Guardian*, 21 Nov, available at: https://www.theguardian.com/us-news/2018/nov/21/our-new-column-from-inside-amazon-they-treat-us-as-disposable (Accessed 10/05/20).

thewrong.org (2020) *Router*, available at: https://thewrong.org/router (Accessed 18/05/19).

Thompson, N. (2017) *Culture as Weapon: The Art of Influence in Everyday*, New York: Melville House.

Thornthon, P. (2016) *{poem}.py: A critique of linguistic capitalism*, available at: https://pipthornton.com/2016/06/12/poem-py-a-critique-of-linguistic-capitalism (Accessed 25/06/21).

Thornthon, P. (2019) *Language in the Age of Algorithmic Reproduction: A Critique of Linguistic Capitalism*, unpublished thesis (Ph.D.), Royal Holloway, University of London.

Thrift, N. and French, S. (2002) ‘The automatic production of space’, *Transactions of the Institute of British Geographers,* 27(3), pp. 309-335, doi: 10.2307/3804486.

Timberg C. and Dwoskin E. (2019) ‘Twitter is sweeping out fake accounts like never before, putting user growth at risk’, *The Washington Post*, 6 Jul, available at: https://www.washingtonpost.com/technology/2018/07/06/twitter-is-sweeping-out-fake-accounts-like-never-before-putting-user-growth-risk (Accessed 11/08/20).

time.com (2016) ‘The 25 Best Inventions of 2016’, *Time*, 17 Nov, available at: https://time.com/4572079/best-inventions-2016 (Accessed 14/09/19).

Toffler, A. (1989) *The Third Wave*, New York: Bantam Books.

transmediale.de (2021) *Homepage*, available at: https://transmediale.de (Accessed 04/02/21).

Tribe, M. and Jana, R. (2006) *New Media Art*, Cologne: Taschen.

Tsing, A. (2009) 'Supply chains and the human condition', *A Journal of Economics, Culture and Society*, 21(2), pp. 148-176, doi: 10.1080/08935690902743088.

Tucker, R.C., ed. (1978) *The Marx-Engels Reader*, 2nd ed., London: Norton.

Turk, V. (2018) 'How a Berlin neighbourhood took on Google and won', *Wired*, 26 Oct, available at: https://www.wired.co.uk/article/google-campus-berlin-protests (Accessed 02/03/20).

twitter.com (2017) *Update: Russian interference in the 2016 US presidential election*, available at: https://blog.twitter.com/en_us/topics/company/2017/Update-Russian-Interference-in-2016--Election-Bots-and-Misinformation (Accessed 06/09/18).

Vijgen, R. (2017) *Wifi Tapestry*, available at: https://www.richardvijgen.nl/#wifi-tapestry (Accessed 03/04/20).

Von Busch, O. and Palmås, K. (2006) *Abstract Hacktivism: The Making of a Hacker Culture*, Berlin: OpenMute.

Ward, M. (2002) 'Chalk points to wireless internet', *BBC*, 23 Jul, available at: http://news.bbc.co.uk/2/hi/technology/2144279.stm (Accessed 07/02/20).

Wark, M. (2008) *The Beach beneath the Street: The Everyday Life and Glorious Times of The Situationist International*, London: Verso Books.

washingtonpost.com (2001) 'Text: President Bush Addresses the Nation', 20 Sep, available at: https://www.washingtonpost.com/wp-srv/nation/specials/attacked/transcripts/bushaddress_092001.html (Accessed 09/02/21).

weise7.org (2020) available at: https://weise7.org (Accessed 18/01/17).

Westad, O.A. (2017) *The Cold War: A World History,* New York: Basic Books.

Whelan, Z. (2018) 'It's time to regulate Walking Tours, says councillor', *Dublin InQuirer*, 10 Oct, available at: https://dublininquirer.com/2018/10/10/it-s-time-to-regulate-walking-tours-says-councillor (Accessed 04/12/20).

Wi-Fi Alliance (2020) *Who We Are*, available at: https://www.wi-fi.org/who-we-are (Accessed 14/01/20).

wigle.net (2020) *Frequently Asked Questions*, available at: https://wigle.net/faq (Accessed 13/04/19).

WikiLeaks (2018) Amazon Atlas, available at: https://wikileaks.org/amazon-atlas/ (Accessed 14/01/19).

Williams, R. (1981) *Culture*, London: Fontana.

Winner, L. (1980) 'Do artifacts have politics?', *Daedalus*, 109(1), pp. 121-136, doi: 10.2307/20024652.

Wray, S. (1998) 'On electronic civil disobedience', presented at *The 1998 Socialist Scholars Conference*, New York, 20-22 Mar, available at: https://www.thing.net/~rdom/ecd/oecd.html (Accessed 07/02/18).

youarehere.network (2020) *You are here: share your story*, available at: http://youarehere.network/ (Accessed 06/07/19).

Zielinski, S. (2008) *Deep Time of The Media: Toward an Archaeology of Hearing and Seeing by Technical Means,* London: MIT Press.

Zielinski, S. (2011) 'Thinking about art after the Media: Research as practised culture of experiment', in Biggs, M. and Karlsson, H., eds., *The Routledge Companion to Research in the Arts*, London: Routledge, pp. 293-312.

Zuboff, S. (2019) *The Age of Surveillance Capitalism: The Fight for a Human Future at the New Frontier of Power*, New York: Public Affairs

Zuckerberg, M, (2016), *Mark Zuckerberg*, 25 Jan, 01:03, available at: https://www.facebook .com/zuck/posts/10102615573032471 (Accessed 02/05/19).

Link to practice-based documentation folder:

https://drive.google.com/drive/folders/1sfO1tUpMdegT4qldrRP84CJqkyCpHRD?usp=sharing