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Investigating Role Of Information Technology As Enabler Of Reverse Logistic Cost Saving And Customer Satisfaction

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ABSTRACT

Purpose: The research looked into the impact of supply chain coordination and integration on Reverse logistic cost saving and customer satisfaction with moderating role of information technology.

Design/Method : Employees and supervisors working in supply chain connections were asked to complete a survey. The response of 240 participants was analysed quantitatively using the newest version of SPSS.

Findings: The findings suggest that IT enables the impact of supply chain coordination and integration on customer satisfaction while its role in reverse logistic cost saving was not proven in this study. This study's practical applications include assisting managers in developing a reverse logistics dynamic capability to meet the growing problem of returns by integrating and coordinating with supply chain participants. The moderating influence of an IT skill is specifically addressed since it improves the impact of reverse logistics capabilities by improving business performance.

Keywords: Integration Capability, Coordination Capability, Information technology competency, Reverse Logistic Cost Saving, Customer Satisfaction

INTRODUCTION

Reverse logistics is getting a lot of attention in the supply chain and marketing research industries. “the procedure of planning, executing, and handling the well-organized, cost effectual flow of raw materials or goods, processing inventory, completed goods and associated information with their final destination to the fact of manufacture for the intention of appropriate disposal” (Govindan et al.,2019). Food retailers encounter supply chain issues all around the world, beginning with the first level, when food products do not keep for long periods of time. Quality control, stock predictions, return management, recurrent food supply, and left-over material management are just a few of the difficult difficulties that food suppliers face (Vijayan et al.,2014). Although reverse logistics management is a vital component of many sectors' performance, it is not a top focus for many businesses. Many corporations pay little attention to RL (reverse logistics), much as they used to focus solely on physical distribution and paid little attention to inbound material management (Stock, 2001, p. 6). This is regrettable because well-organized reverse logistics projects can reduce expenses. Reverse logistics should always be viewed as an opportunity to gain a competitive advantage, lower costs, and improve customer satisfaction (Piyachat, 2017).

Supply chain management revolves around the forward logistics network. The product flow is reversed in various cases, such as order issues, surplus stock, expired products, and product recalls. The reverse flow of products needs reverse systems for returned goods (Kabir, 2013). Reverse logistics aims to control the flow of goods from customers and consumers in order to recover value or manage waste (Hawks, 2006).

The capacity to locate products, assist in operations scheduling, and, most significantly, contribute to the construction of a green and sustainable industry environment are all advantages of using reverse logistics. According to the literature, reverse operations are also advised as a reliable supply chain approach in automation and manufacturing businesses (Vijayan et al.,2014). When it comes to reverse operations, cost is the most important consideration. The quality and storage time of returned commodities impact the cost of reverse logistics (Kumar & Tan, 2008). Returns may improve customer service in organisations that lack the ability to use reverse logistics techniques, but the costs associated with returns administration put a financial strain on the company (Daugherty et al.,2001).

In product reverse operations, cost is a factor that affects both the corporation and its supply chain partners (Daugherty et al.,2005). It's not as simple to manage reverse logistics as it is to handle traditional logistics. Backward product flow has an impact on consumer happiness, company profitability, and has major environmental consequences (Vlachos, 2014). In the reverse supply chain, efficient logistics operations management provides a method for companies to satisfy their customers while saving money (Dowlatshahi 2000; Franke et al., 2006; Rubio, Chamorro, & Miranda, 2008; Chen 2010; Weeks et al., 2010). There is a scarcity of literature and applied research on reverse logistics competences and their impact on business performance (Ramrez, Morales, & Jess 2011; Hazen et al., 2012; Jayant, Gupta, & Garg 2012).

The goal of this research is to look into reverse logistics in Pakistani fast food businesses. The purpose of this study is to look at the link between reverse logistics capabilities and business performance, with information technology proficiency acting as a moderator. Fast food has become one of the most popular foods all over the world and it is also regarded as one

of the most swiftly changing settings (Gunasinghe & Cooray,2020).

By identifying and closing the gap between reverse logistics skills and firm performance factors, the research will add to the expanding body of literature. The majority of past research on Pakistan's reverse logistics skills has focused on the country's pharmaceutical and manufacturing industries. In Pakistan, reverse logistics research is mostly focused on explaining and investigating basic notions about what reverse logistics is, but researchers are ignoring a developing and long-standing problem area i.e. the development of reverse logistics skills and their impact on firm performance. The study throws light on this emerging field related to logistics in food industry in a developing country. As Ngadiman et al., (2016) pointed out that "The successful implementing reverse logistics industries can be a benchmark to the other food and beverage industries" (p.1).

After introduction, review of related literature is presented. In subsequent section, research design, and methodology is discussed. After the results, discussion, final section concludes.

LITERATURE REVIEW

Resource based Theory

The resource-based view (RBV) provides valuable information into reverse logistics performance, as well as the impact of a company's specialised resources, such as IT, on the handling of reverse flows (Richey et al.,2005). The resource-based view of integrated supply chains, as defined by Lockström et al. (2010), focuses on resource allocations and information streams. Internal functional areas (where returns are handled) collaborate to increase value creation activities, which will aid in the orientation of firm-specific resources regarding returns processes (Mollenkopf et al.,2011). Firm reverse logistics capability, as defined by Autry et al. (2001), is the ability to efficiently apply firm specific resources to manage important operations in reverse flows. Further, Touboulic and Walker (2015) explained that firms can attain superior performance outcomes by achieving competitive advantage because of superior packages of resources.

Genchev et al. (2010) also stated that firm should master itself in numerous exclusive and critical operations that help company to efficiently use the corporate resources that will ultimately contribute towards creation of reverse logistics capabilities in handling returns. According to Genchev et al. (2010), a company should master a number of unique and vital operations that will enable it to more effectively use corporate resources and, as a result, contribute to the development of reverse logistics skills for processing returns. Businesses are now attempting to adjust their practises in response to strategic requirements for reverse flows (Janse et al.,2009). Nothnagel and Mellewigt (2011) proposed a novel approach to resource-based theory by arguing that capabilities and resources are two distinct assets that can be combined to form the foundation for long-term strategy.

The study of Nothnagel and Mellewigt (2011) also stated that capabilities are the exclusive package of knowledge, capital and skills performed in company's operations, which allow firm to utilize their resources and help them to take coordinate actions. Companies must assign resources, develop relationships (with partners), and design strategies that will strengthen the firm's competences in order to effectively plan (perform) reverse logistics

procedures (Taylor et al., 2012; Nothnagel & Mellewigt 2011). Firms compete based on their resources and competencies. They must have distinctive capabilities that can be a one-of-a-kind set of resources in order to reach high levels of performance and a competitive edge (Nothnagel & Mellewigt 2011).

Transaction cost economies

The theory of Transaction Cost Economies (TCE) states that organisations coordinate with one another and engage in collaborative activities in order to lower operational costs and achieve extraordinary results (Kim, 2013; Zhang & Cao, 2011; Cheng, Lee & Yeung 2009). Corporations rarely conduct operations in isolation, according to Nalebuff and Brandenburger (2011), thus companies must form parallel relationships with service providers, customers, and other partners for the cooperative extension and development of current markets.

Reverse logistics capabilities

Reverse logistics capabilities, according to Jack, Skinner, and Powers (2010), are the capabilities that allow organisations to accurately utilise accessible information; they reflect the procedures and schedule of operations of reverse logistics information. External and internal connections, as well as information use, are all part of these capabilities. Reverse logistics skills are mostly information-related operations that enable a company to efficiently complete its backward logistics tasks, resulting in cost savings for the company (Jack, Skinner & Powers, 2010).

The goal of reverse supply chain is to recapture value as a product's life cycle approaches its end. Post-consumption activities are included in reverse logistics. Products could be recycled, reused, remanufactured, or renovated as part of the activities (Nasiri & Mafakheri, 2013). Firms can use reverse logistics to achieve sustainable development. At the end of a product's life cycle, the reverse supply chain aims to recover value through reuse, recycling, redevelopment, and refurbishment (Prahinski & Kocabasoglu, 2006; Mutha & Pokharel, 2009; Millet, 2011)

Firms that are concentrating on developing their reverse logistics capabilities in order to achieve the best possible results by maintaining high quality standards in the form of remarkable performance (Srivastava, 2006; Lam & Lee, 2012). Studies by Jack, Powers, and Skinner (2010) have spawned a plethora of literature on reverse logistics capabilities, which are defined as a firm's ability to correctly utilise existing information and the operational time periods required to provide reverse logistics information. These capabilities would be advantageous because they create internal or external linkages and assist the company in making better use of the information gathered from these linkages. These capabilities illuminated the predicted good outcomes of a company's handling of a large number of data-related operations that led to the efficient management of reverse logistics processes and outcomes (Jack, Powers & Skinner, 2010).

Supply chain coordination relation with customer satisfaction and reverse logistics cost savings

One of the dynamic capabilities of a corporation for managing reverse logistics activities is supply chain coordination. A company can achieve coordination through cooperation

agreements, market processes, and governing legislation (Vlachos, 2016). The reduction of associated risks and costs is a benefit of supply chain collaboration for all supply chain partners. Coordination in supply chains improves business performance and revenues, but collaboration with supply chain members can raise coordination costs, restrict flexibility, and reduce cooperation (Das et al.,2006).

When information is passed from a producer to a supplier, it provides various advantages that aid in future planning; however, this is only achievable when a company increases its coordination competence (Malhotra et al., 2005). Collaboration efficiency can be viewed as a corporate competence (Daugherty et al.,2005). Collaboration has been beneficial to the company since it results in more delighted consumers, increased revenues, and, most importantly, increased supply chain visibility (Daugherty et al.,2005; Fontanella & Sabath, 2002). Collaboration, which is a corporate competency, is projected to result in cost savings, innovation, and greater performance (Felde & Corsten, 2005). The broadened view of supply chain collaboration is that supply chain participants establish a cooperative environment rather than a competitive one (Zhang & Cao, 2011).So, the current study proposes following hypothesis:

H1: Coordination capability significantly influence customer satisfaction.

H2: Coordination capability significantly influence Cost savings.

Moderating role of IT competency of firm

Nowadays, developing an IT infrastructure is a must, as it is important for both supply chain partners and the company itself. According to Dubois, Rucker, and Galinsky (2011), unanticipated market scenarios put pressure on management teams to build crucial proficiency with updated IT systems, which will assist organisations in achieving positive performance results. According to Lee and Whang (2004), Mishra, Konana, and Barua (2007), and Swafford, Ghosh, and Murthy (2008), the organisation can identify experienced suppliers utilising current IT systems, and the appropriate measures based on market conditions can be taken effectively and competently.

The advantages of IT proficiency to supply chain partners include increased information flow, which allows supply chain participants to coordinate with one another and have a greater sense of responsibility (Daugherty et al., 1995).Therefore, it is hypothesized that:

H1 (a):IT competency enhance the relationship between coordination capability and customer satisfaction in handling reverse logistics

H2 (a): IT competency enhance the relationship between coordination capability and cost savings in handling reverse logistics.

Supply chain integration and relation with customer satisfaction and reverse logistics cost savings

Many studies on supply chain integration have been undertaken during the last two decades. Researchers like Leuschner, Rogers, and Charvet (2013) contribute to the literature on supply chain integration by arguing that because supply chain events are isolated between merchants, customers, and facility providers, suppliers and customers must inevitably combine their activities in supply chains.

Reverse logistics management has become just as important as forward supply chain management as a result of rising consumer demands and increased company burdens. Management teams combine the supply chain operations that are worth creating, but not all businesses are effective in mixing internal logistic activities such as forward logistics and reverse streams (Leuschner, Rogers & Charvet 2013). Integration operations in supply chains can be arranged forward, i.e. between suppliers and procurement firms, or in reverse, i.e. between end users and procuring firms (Menguc & Cousins, 2006). Cao and Zhang (2011) define supply chain integration as an integrated process in which organisations manage supply chain processes to accomplish the firm's common goals and advantages.

Villena et al., (2009); Zhang and Cao (2011), for example, give empirical evidence on the various consequences of supply chain integration on corporate performance. The majority of studies concluded that integrating competence had a beneficial impact on company performance. The logistic members play a vital role in the integration operations oriented toward the information and material streams, as they handle the flows that result in valuable outcomes. Outdoor and internal integrations are also described in studies as supply chain integration activities (Droge et al., 2004; Ventura & Gimenez, 2005; Sanders, 2007).

Most authors, such as Devaraj et al. (2007), Koufteros et al. (2010), Zhao et al. (2011), and Flynn et al. (2010), believed that external integration was effectively turned into supplier and customer integration in order to better address management challenges. Market leaders aim to achieve excellent synergies and advantages, thus they want to collaborate with their supply chain partners on a regular basis. This will help them recognise their customers' needs and result in a shared information discussion with dealers. (Koufteros et al., 2010; Allred et al., 2011).

Companies with a drive for advancement, according to Leuschner, Rogers, and Charvet (2013), engage in integrated supply chain activities as an effective technique to achieve company goals and increase performance. The study also found that while each integration strategy improves firm performance, integration actions in the sphere of operations, such as innovation and deliverable performance, might alter the concept of integration outcomes (Leuschner, Rogers & Charvet, 2013).

Rogers, Leuschner, and Charvet (2013) found that while organisations should not expect immediate investment returns such as cost reductions and improved quality from implementing integrated supply chain activities, if they remain calm, they will achieve long-term positive performance outcomes. As a result of their internal logistics' disintegrated operations, businesses face long lead times in manufacturing or buying items, expensive warehousing and shipping expenses, and dissatisfied consumers (Jayant, Garg, & Gupta, 2012; Hazen et al., 2012). According to researchers such as Rogers, Leuschner, and Charvet (2013), supply chain integration is important from a managerial perspective. While there are general

indications that supply chain integration leads to higher performance, the level of integration that is most important for a firm's success should be evaluated first by management. In the light of above reviewed literature, the study hypothesized following statements:

H3: Integration capability significantly influences customer satisfaction

H4: Integration capability significantly influences reverse logistics costsavings

Moderating role of IT competency of firm

Researchers like Sohi and Tippins (2003) define IT competency as a company's ability to know how to use technology efficiently and manage information within the company. Management teams in supply chains focus on IT developments (either internally or externally) in the supply chain based on their strategic interests (Christopher, 2011). Literature also suggests that implementing various IT applications in supply chains might improve a company's capacity to locate a specific product point across the supply chain process and improve the company's information accessibility (Sarac et al.,2010).

Acceptance and utilisation of IT are critical in supply chain management, but the results are less than ideal. As previously mentioned, most technologies are costly and crucial, such as radio frequency identification (RFID), online markets, and electronic data exchange (EDI) (Lau, 2007; Wang et al.,2007). Rai et al. (2006) argued that a company's information technology competency is a lower-level capability that can be modified to create an advanced level of operational capability, such as collaboration in supply chain processes, and that companies can achieve sustainable and necessary performance outcomes as a result of this process integration. Dynamic capabilities, according to researchers, construct a firm's present process capability according to requirements, i.e. when opportunities exist, because dynamic capabilities are a strategic decision for any firm (Sawy & Pavolou, 2006). Therefore, it is hypothesized that:

H3(a): IT competency enhances the relationship between integration capability and customer satisfaction in handling reverse logistics

H4(a): IT competency enhances the relationship between integration capability and reverse logistics cost savings in handling reverse logistics.

As a result of the foregoing discussion, it can be concluded that, despite a large body of literature on supply chain management capabilities, progress in research on reverse logistics capability elements and their impact on company performance is still debated. The study attempted to fill the vacuum by evaluating historical literature in the context of reverse logistics and focused on three main dynamic capacities in the reverse logistics context: supply chain integration competence, supply chain coordination capability, and company IT competency. The key contribution of this research is that it will investigate the moderating influence of IT competency between reverse logistics skills and firm performance in order to propose a better combination of reverse logistics capabilities for firm performance.

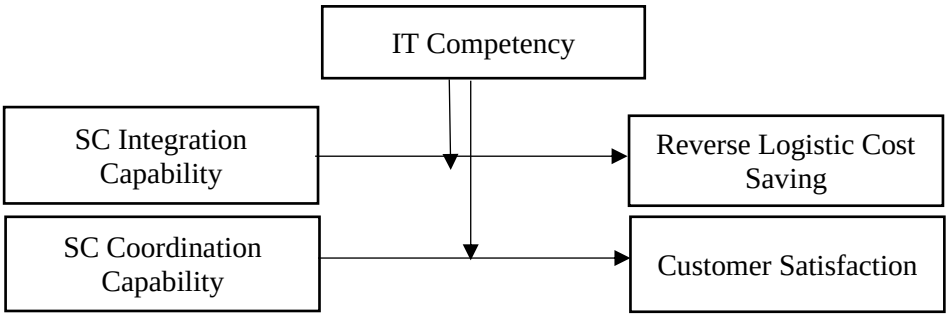

Figure 1: Research Model

RESEARCH METHODOLOGY

The research was quantitative and causal in character, with the researcher discussing cause and effect linkages among variables and testing hypotheses based on the research's theoretical framework. The current study was conducted to determine the impact of supply chain capacity factors on firm performance variables in the setting of reverse logistics, with the moderating role of company information technology competency. The strong influence of reverse logistics skills on business performance was demonstrated using quantitative data. The information was gathered using a standardised study questionnaire. The questionnaire had only closed-ended questions. Because it works with numeric figures and static data, the study was quantitative. The numeric data could be analysed using different statistical software.

Sample

A survey was undertaken in the fast food restaurant sector, with the goal of finding as many establishments as possible in Pakistan. A total of 300 surveys were sent to restaurant managers, including operations managers, supply chain managers, and other workers. Around 240 questionnaires were returned out of a total of 300. As a result, the study's sample size was 240 people. The data was obtained in a simple and accessible manner for the respondents using a convenience sampling technique.

Research instrument

For data collection, questionnaire was designed with 24 items. The independent variables; coordination capability and integration capability had five items while dependent variables; customer satisfaction had six items and reverse logistics cost savings had four items. The moderating variable IT competency had four items. Items of supply chain coordination and integration were adapted from (Yeniyurt & Cavusgil, 2006), items of customer satisfaction were adapted from (Vonderembse, Lim & Zhang, 2005), items of reverse logistics cost savings were adapted from (Skinner, Jack & Powers, 2010), and items of IT competency were adapted from (Vonderembse, Lim & Zhang, 2005) and (Richey, Autry & Morgan, 2016). Questionnaire consist of items that were closed ended and a five point Likert scale was used, (1=strongly disagree, 2=disagree, 3=neutral, 4=agree, 5=strongly agree). The quantitative data collected with the help of questionnaires and analysed by using Statistical Package for the Social Sciences (SPSS).

DATA ANALYSIS

Demographic Analysis

A demographic analysis is performed to get a rapid overview of the characteristics of the respondents. Males make up 92 percent of the 240 respondents, while females make up 8%. 87 percent of respondents are between the ages of 21 and 30, 12 percent are between the ages of 31 and 40, and 1 percent are between the ages of 41 and 50 years. Only 6.7 percent of the responding employees had a master's degree, 38.8 percent were graduates, 35 percent were intermediates, 19.2 percent had a matriculation degree, and only. Only 4% of the population was matriculated. Table 1 shows profile of respondents.

Table 1: Demographic Analysis

		Frequency	Percentage
Gender	Male	220	91.7
	Female	20	8.3
Qualification	Master‘s degree	16	6.7
	Graduates	93	38.8
	Intermediates	84	35.0
	Matriculation	46	19.2
	Under Matric	1	.4
Age	21-30	208	86.7
	31-40	29	12.1
	41-50	3	1.3
Experience	< 6 months	26	10.8
	< 1 year	59	24.6
	< 3 years	76	31.7
	3 years and above	79	32.9

Correlation, Mean, Standard deviation and Cronbach’s Alpha

In order to check the internal reliability of all factors the value of Cronbach alpha was computed. The value of Alpha that is >.60 is an acceptable value (Hair et al.,2006). The value of alpha for all constructs along with the number of items is shown in Table 2. From the results, we can see that the Cronbach‘s alpha value for all variables of the study are within acceptable range >.60 (Hair et al., 2006).Thus, reliability was confirmed.

The values in table 2 show that the mean value for supply chain integration is (M = 3.9, SD = .63), supply chain coordination (M = 3.8, SD = .74), reverse logistics cost savings (M = 3.7, SD = .71), customer Satisfaction (M = 3.8, SD = .72) and information technology competency (M = 3.8, SD = .81) were above three.

In order to calculate the correlation between dependent and independent variables

Pearson correlation was applied. Table 2 shows that all the variables show significant positive correlation.

Hypotheses Testing

To check the hypothesized relationships among variables, bootstrapping approach proposed by Preacher and Hayes (2004) was used. Bootstrapping calculates statistics based on random sampling from the data, thus, it is another name for re-sampling. Bootstrapping method provides an appropriate, easy and straightforward method to estimate for standard errors and confidence intervals for complex parameters.

In this study, it was supposed that with change in Information Technology Competency will change the effect of supply chain integration on reverse logistics cost savings. So, Information Technology Competency served as a moderator variable for the effect of supply chain integration on reverse logistics cost savings.

Table 2: Correlation, Mean, Standard deviation and Cronbach's Alpha

	Constructs	1	2	3	4	5	M	S.D	α
1	Supply Chain Integration	-					3.87	.629	.706
2	Supply Chain Coordination	0.598**	-				3.77	.738	.781
3	RL Cost Savings	0.169**	0.170**	-			3.75	711	.688
4	Customer Satisfaction	0.235**	0.220**	0.557**	-		3.78	.717	.813
5	Information Technology Competency	0.121	0.184**	0.192**	0.212**	-	3.78	.805	.783

Note: ** Correlation is significant at the 0.01 level (2-tailed).

Table 3: Moderating Effect of Information technology competency on SC Integration and Reverse logistics cost savings

	R	R^2	F	df1	df2	p
	.24	.06	4.9509	3.0000	236.00	.0024
		β	**SE**	**t**	**p**	
1	Supply Chain Integration	.1691	.0721	2.3448	.0199	
2	Information technology competency	.1534	.0562	2.7301	.0068	
3	Interaction term	.0352	.0816	.4308	.6670	

R^2 change = .0007, F (3,236) =4.9509, p=.0024

*Interaction term= Supply Chain Integration * Information technology competency

Dependent Variable: Reverse logistics cost savings

Table 3 shows the statistical values of effect of supply chain integration on reverse logistics cost savings with information technology competency as moderator. The values of overall model fit

are F (3, 236) = 4.9509, p =.0024, R^2 = .06. It shows that the two variables, supply chain integration and moderator together explain 6 percent of variance in reverse logistics cost savings. The effect of information technology competency on reverse logistics cost savings shows that one unit change in information technology competency brings 6 units change in reverse logistics cost savings (b =.0562, t (236) = 2.7301, p =.0068). The effect of supply chain integration on reverse logistics cost savings brought 7 units change in reverse logistics cost savings (b =.07, t (236) = 2.3448, p =.0199). So, the **H4:** Reverse logistics integration capability significantly influence reverse logistics cost savings has been accepted.For interaction term of supply chain integration and information technology competency there is insignificant value i.e. p value shows an insignificant moderation effect on reverse logistics cost savings (b =.0352, t (236) = .4308, p =.6670). This means that when firms perceive high level of information technology competency, the impact of supply chain integration on their cost savings would not increase, because firms have to face the cost to establish their IT systems. Hence, **H4(a):**IT competency enhance the relationship between integration capability and reverse logistics cost savings in handling reverse logistics has not been accepted. This effect is also graphically depicted in the moderation plot. The p-value of interaction term shown above is insignificant and graph proves that there was no moderating effect of ITC.

In this study, it was also supposed that with the supply chain coordination capability of firm, information technology competency also effects the reverse logistics cost savings with the increase and decrease use of the information technology competency, effect of supply chain coordination on reverse logistics cost savings may decrease or increase. Hence, change in information technology competency will change the effect of supply chain coordination on reverse logistics cost savings. So, information technology competency served as a moderator variable for the effect of supply chain coordination on reverse logistics cost savings.

Table 4 : Moderating Effect of Information technology competency on Sc coordination and Reverse logisticscost savings

	R	R^2	F	df1	df2	p
	.24	.06	4.6471	3.0000	236.0	.0035
		β	SE	t	p	
1	Supply Chain Coordination	.1348	.0623	2.1628	.0316	
2	Information technology Competency	.1472	.0568	2.5904	.0102	
3	Interaction term	.0054	.0749	.0726	.9422	

R^2 change = .0000, F (1,236) =.0053, p=.9422
*Interaction term= Supply Chain Coordination * Information technology competency
Dependent Variable: Reverse logistics cost savings

Table 4 shows the statistical values of effect of supply chain coordination on reverse logistics cost savings with information technology competency as moderator. The values of overall model fit are F (3, 236) = 4.6471, p =.0035, R^2 = .06. It shows that the two variables, supply chain coordination and moderator together explain 6 percent of variance in reverse logistics cost savings. The effect of information technology competency on reverse logistics cost savings

shows that one unit change in information technology competency brings 6 unitschange in reverse logistics cost savings (b =.06, t (236) = 2.5904, p =.0102). The effect of supply chain coordination on reverse logistics cost savings brought 6 units change in reverse logistics cost savings (b =.06, t (236) = 2.1628, p =.0316). There is positive and significant relationship among variables .So, the **H2:** Reverse logistics coordination capability significantly influence Cost savings has been accepted. For interaction term of Supply Chain Coordination and Information technology competency there is insignificant value i.e. p value shows an insignificant moderation effect on reverse logistics cost savings (b =.0749, t (236)= .0726, p =.9422). This means that when firms perceive high level of information technology competency, the impact of supply chain coordination on their cost savings would not increase, because firms have to face the cost to establish their IT systems. Hence, **H2(a):** IT competency enhance the relationship between coordination capability and cost savings in handling reverse logistics has not been accepted. This effect is also graphically depicted inthe moderation plot. Parallel lines show that ITC haven‘t played a role of moderator between SCC and RLCS. The p-value of interaction term shown above is insignificant showing that there is no moderating effect of ITC.

In this study, it was also supposed that with the supply chain integration capability of firm, information technology competency also effects the customer satisfaction with the increase and decrease use of the information technology competency, effect of supply chain integration on customer satisfaction may decrease or increase. Hence, change in information technology competency will change the effect of supply chain integration on customer satisfaction. So, information technology competency served as a moderator variable for the effect of supply chain integration on customer satisfaction.

Table 5: Moderating effect of information technology competency on SC Integration and customer satisfaction

	R	R^2	F	df1	df2	p
	.32	.11	9.2216	3.0000	236.0000	.0000
		β	**SE**	**t**	**p**	
1	Supply Chain Integration	.2516	.0709	3.5469	.0005	
2	Information technology competency	.1630	.0553	2.9492	.0035	
3	Interaction term	.1629	.0803	2.0294	.0435	

R^2 change = .0156, F (1,236) =4.1185, p=.0435
*Interaction term= Supply Chain Integration * Information technology competency
Dependent Variable: customer satisfaction

Table 5 shows the statistical values of effect of supply chain integration on customer satisfaction with information technology competency as moderator. The values of overall model fit are F (3, 236) = 9.2216, p =.0000, R^2 = .11. It shows that the two variables, supply chain integration and moderator together explain 11 percent of variance in customer satisfaction. The effect of information technology competency on customer satisfaction shows that one unit change in information technology competency brings 6 units change in customer satisfaction (b =.06, t (236) =2.9492 , p =.0035). The effect of supply chain integration on

customer satisfaction brought 7 units change in customer satisfaction (b =.07, t(236) =3.5469, p =.0005).So, the **H3:** Reverse logistics integration capability significantly influences customer satisfaction has been accepted. For interaction term of supply chain integration and on information technology competency there is positive and significant relationship i.e. p value shows a significant moderation effect on customer satisfaction (b=.08, t (236) = 2.0294, p =.0435). This means that when firms perceive high level of information technology competency, the impact of supply chain integration on customer satisfaction would also increase. Hence, **H3(a):**IT competency enhance the relationship between integration capability and customer satisfaction in handling reverse logistics has been accepted. This effect is also graphically depicted in the moderation plot. A graph of the hypothesized interaction showed how an ITC enhances the positive relationship or the impactof supply chain integration on customer satisfaction.

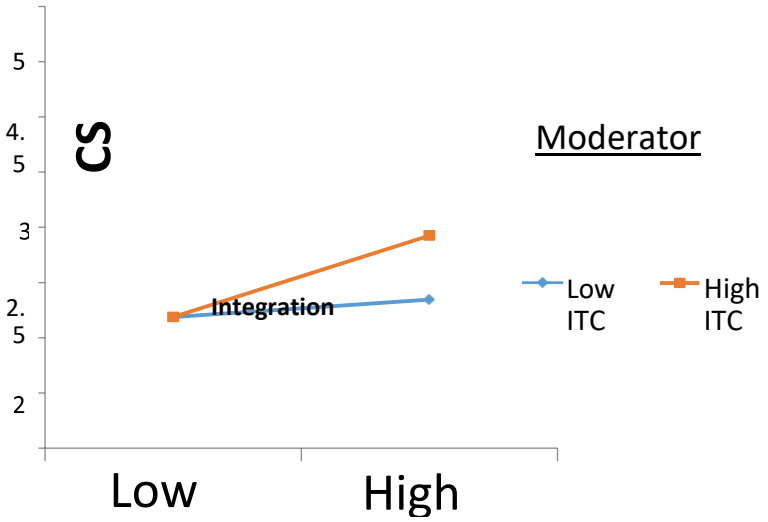

Figure 2: Moderating role of ITC On CS Integration and Customer Satisfaction

In this study, it was also supposed that with the supply chain coordination capability of firm, Information Technology Competency also effects the customer satisfaction with the increase and decrease use of the Information Technology Competency, effect of supply chain coordination on customer satisfaction may decrease or increase. Hence, change in Information Technology Competency will change the effect of supply chain coordination on customer satisfaction. So, Information Technology Competency served as a moderator variable for the effect of supply chain coordination on customer satisfaction.

Table 6: Moderating effect of information technology competency on SC Coordination and customer satisfaction

	R	R^2	F	df1	df2	p
	.31	.10	8.4326	3.0000	236.0000	.0000
		β	SE	t	p	
1	Supply Chain Coordination	.1950	.0615	3.1703	.0017	
2	Information technology competency	.1582	.0561	2.8215	.0052	
3	Interaction term	.1606	.0739	2.1733	.0308	

R^2 change = .0181, F (1,236) =4.7233, p=.0308
*Interaction term= Supply Chain Coordination * Information technology competency
Dependent Variable: customer satisfaction

Table 6 shows the statistical values of effect of supply chain coordination on customer satisfaction with information technology competency as moderator. The values of overall model fit are F (3, 236) = 8.4326, p =.0000, R^2 = .10. It shows that the two variables, supply chain coordination and moderator together explain 10 % of variance in customer satisfaction. The effect of information technology competency on customer satisfaction shows that one unit change in information technology competency brings 6 units change in customer satisfaction (b =.06, t (236) = 2.8215, p =.0052). The effect of supply chain coordination on customer satisfaction brought 6 units change in customer satisfaction (b =.06, t (236) = 3.1703, p =.0017). So, the **H1:** Reverse logistics coordination capability significantly influence customer satisfaction has been accepted .For interaction term of Supply Chain Coordination and Information technology competency there is positive and significant relationship i.e. p value shows a significant moderation effect on customer satisfaction (b =.06, t (236) = 3.1703, p =.0017). This means that when firms perceive high level ofinformation technology competency, the impact of supply chain coordination on customer satisfaction would also increase. Hence, **H1(a):**IT competency enhance the relationship between coordination capability and customer satisfaction in handling reverse logistics has been accepted. This effect is also graphically depicted in the moderation plot. A graph of the hypothesized interaction in figure 3 showed how an ITC enhances the positive relationship or the impactof supply chain coordination on customer satisfaction.

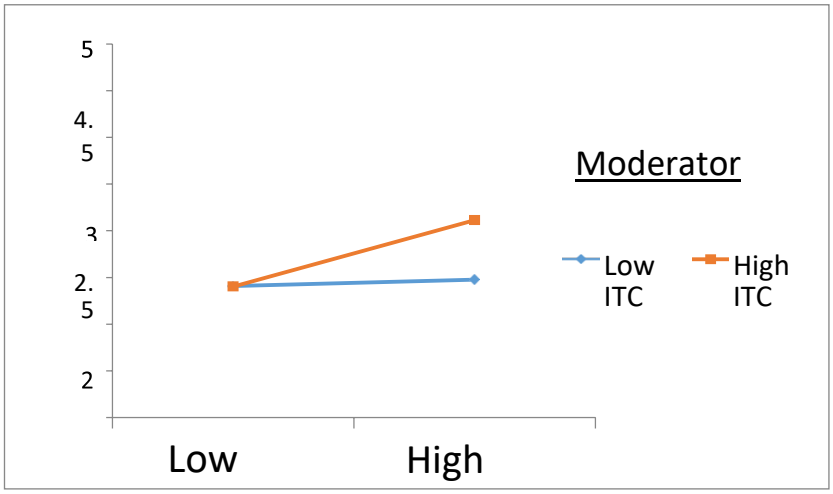

Figure 3: Moderating role of ITC On CS Coordination and Customer Satisfaction

Discussion

The study's goal was to look at the impact of reverse logistics capabilities such Supply Chain Integration and Supply Chain Coordination on business performance, with Information Technology Competency acting as a moderator. A survey-based research approach was employed to accomplish this. The study's findings on the impact of reverse logistics capabilities on business performance with

the moderating role of Information Technology Competency are summarised in this discussion part.

The study was a preliminary investigation of the impact of reverse logistics capabilities on business performance in Pakistan's fast food sector. The findings of this study suggest that supply chain competencies that contribute to business success should be investigated and developed. To investigate this research problem, the current study was conducted at Pakistani fast food outlets, focusing on those in Rawalpindi and Islamabad. Their feedback was obtained in order to acquire data in order to validate the research model provided in the previous sections. Many of the hypotheses presented in the study were verified by empirical tests, providing strong support for the suggested model.

The study looked at the impact of reverse logistics capabilities including supply chain integration and supply chain coordination on business performance, with information technology proficiency acting as a moderator. The statistical findings revealed that supply chain integration and coordination influenced company performance metrics such as reverse logistics cost savings and customer satisfaction in a positive way.

To achieve exceptional performance in reverse logistics, cooperation with suppliers is required; reverse logistics is all about material exchange, hence coordination with suppliers is required (Autry et al., 2016). Autry et al. (2016) anticipated that enterprises who interact with their supply chain partners in return processing will be more successful. Customer satisfaction is a factor of firm performance in this study. As a result, hypothesis H1: Reverse logistics coordination competence has a major impact on customer satisfaction, which has been established in prior research.

According to Autry et al. (2016), the positive association between IT competency and reverse logistics skills or capabilities and firm performance is explained by the researchers' discovery that the combined effect of IT and reverse logistics capabilities leads in improved firm performance. The hypothesis H1(a): IT competency improves the relationship between coordination capability and customer satisfaction in reverse logistics, as well as H3(a): IT competency improves the relationship between integration capability and customer satisfaction in reverse logistics, are supported by research (Autry et al.,2016). According to Powers, Jack, and Skinner (2010), organisations can save money if they focus on improving their reverse logistics capabilities. Researchers discovered a strong and positive association between a firm's reverse logistics capabilities and cost savings. The findings of a current study confirmed the results of previous study as the reverse logisticscapabilities such as supply chain integration and supply chain coordination have positive and significant relationship with cost savings. Hence hypothesis H2 and H4 are proved that were –Reverse logistics integration capability significantly influence reverse logistics cost savings" and "Reverse logistics coordination capability significantly influence reverse logistics Cost savings".

In their study, Rogers, Leuschner, and Charvet (2013) describe the relationships between SCI (supply chain integration) and firm performance, and the findings show that the association between SCI and firm performance is significant and beneficial. Customer happiness and reverse logistics cost savings are the predictors of firm performance, as they are in this study. As a result, the hypothesis H3: Reverse logistics integration competence has a considerable impact on customer satisfaction has been confirmed, which is in line with earlier research (Leuschner et al., 2013). IT is a significant field in supply chain management (SCM).

The adoption and application of information technology in supply chain management (SCM) also falls short of expectations. Many technologies, including as radio frequency identification (RFID), electronic data exchange (EDI), and the internet market, are more vital and costly than previously anticipated (Lau, 2007; Wang et al.,2007). Furthermore, IT adoption is complicated by a number of supply chain factors such as integration and coordination. As a result, the development of IT competency is not always a profit area or a cost savings for the company, but it is an expense for the company. The hypothesis **H2 (a):** IT competency enhance the relationship between coordination capability and cost savings in handling reverse logistics and **H4(a):**IT competency enhance the relationship between integration capability and reverse logistics cost savings in handling reverse logistics were not accepted with the reference study of (Lau, 2007; Wang et al.,2007).

To summarise the findings of the study, the researcher proposes that enterprises engage themselves to improve their supply chain capabilities such as integration and coordination with a perfect and cost-effective mix of IT competency in both the forward and reverse context. In the current study, two performance variables reverse logistics cost savings and customer satisfaction are positively influenced by coordination and integration capabilities, implying that these capabilities boost firm performance. However, when combined with integration and coordination on cost savings, the moderator IT competency hasn't shown significant or positive results. ITC has also produced positive and significant outcomes, demonstrating that supply chain integration and coordination are linked to consumer happiness.

Conclusion

The study's findings confirmed the positive impact of supply chain integration and coordination on firm performance determinants such as reverse logistics cost savings and customer satisfaction, while the Information Technology Competency strengthened the relationship between supply chain integration and supply chain coordination with customer satisfaction, but the moderator Information Technology Competency did not show significant results with supply chain integration and coordination.

In terms of resources, developing reverse logistics capabilities may necessitate firms devoting specific resources to their efforts. The allocation of resources should be directed to plan the reverse logistics method, especially in the dynamic consumer-driven economy. For example, a firm's financial strength and human resource allocation are both dependent on the development of IT competency since well-qualified employees are necessary to ensure that technology is deployed appropriately. Returns-focused resources could be pooled to improve other supply chain ideas while maintaining openness. Autry and his associates (2016). The study explores how effective reverse logistics skills, such as integration, coordination, and enhanced (IT) information technology, can help companies achieve customer satisfaction.

Theoretical and Managerial Implications

The research is worthwhile because it advances theoretical ideas and establishes a managerial foundation. The study's findings offer insight into how to establish efficient and effective reverse logistics capabilities, and the moderator information technology competency' illustrates how proper application of IT competency leads to customer happiness. Because a company's

weak reverse logistics capabilities result in poor handling and recycling of used products, these used products have a bigger environmental impact. As a result, managers should work to improve their ability to deal with reverse logistics on a proactive basis. Another point of view for managers is that in order to maximise their reverse logistics capabilities, companies choose to engage in minimal levels of coordination and integration that demand just the most basic levels of IT expertise. In such instances, the managers will require a minimal level of collaboration in order to accomplish the required outcomes. The phenomena in which ITC hasn't strengthened the association between supply chain capability variables and reverse logistic cost saving was explained by the hypothesis that was not accepted in the current investigation.

Companies can save money on packaging by recycling used plastic bottles, fast food wrappers, containers, and other packing materials. Restaurants should provide a convenient location for customers to dispose of waste items, and they can also encourage and engage their customers to recycle packaging and other waste materials. In order to introduce this study, the researcher reviewed a large body of literature that assisted him in explaining a variety of perspectives and theories related to reverse logistics skills. Existing ideas such as the resource-based view (RBV) and the firm's transection cost economies are studied by researchers. The main goal of this study was to see if reverse logistics capabilities as a company resource are linked to higher firm performance. We may argue that enterprises that aim to satisfy their consumers employ their resources to establish effective logistics capabilities and IT systems that cut transaction costs and improve performance in terms of enhanced customer satisfaction by considering RBV.

This can assist in determining whether reverse logistics capabilities might be seen as a competitive advantage. We have proposed a novel theoretical framework to enhance current corporate skills connected to reverse supply chain in this study. The research factors can be utilised to better understand previous reverse logistics research as well as to guide future study. This framework of basic reverse logistics capabilities and reviewed literature will serve as a guide for scholars and offer them with opportunities for future study.

Future Implications

Because the study only looked at the impact of reverse supply chain capabilities on firm performance, it would be useful to broaden the scope of the study to include both forward and reverse supply chain capabilities, or closed loop supply chain capabilities. Continuing with the same research strategy and relating results from various industries and sources could also be a direction for future research. Furthermore, the volunteers were chosen only from Pakistani fast food establishments. The two elements that influence the reverse logistics aspects and give differing results on firm performance are culture and people behaviour. As a result, future study should look into reverse logistics competence elements in other industries in the country, or globally, to offer a framework for cross-validation of the research model.

Although this study does not cover every aspect of reverse logistics, it can be considered a tiny but significant step forward in the theoretical disciplines of reverse logistics. Future research should focus on not only refining and strengthening the constructs identified in this study, but also expanding the domain by focusing on factors other than information technology competency. Many other dynamic capabilities, such as creating a sustainable business

environment, have been investigated in reverse logistics studies, and the literature will continue to expand in this direction in the future. Because we used information technology competency as a moderator in this study, future research will use information technology competency as an independent variable. Because the role of information technology competency is important in every industry and type of organisation, researchers can examine the effect of information technology competency as an independent variable in reverse logistics in the future.

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