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Impact of ICT on Supply Chain Management in Flextronics Limited, Singapore

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Abstract

Supply chain management is the regulation of a channel of interconnected businesses engaged in the ultimate provision of goods or service needed by consumers. It manages the flow of goods and services and includes all processes that transform raw materials into final products. Precisely, supply chain management aims to maximize customer value. Hence, the study sought to examine the impact of ICT on supply chain management in the case study of Flextronics Limited in Singapore. The study adopted the descriptive research design. The target population was 593 employees. The study managed to get a sample size of 239 from the targeted population. The collection of the data was done using questionnaires. The basis for choosing the questionnaires to collect the data was because they were considered more reliable and less costly. The analysis of the data was done using descriptive and inferential statistics. The study findings showed that ICT adoption positively and significantly impacts supply chain management in Flextronics Limited, Singapore. The utilization of ICT in supply chain management has resulted in high efficiency, quality and timely sharing of needed business information. Besides, ICT adoption increases collaboration between suppliers and customers. The study concluded that adoption of the ICT has a significant impact on supply chain management. ICT increases communication and partnerships between suppliers and customers. The study recommended that modernized ICT tools should be adopted and implemented by Flextronics Limited, especially stores and production departments. The organization needs to keep advancing based on the changes in technology, given that technology keeps on changing on a daily basis. The organization's departments should be sensitized to the essence of ICT in improving the organization's supply chain management.

Keywords: *ICT, Supply Chain Management, Flextronics Limited, Singapore*

1.0 Introduction

Supply chain management (SCM) is defined as the regulation of a channel of related businesses engaged in providing commodity or service packages that end customers need. SCM is the cooperation of business functions from the end users through the original suppliers who offer services and information which adds value for customers. Moreover, the supply chain is regarded as a simple logistics extension, connecting customers to manufacturers through suppliers. Aazam, Zeadally and Harras (2018) defined ICT as giving and receiving information using scientific practices like computers, networks and the internet, which requires sending understanding and feedback. As a result of globalization, organizations have already begun changing the means of communication, using technology, embracing the diversity of business transactions and process advancement for improving the organization's performance through ICT use in their Supply Chain Networks (Neumeyer, Santos & Morris, 2020).

SCM is a rigid and complex network method, which refers to the combination of all operations, beginning with the procurement of the raw materials from the manufacturer/producer and ending with the delivery of the final commodity to the customer. Supply chain management is the regulation of a channel of interconnected businesses engaged in the ultimate provision of goods or service needed by consumers. It manages the flow of goods and services and includes all processes that transform raw materials into final products. Precisely, supply chain management aims to maximize customer value (Raja Santhi & Muthuswamy, 2022). Supply chain management is a rapidly growing important management strategy that will assist businesses to highly improve their supply chain functions (Lee, Ooi, Chong & Sohal, 2018). It includes the flow of products, information, and funds in a network with suppliers, producers, distributors, and customers. The use of ICT is growing quickly in the supply chain management field. Since businesses seek to improve supply chain efficiency through enhanced integration, ICT might be an essential enabler for supply chain management by assisting in information-sharing (Panahifar, Byrne, Salam & Heavey, 2018).

Khan and Yu (2019) reported that SCM is a set of strategies used to properly integrate systems for producers, warehouses and storage facilities so that product is manufactured, packed and distributed with the required amounts to the designated place and at the right time to reduce the system-many expenses while satisfying customers. SCM considers each element that might influence the cost and plays a critical role in ensuring the commodity conforms to the demands of the customer from the supplier and production centers through warehouses facilities and distribution channels to retailers and stores (Xiao, Wilhelm, van der Vaart & Van Donk, 2019). ICT enhances supply chain management since it creates value. ICT-based services make it easy for firms to improve purchasing management tasks and remodel or redesign supply chain tasks, increasing business operations. Using ICT in SCM results in high efficiencies, quality and timely sharing of needed business information (Kumar, Singh & Modgil, 2020).

The extent could influence supply chain management in the use of ICT. The innovations in the internet sector and the growth in information and communication technology (ICT) have contributed to efficiency in the dissemination of information in the required time, timely access, sharing and exchange of information, enhancements in regulation and interactions, logistics and other supply chain management activities (Wang, Agyemang & Jia, 2021). ICT has enabled

interactions between various businesses along the supply chain, enabling data sharing and exchange of information at a quicker speed and accuracy, facilitating enterprises to meet customer needs on time and meeting the required set customer service standards. Hence, based on this background, the study sought to examine the impact of ICT on supply chain management in the case study of Flextronics Limited in Singapore.

2.0 Literature Review

Raja Santhi and Muthuswamy (2022) noted that supply chain management is becoming a key management tool to assist firms in enhancing their business functions. Even though ICT technologies have been highly utilized in supply chains, there is an inadequacy of clear proof showing the methods through which IT creates value. Moreover, as supply chain goals are overtaking operational efficiency in performing higher-order goals, like knowing the market changes and understanding new partnering frameworks to give higher customer value, the skills required for supply chains to maintain their competitive advantages should be properly comprehended by researchers and practitioners. The study examines the impacts of ICT knowledge management capability on the performance of the supply chain. Referring to the resource-based theory of the organization and the relationship perspective of the organization's competitive advantage, the study proposes a proper structure of supply chain IT capability as enhancing/hindering the supply chain knowledge management capability. Research utilizing survey-based data gathering was performed and a simulation model was constructed to determine how IT facilitated knowledge management tasks influence organizations' long-term knowledge outcomes.

According to Sandybayev and Bvepfepfe (2022), there is the rapid development of IT together with communication technology in SCM has a very important function in operationalizing decisions of supply chain network flow for attaining the anticipated competitiveness, enhancing greater operational level, reducing inventory, supply chain expenses and lowering electronic risks. IT in SCM is needed to achieve cooperation and properly share information all over and beyond the firms. Firms are migrating to the virtual supply chain with the aid of constant innovations in technology and usage of IT; Electronic Data Exchange, Radio Frequency Identification, Bar Code, E-Commerce, Decision Assistance system and Enterprises Resource Planning package. Additionally, it is commonly used in reducing e-risks. Knowing the function and the usage of IT in regulating and lowering e-risks of the Supply Chain is the fundamental theme of the study. Growth in information and communication technology (ICT) has contributed to efficiency in disseminating information in the required time, timely access, sharing and exchanging information, enhancements in regulation and interactions, logistics and other supply chain management activities. The process should be regular because ICT will keep changing with the supply chain changes. ICT has enabled interactions between various businesses along the supply chain, enabling data sharing and exchange of information at a quicker speed and in an accurate manner. The extent could influence supply chain management in the use of ICT. ICT has enabled interactions between various businesses along the supply chain, enabling data sharing and exchange of information at a quicker speed and accuracy, facilitating enterprises to meet customer needs on time and meeting the required set customer service standards. The study concluded that adoption of the ICT has a significant impact on supply chain management. It is critical for

organizations to adopt and implement modernized ICT tools, especially in stores and production departments.

Dehghani and Navimipour (2019) sought to determine the effect of ICT on supply chain management. The research goals were to investigate the ICT tools employed in SCM at Alkem Laboratories, examine the impact of ICT on the SCM at Alkem Laboratories and the problems caused by ICT on the SCM at Alkem Laboratories. The study consisted of quantifying data, tabulating results and knowing the treatment of information. The sample size included participants comprised of the top management, junior employees, transport, auditing, stores and other user departments. Data were obtained from the field by the use of questionnaires and further analyzed by the use of frequencies, correlations and percentages. The results indicated that orders and deliveries are highly provided and there is low credit regulation. Levels of ICT tools reveal that there needs to be more training. The effect of ICT on SCM has a strong positive association of 0.89. It was recommended that ICT ought to be used to attain supply chain management.

Zeadally (2021) showed that ICT is positively and significantly related to SCM. The use of ICT enhances the handling of information resources and prevents delays, hence resulting in lowering costs and increasing customer compliance; therefore, it improves the general competitiveness of the firm. In the current generations, organizations have already started changing the methods of communication, using technology, embracing the diversity of business transactions and advancement in different processes to improve the performance of organizations through ICT use in their Supply Chain Networks. Growth in information and communication technology (ICT) has contributed to efficiency in disseminating information in the required time, timely access, sharing and exchanging information, enhancements in regulation and interactions, logistics and other supply chain management activities. The extent could influence supply chain management in the use of ICT. ICT has enabled interactions between various businesses along the supply chain, enabling data sharing and exchange of information at a quicker speed and accuracy, facilitating enterprises to meet customer needs on time and meeting the required set customer service standards. The study concluded that adoption of the ICT has a significant impact on supply chain management. It is critical for organizations to adopt and implement modernized ICT tools, especially in stores and production departments. The process should be regular because ICT will keep changing with the supply chain changes. ICT has enabled interactions between various businesses along the supply chain, enabling data sharing and exchange of information at a quicker speed and in an accurate manner.

Amoako, Sheng, Dogbe and Pomegbe (2022) discovered that good SCM is important for the competitiveness of firms because it ensures that there is the effective delivery of supplies, the good coordination with suppliers, intermediaries and market demands. The usage of ICT in the SCM has shown a favorable effect in firms that have executed it, especially in the procurement sector, because it increases collaboration and improves the kind of information shared between suppliers and purchasers. The study evaluates the association between ICT, strategies and SCM. An analysis was performed among managers in 80 processing SMEs in the food industry. Data was assessed using structural equations and linear regression models with SPSS software assistance. The essence of the study was within the evaluated area (food industry); there have been few types of research concerning the processing sector, particularly in the aspects associated with factors that

affect performance and competitiveness. The research of the SCM and the techniques used by this sector indicates the economic development of the area in past years, its enhancement in infrastructure, and a significant improvement in the creation of jobs; it also takes a big share of the exports. The research is hence important, especially for SMEs that, despite being the main dynamic sub-sector in the industry, still have the most challenging issues of how they are organized, how they connect with other sectors and the overall efficiency. The findings indicate that the various approaches and ICT affect the performance of the SCM. The usage of ICT enhances the handling of information resources and prevents delays, hence resulting in lowering costs and in increasing customer compliance; therefore, it improves the general competitiveness of the firm.

Panahifar, Byrne, Salam, and Heaveyn (2018) indicated that the use of ICT is growing quickly in the supply chain management field. The utilization of ICT in SCM results in high levels of efficiency, quality and timely sharing of needed business information. The use of ICT in the SCM has increased in many firms that have executed it, especially in the procurement sector, because it increases collaboration and improves the kind of information shared between suppliers and purchasers. ICT has enabled interactions between various businesses along the supply chain, enabling data sharing and exchange of information at a quicker speed and accuracy. The research generally concluded that ICT greatly impacts supply chain management practices by improving the financial status. The biggest noted problems that hinder firms from adopting ICT are security and reliability perception challenges and affect the operating cost. The study recommended that modernized ICT tools should be adopted and implemented by Flextronics Limited, especially stores and production departments. The process ought to be regular because ICT will keep changing with the supply chain changes. All departments of the organization should be sensitized on the essence of ICT in improving the SCM of the organization.

Yu, Huo and Zhang (2021) argued that supply chain usage is broadly regarded a key contributor to supply chain effectiveness. The two main flows in the such association are procurement and information technology. Prior researches have handled information technology and procurement in different researches. In this study, we explore the relationship between information communication technology and procurement between supply chain partners and their impact on the supply chain. Information technology capabilities and procurement both have substantial implications for the supply chain. The research investigates the significance of information and communication technology and procurement to survive and maintain a competitive advantage, which in turn tries to enhance the supply chain. In addition, the proposed framework will be very important in any environment as it results from the review of past research. The research is among the first to define and explain the relationship between information technology, procurement and supply chain conceptually.

Afshan, Chatterjee and Chhetri (2018) performed research to investigate the impacts of ICT on SCM practices in Boon Rawd Brewery in Thailand. Furthermore, the research identified the problems faced by Boon Rawd Brewery when adopting ICT in their supply chain management practices and the level and impact of the utilization of ICT on SCM. A case study design with 200 participants was used in the research. Simple random sampling was utilized to choose the participants, whereby questionnaires and Interview techniques were employed to collect the required data. The research discovered that; ICT influences the supply chain management practices

by enhancing the financial performance of Boon Rawd Brewery; The biggest noted problems which hinder the firm from adopting ICT are the challenges of security and reliability perception and huge operating cost for employing the ICT frameworks and paying the employees, and ICT is largely utilized in Resources Planning and Management and records management and maintaining the supply chain management practices of Boon Rawd Brewery. The research suggested that it is important for the Boon Rawd Brewery to look for ways that may enhance their development projections and give them the required skill to develop a proper distinction in the industry. Hence, the firm is required to use ICT in a particular way that matches the needed targets of flexibility and scalability, giving them the competitive advantage to be ahead and provide new and enhanced commodities to delight their consumers.

3.0 Research Methodology

The study adopted the descriptive research design. The target population was 593 employees. The study managed to get a sample size of 239 from the targeted population. The collection of the data was done using questionnaires. The basis for choosing the questionnaires to collect the data was because they were considered more reliable and less costly. The analysis of the data was done using descriptive and inferential statistics

4.0 Research Findings and Discussion

The research findings and discussion are presented in sections. Each section is exhaustively discussed.

4.1 Correlation Analysis

The results presented in Table 1 show the correlation analysis

Table 1: Correlation Analysis

		SCM	ICT
SCM	Pearson Correlation	1.000	
	Sig. (2-tailed)		
ICT	Pearson Correlation	. 518**	
	Sig. (2-tailed)	0.000	0.000

The correlation results from Table 1 show that the ICT was positively and significantly associated with SCM (r=.518, p=.000). This concurs with Yu, Huo and Zhang (2021) reported that Information technology capabilities and procurement both have substantial impacts on the supply chain. The various ICT approaches are used to affect the performance of the SCM. The use of ICT in the SCM has shown a positive effect in firms that have executed it, especially in the procurement sector, because it increases collaboration and improves the kind of information shared between suppliers and purchasers. ICT has enabled interactions between various businesses along the supply chain, enabling data sharing and exchange of information at a quicker speed and accuracy.

The study by Panahifar, Byrne, Salam and Heavey (2018) noted that innovations in the internet sector and the growth in information and communication technology (ICT) have contributed to efficiency in the dissemination of information in the required time, timely access, sharing and exchange of information, enhancements in regulation and interactions, logistics and other supply chain management activities. ICT has enabled interactions between various businesses along the supply chain, enabling data sharing and exchange of information at a quicker speed and accuracy, facilitating enterprises to meet customer needs on time and meeting the required set customer service standards.

4.2 Regression Analysis

This section includes model fitness, analysis of variance and regression of coefficient. The results presented in Table 2 show the model fitness

Table 2: Model Fitness

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.518 a	0.227	0.184	0.002501

The results from Table 2 indicate that ICT was found to be satisfactory in explaining the SCM in Flextronics Limited, Singapore. This was supported by the coefficient of determination, also known as R square of 0.227. This indicates that ICT explains 22.7% of the variations in the SCM in Flextronics Limited in Singapore. The use of ICT is growing quickly in the supply chain management field. Since businesses seek to improve supply chain efficiency through enhanced integration, ICT might be an essential enabler for supply chain management by assisting in information-sharing (Panahifar, Byrne, Salam & Heavey, 2018). The extent could influence supply chain management in the use of ICT. The innovations in the internet sector and the growth in information and communication technology (ICT) have contributed to efficiency in the dissemination of information in the required time, timely access, sharing and exchange of information, enhancements in regulation and interactions, logistics and other supply chain management activities (Wang, Agyemang & Jia, 2021). ICT has enabled interactions between various businesses along the supply chain, enabling data sharing and exchange of information at a quicker speed and accuracy, facilitating enterprises to meet customer needs on time and meeting the required set customer service standards.

Table 3: Analysis of Variance

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	7.45	1	7.45	174.13	.000b
	Residual	10.14	237	0.043		
	Total	17.59	238			

The result in Table 3 shows that the overall model was statistically significant. The findings show that SCM is a good predictor of the ICT among Flextronics Limited profitability in Flextronics Limited, Singapore. This was supported by an F statistic of 174.13 and the reported p-value of 0.000, which was less than the conventional probability significance level of 0.05. ICT adoption positively and significantly impacts supply chain management in Flextronics Limited, Singapore. The utilization of ICT in supply chain management has resulted in high efficiency, quality and timely sharing of needed business information. Besides, ICT adoption increases collaboration between suppliers and customers. ICT improves communication and partnerships between suppliers and customers.

Table 4: Regression of Coefficient

	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
(Constant)	0.795	0.112		7.10	0.021
ICT	0.854	0.125	0.572	6.83	0.008

Based on the results presented in Table 4, it was noted that ICT was positively and significantly related to SCM (β=0.854, p=0.008). This was supported by a calculated t-statistic of 6.83, which is larger than the critical t-statistic of 1.96. This result implies that when the efficiency in the ICT improves by one unit, the SCM in Flextronics Limited in Singapore will increase by 0.854 units. At the same time, other factors that influence the SCM are held constant. Amoako, Sheng, Dogbe and Pomegbe (2022) articulated that using ICT enhances the handling of information resources and prevents delays, hence resulting in lowering costs and increasing customer compliance; therefore, it improves the general competitiveness of the firm. Most organizations have already started changing the methods of communication, using technology, embracing the diversity of business transactions and advancement in different processes to improve the performance of organizations through ICT use in their Supply Chain Networks. The study by Panahifar, Byrne, Salam and Heavey (2018) noted that innovations in the internet sector and the growth in information and communication technology (ICT) have contributed to efficiency in the dissemination of information in the required time, timely access, sharing and exchange of information, enhancements in regulation and interactions, logistics and other supply chain management activities. The extent could influence supply chain management in the use of ICT. ICT has enabled interactions between various businesses along the supply chain, enabling data sharing and exchange of information at a quicker speed and accuracy, facilitating enterprises to meet customer needs on time and meeting the required set customer service standards. The utilization of ICT in supply chain management has resulted in high efficiency, quality and timely sharing of needed business information (Zeadally, 2021). Besides, ICT adoption increases collaboration between suppliers and customers. ICT improves communication and partnerships between suppliers and customers.

5.0 Conclusion

The study concluded that adoption of the ICT has a significant impact on supply chain management. ICT increases communication and partnerships between suppliers and customers. ICT has a great impact on supply chain management practices by improving the financial status of Flextronics Limited. The biggest noted problems that hinder firms from adopting ICT are security and reliability perception challenges and affect the operating cost. The various approaches of ICT are used to simulate the performance of SCM. The use of ICT is growing quickly in the supply chain management field. Supply chain management is the regulation of a channel of interconnected businesses engaged in the ultimate provision of goods or service needed by consumers. It manages the flow of goods and services and includes all processes that transform raw materials into final products. Precisely, supply chain management aims to maximize customer value. The utilization of ICT in supply chain management has resulted in high efficiency, quality and timely sharing of needed business information. ICT adoption increases collaboration between suppliers and customers. ICT improves communication and partnerships between suppliers and customers. ICT has enabled interactions between various businesses along the supply chain, enabling data sharing and exchange of information at a quicker speed and in an accurate manner.

6.0 Recommendations

Flextronics Limited should adopt and implement modernized ICT tools, especially in stores and production departments. The process ought to be regular because ICT will keep changing with the supply chain changes. All departments of the organization should be sensitized on the essence of ICT in improving the SCM of the organization. Anti-virus measures should be adopted to control viruses over the internet and computers. These will lower the chances of the virus spreading to computers and destroying files, systems and other documents, hence losing information at Flextronics Limited. Flextronics Limited should also in-cooperate with the insurance industry to make sure the risks of losses resulting from the use of ICT are taken care of. ICT has enabled interactions between various businesses along the supply chain, enabling data sharing and exchange of information at a quicker speed and in an accurate manner.

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