The Journal of Social Sciences Research
ISSN(e): 2411-9458, ISSN(p): 2413-6670
Vol. 5, Issue. 4, pp: 949-956, 2019
URL: https://arpgweb.com/journal/journal/7
DOI: https://doi.org/10.32861/jssr.54.1295.1302

Academic Research Publishing Group

Original Research Open Access

The Role of Just in Time, Total Quality Management, and Supply Chain Management toward Better Operational Performance

Jamal Ahmed Al-Doori*
Business School, Al-Ahliyya Amman University, Jordan

Alaa Alhorani
Business School, Al-Ahliyya Amman University, Jordan

Ahmad Yousef Areiqat
Business School, Al-Ahliyya Amman University, Jordan

Abstract

The medical sector has entered an epoch of rapid innovation and strengthened competition that demands more creativity. That rapidly changing environment demand more flexibility for the operations. Although, various studies are available on the effects of multiple approaches on operational flexibility still JIT, TQM, and SCM never have been verified in the same study. This is empirically varification, a questionnaire has been distributed by convenience sampling in the medical sector of Jordan. Total 318 responses received and SPSS have been applied for multiple regression analysis. It has found that all three approaches have positive effects on operational flexibility but very minor even no approach has significant effects. This study is unique because it applies three diversified approaches in the same study and findings are unique. It is recommended for all managers of a medical sector that JIT, TQM, and SCM are not beneficial for operational flexibility for developing countries due to lack of resources, technology, and education. This study will help the researches that more studies need to verify for Jordan hospitals. Moreover, future studies can be done to identify the reasons behind these unique findings.

Keywords: Just-in-time; Total quality management; supply chain management; Operational flexibility.

1. Introduction

Global crises, war on terror and oil prices effects all the industries on the gulf. It has become essential to be more proactive, operationally efficient and reduce the cost to sustain the current scenario. Enhancing the quality of health care has become not only an apprehension of patients but also for the governments, professionals, and managers. Patients more and more expect more from health care services and relate their experiences to those countries with higher quality services. There are various approaches and strategies are available that have verified how to improve the performance of the hospitals or health care services (Naser *et al.*, 2011), The aim of this study is to empirically verify the positive effects of JIT, TQM, and SCM on the operational flexibility. A questionnaire has been distributed by convenience sampling among all health care organizations like public and private hospitals and medical centers.

Naser *et al.* (2011), illustrated that flexibility is a significant concept in operations management which should not be limited to manufacturing but be discovered in all types of operations. Kumar *et al.* (2010), flexibility always an inhered portion of health care due to the essential responsiveness to each patient in the clinical service procedure. Today changing environment marks flexibility one of the competitive urgency that service sector has to covenant with. Previous studies show that operational flexibility not only reduces the risks but also enhance the stakeholders, wealth (Kumar *et al.*, 2010), Meanwhile, operational flexibility also creates a competitive position (Tang and Tomlin, 2008).

There are various studies available that significantly effects operational flexibility like Wang (2010), SCM reduce operational and financial hedging by improving operational flexibility. Meanwhile, it has been found that SCM positive effects a hospital's supply chain performance (Chena *et al.*, 2013; Shahbaz *et al.*, 2018b), Additionally, TQM also proved to have positive effects on the performance of the supply chain (Laboso, 2016; Naser *et al.*, 2011). Moreover, SCM has positive and significant effects on operational flexibility (Shou *et al.*, 2018). Furthermore, it has found that supply chain management will give the maximum in the presence of flexibility (Rao and Goldsby, 2009). Now there is a need to verify these approaches for Jordan hospitals. There are numerous strategies and approaches but three JIT, TQM, and SCM got considerable attention (Kannan and Tan, 2005; Shahbaz *et al.*, 2018b).

It can be concluded that although various studies are available on JIT, TQM and SCM and their relationship for the manufacturing sector as well as service sector but the study is scared for health care sector especially for developing countries like Jordan. The aim of this study is the empirical verification of the hypothesis. A questionnaire has been distributed to health care sector of Jordan. SPSS has been applied for multiple regressions. The finding of this study is very unique. Although, all three approaches have a positive effect on operational

*Corresponding Author

flexibility but these effects are not significant. Next segment is a literature review that will explain the brief literature on JIT, TQM, SCM, and OF. After that methodology and data analysis has been explained. Lastly, discussion and conclusion have been illustrated.

2. Literature Review

This chapter will present a brief description of one dependent variable operational flexibility and three independent variables namely Just-in-time, total quality management, and supply chain management. A previous literature review has been discussed three hypotheses have developed.

2.1. Operational Flexibility

Today changing environment marks flexibility one of the competitive urgency that service sector has to covenant with. Flexibility usually stretches organizations more options to diversify themselves that allowing them to handle a greater variety of market needs and customers. Every organization is an essential part of a complex network any problem occurred in anywhere will disrupt the whole system. So, it is important for the organizations to keenly consider their individual performance (Kanji *et al.*, 2010; Shahbaz *et al.*, 2017), Performance is defined in diverse ways and from various perspectives. First, there is a need to know about performance. Performance refers to instigate and execute a set of actions and these activities characterize as an actual result, consequences, or achievements (Zwain, 2012), Based on this phenomenon, numerous definitions have proposed but the researchers are willing to agree with the position that a consistent definition is essential. Performance is narrowly viewed from the financial performance perspective, giving considerations to assets, budgets, sales volume, revenues growth or profitability results (Basu *et al.*, 2017), However, findings show that performance increase beyond financial benefits such as competitive advantage, innovation, quality result, improvement trends, etc. (Al-douri, 2018; Florian and Constangioara, 2014; Shahbaz *et al.*, 2019b; Zwain, 2012), Thus, this will lead the definition of performance as "a broad construct, which captures what organizations are involved in, produce, and accomplish for the various constituencies with which they interact" (Fransoo *et al.*, 2011). This study perceived performance from the level of institutions flexibility in relations of enhancement trends. Naser *et al.* (2011), illustrated that flexibility is a significant concept in operations management which should not be limited to manufacturing but be discovered in all types of operations. Kumar *et al.* (2010), flexibility always an inhered portion of health care due to the essential responsiveness to each patient in the clinical service procedure. Table 1 shows the measurement items for operational flexibility.

Table-1. Measurement items for operational flexibility

Variable	Items	Reference
Operational flexibility	We have been able to offer new, unique, and innovative services to our customer	(Naser Alolayyan et al., 2011)
	We have been able to integrate some features of services into an alternative package as requested by customers	
	We have been able to offer a large number of service features and a variety	
	We have been able to anticipate service delivery to meet customer requirements	
	We have been able to recover service to customers after something goes wrong	
	We are able to remain effective operationally, despite some elements of service, which could go wrong	
	There seems to be less confusion in procedures to the employees in carrying out their responsibilities	
Operational flexibility	Managers seem to contradict themselves while making important decisions.	Operational flexibility
	There has been less interruption of activities due to maintenance glitches	
	Employees know what to do when there is a system failure such as "blackout" or accident.	

2.2. Just in Time

The aim of just in time is based on "philosophy of eliminating waste and utilizing the full capability of each worker to gain maximum benefit traditionally, purchasing departments have been given the task of negotiating for the lowest prices possible in an effort to reduce costs and increase company profits (Manese, 2014). Today's competitive market demands for a rationalized strategy and JIT has become a world-class competitor for world-class organizations. Since last two decades, the purchasing has converted one of the most essential origins in launching the value-added contents for the products and services (Kim, 2010). In order to contrivance JIT practically and eliminate the various forms of waste, the real-world aspects of JIT have sub-divided into techniques. Certain techniques epitomize JIT production these methods are denoted as JIT techniques. It is important to note that many of these so-called JIT techniques are not unique to JIT. In order to operate JIT, the assembler firm needs to encourage co-operative supplier relationships across the whole manufacturing chain and therefore support the reduction of supply interruptions (Aitken, 1998). Shortages of raw material, shorter lead time, high quality, increasing the variety of products with smaller runs, inflation, productivity, and the introduction of a JIT purchasing system etc. has prompted the realization of the importance of purchasing. The traditional approach to purchasing is at the root of many of the problems, the business faces today (Shahbaz *et al.*, 2018c; Tenhiälä, 2009), JIT pressures on quality, which is vital for a JIT system. The flaws not only yield waste but they can also work the production route to a halt. A JIT system is designed to expose errors and get them corrected rather than covering them up with inventory. JIT can be applied

to many subsystems of a manufacturing environment such as engineering design, setup time and lot size reduction, purchasing, flexibility, suppliers' management, product development, inventory reduction at every stage, marketing, lead time reduction etc. among these purchasing has the cost saving (Qrunfleh, 2010), Thus, to assess the just in time below mentioned hypothesis has been developed:

H_1: Just in time has a positive effect on operational flexibility

2.3. Total Quality Management (TQM)

TQM can be defined as "a management strategy of an organization which focuses on quality, the participation of all staff members and aims at long term success" (Laboso, 2016), Here, quality considered as "the value and degree of excellence" (Twaissi, 1998), Quality initiatives in every country usually begin with quality improvement platforms at industrial organizations since the quality at organizational levels accumulates with the overall. Seppänen *et al.* (2017), defines organizational as "a systematic approach of managing quality aimed at achieving high performance in terms of academic achievement, which requires commitment from the academic leadership by adopting effective core quality elements to develop a cohesive academic environment, which infuses and enhances the continuous improvement for all educational related processes and activities" (Khalili and Subari, 2014; Seppänen *et al.*, 2017), Classifying and defining the TQM model is not an easy procedure, mostly researches define by their own description which suits their opinions, prejudices, experience. Consequently, there is no explicit definition of TQM. It is an embryonic idea; it broadly adopted as a management model by many organizations. Based on the previous literature and problem identified following hypothesis has been developed:

H_2: Total quality management has a positive effect on operational flexibility

2.4. Supply Chain Management

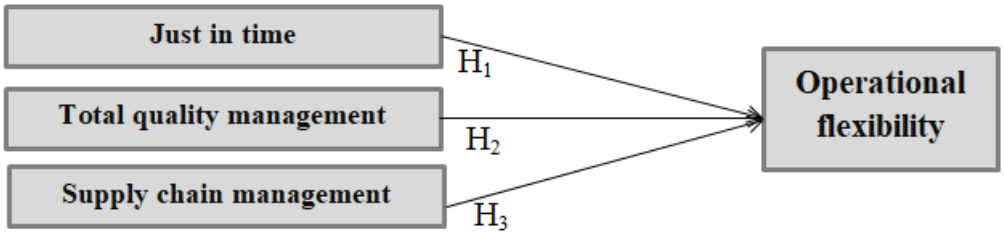
Previous logistics focused only on procurement, maintenance, inventory management, and distribution. Supply chain adds values like new product development, marketing, customer services, and finance. Now supply chain has its own objectives like customer satisfaction and sustainable organizational performance (Hassan *et al.*, 2015; Shahbaz *et al.*, 2019a), In the definition of SCM, the world flow is usual, most of the researchers use three-fold flow to describe the SCM, flow of information, the flow of material and flow of finance ((Chopra and Meindl, 2006; Mentzer *et al.*, 2008; Shahbaz *et al.*, 2018a). Hassan *et al.* (2015), quoted that first research on SCM is by Ganeshan and Harrison in 1995, according to the SCM is a network of facilities and distribution and its main functions are procurement, transfer, and distribution till the end users. Meanwhile (Simchi-Levi *et al.*, 1999), explain SCM as "a set of approaches utilized to efficiently integrate suppliers, manufacturers, warehouses and stores, so that merchandise is produced and distributed at the right quantities, to the right locations, and at the right time, in order to minimize system-wide costs while satisfying service level requirements". Furthermore, in a comprehensive literature review of Shukla *et al.* (2011), revealed that SCM is management which includes material, finance, information and personnel, the main aim of all is to attain customer satisfaction and competitive advantages. Efficient and effective supply chain by managing risk can give insights to numerous stakeholders of an organization. For instance, in order to avoid or mitigate risk situation, policies are made and accomplished with risk management methods and procedures. Therefore, supply chain risk management (SCRM) leads to identifying risks as well as developing the risk mitigation strategies to sustain operational performance. The risk apathy is driven by supply chain executives striving to balance very demanding operational objectives while satisfying customers, cutting costs, and helping grow revenue. Based on the previous studies below hypothesis has been projected:

H_3: Supply chain management has positive effects on operational flexibility

2.5. Research Framework

Based on previous research, hypothesis and identified problem this study have three independent variables namely Just in time, total quality management and supply chain management and one dependent variable that is operational flexibility. Based on the literature review and hypothesis all three independent variables have positive effects on operational fallibility. Figure 1 explained all these variables and their relationships.

Figure-1. Research framework



3. Methodology

This is a quantitative investigation of hypothesis testing. An empirical investigation has been done for the relationship of JIT, TQM, and SCM on OP. The aim of this study is the empirical verification of the hypothesis to make these finding generalize. A questionnaire has adopted and distributed by convenience sampling through emails to the public and private hospitals of the Jordanian Hospitals. The totals of 412 questionnaires have been sent and only 318 responses received. There are several approaches to measure the TQM, four are considered very most

important leadership commitment, strategic planning, customer focus and continuous improvement as these are mostly used approaches (AL-AMRI, 2012; Al-douri, 2018; Al-Tarawneh, 2011; Laboso, 2016; Leem and Rogers, 2017; Twaissi, 1998), SCM approaches have been defined in various ways like according to Basu *et al.* (2017), "SCM approaches are used to achieve organizations short term and long term goals such as to enhance productivity, control inventory, reduce waste, increase market share and sustain growth". OF is the most popularly used dependent variable in organizational research nowadays, but its measurement is yet to be clearly defined as research constructs. Measuring OF is considered central to organizational decision-making and thus will enable both the researchers and managers to evaluate the overall organizational activities, for such an organization to sustain and maintain a competitive advantage over their rivals. Thus, based on extensive literature the items for just in time, total quality management and supply chain management have been adopted from Kannan and Tan (2005), The detail has been mentioned in table 2.

Table-2. Items for JIT, TQM, and SCM

Variable	Items	Reference
Just in Time	Reducing lot size	(Kannan and Tan, 2005)
	Reducing setup time	
	Reducing supplier base	
	Preventive Maintenance	
	Buying from JIT suppliers	
	Increasing delivery frequency	
	Reducing inventory to expose manufacturing and scheduling problems	
	Increasing JIT capabilities	
	Helping suppliers increase their JIT capabilities	
	Selecting suppliers striving to eliminate waste	
	Selecting suppliers striving to promote JIT principles	
Total quality management	Inspection	(Kannan and Tan, 2005)
	Using benchmark data	
	Simplifying the product	
	Statistical process control	
	Using standard components	
	Designing quality into the product	
	The modular design of component parts	
	Process improvement (modification of process)	
	Employee training in quality management and control	
	Empowerment of shop operators to correct quality problems	
	Top management communication of quality goals to the organization	
	Emphasizing quality instead of price in supplier selection	
	Considering manufacturability and assembly in product design	
	Using Quality Function Deployment in new product development	
	Considering quality in supplier evaluation	
	Considering commitment to quality in supplier selection	
	Considering process capability in supplier selection	
	Considering commitment to continuous improvement in supplier selection	
Supply chain management	Determining customers' future needs	(Kannan and Tan, 2005)
	Participating in the sourcing decisions of your suppliers	
	Participating in the marketing e5orts of your customers	
	Using informal information sharing with suppliers and customers	
	Using formal information-sharing agreements with suppliers and customers	
	Improving integration of activities across the supply chain	
	Seeking new ways to integrate supply chain management activities	
	Establishing more frequent contact with supply chain members	
	Communicating your firm's future strategic needs to your suppliers	
	Communicating customers' future strategic needs throughout the supply chain	
	Creating a greater level of trust among supply chain members	
	Identifying additional supply chains where the firm can establish a presence	
	Creating supply chain management teams with members from di5erent companies	
	Reducing response time across the supply chain	
	Involving all members of the supply chain in your product/service/marketing plans	
	Extending supply chain membership beyond immediate suppliers, customers	
	Creating compatible communication/info. system for supply chain members	

4. Data Analysis

4.1. Descriptive Analysis

Table 3 shows that among the participants of this study the highest number are private hospitals that are 43% the total respondents, whereas the lowest respondents are from medal centers as medical centers are low lower as compare to hospitals. The highest participation has experienced below 5 while, the lowest number of experience have experienced higher than 20 years of experience. Lastly, the distributions of respondents about position reveal

that most of the participants are senior administrators that are 38% of the total responses that shows the authenticity of the study as most senior management are involved in JIT, TQM and SCM decisions.

Table-3. Descriptive statistics

Designation	Number of respondents	Percentage (%)
Public hospitals	97	31
Private hospitals	138	43
Medical centers	83	26
Total	**318**	**100**
Employee experience		
1-5	91	29
6-10	79	25
11-15	78	25
16-20	44	14
21 and more	26	7
Total	**318**	**100**
Job Position		
Doctor	36	11
Junior Administrators	76	24
Senior Administrators	122	38
Technicians	84	27
Total	**318**	**100**

4.2. Data Analysis and Discussion

The first step in data analysis is data screening. Manual screening has made and respondents with missing values with pattern and outliers were deleted. Secondly, special codes were assigned to all items/sub-dimensions for analysis. Third, measurement measure has been insured by normality and validity. Table 4 shows the value of Cronbach's σ, mean and variance. For the independent variables, JIT have the highest mean is 5.21 and SCM mean is 4.85 that is the lowest mean, the Cronbach's α value should be more than 0.7 for reliability (Hair *et al.*, 2014), and all values meet the criteria of threshold value thus it can be established that all constructs are reliable.

Table-4. Cronbach's σ coefficient, means and standard deviations

Variable	Number of items	Cronbach's α	Mean	Variance
Just-in-Time	11	0.942	5.21	2.075
Supply chain management	18	0.957	4.851	2.039
Total quality management	18	0.713	4.914	2.488
Operational flexibility	10	0.802	4.944	2.869

Correlation is a relationship among variables; one tail Pearson correlation has been calculated to determine the relationship between just in time, total quality management, and supply chain management with operational flexibility. Analysis of correlation showed that all four relationships are rejected it can be seen in table 5. The correlations between JIT and OF is 0.212*, that means there is a positive relationship between these two but significant at 5%. Correlation of TQM and OF is 0.202* indicates a positive relationship as well but significant at 5%. The value of the correlation of SCM and OF is 0.222* that also explain the strong positive relationship but significant at 5%.

Table-5. Correlation analysis

Variable	JIT	TQM	SCM	OF
JIT	1			
TQM	0.816**	1		
SCM	0.427**	0.486**	1	
OF	0.212*	0.202*	0.222*	1

**Correlation is significant at the 0.01 level (1-tailed)
*Correlation is significant at the 0.05 level (1-tailed)

Multiple regression analysis allows for determining the degree of strength and the direction of the linear relationship among research variables (Shukla, 2016), Regression analysis in Table 6 indicates the relationship among independent and dependent variable. JIT, TQM, and SCM regressed against OF and the variance accounted for, R^2 (0.069) that mean all four TQM approaches collectively explain only 6.9% operational flexibility. Although, it is very low it has been observed that public sector organizations normally avoid flexibility as their iteration process is very long and complicated.

Table-6. Regression analysis

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Results
	B	Std. Error	Beta			
a (Constant)	0.722	0.969		0.745	.459	
JIT	0.142	0.183	0.128	0.774	.441	Rejected
TQM	0.039	0.206	0.032	0.188	.851	Rejected
SCM	0.287	0.209	0.160	1.373	.173	Rejected
	a. Dependent Variable: Nonacademic performance					

Multiple linear regression analyses are employed to develop models relating the three independent variables and one dependent variable. In the first model, the dependent variable is OF, the model is reliable if (p-value for F<0.05). Table 6 shows that in the significant columns all the values are more than 0.5 so all three hypotheses are rejected. The findings are unique and have high variations with literature like Naser *et al.* (2011), stated that TQM have significant positive effects on the operational flexibility but the current study does not contradict with this study as Naser *et al.* (2011), measure TQM with 8 dimensions only while current study measure with 18 dimensions. The reason for this uniqueness may be the hospitals hesitate to be flexible due to developing countries as sources are scare. Meanwhile, it has been found that SCM positive effects a hospital's supply chain performance (Chena *et al.*, 2013), Additionally, TQM also proved to have positive effects on the performance of the supply chain (Laboso, 2016; Naser *et al.*, 2011).

5. Conclusion

This study focuses on the relationship between JIT, TQM, and SCM with OF in the context of the Jordan Hospitals. It has been found that JIT, TQM, and SCM have no significant effects on OF. Although, they have positive effects but very minor. Normally, the main duty of the hospital is to facilitate the human beings the deal with critical stages so they supposed to focus on systematic procedure, their operations must be static and fixed. Although hospitals must be flexible in their operations to with the uncertain situation but JIT, TQM and SCM are not recommended for their operational flexibility. This is a unique study as there is no study available before that empirically verifies divergent approaches in the same study. Secondly, various industries and sectors have been considered for JIT, TQM, and SCM but hospital industry always is neglected. Thirdly, most research is available for private industries but this study also focuses on public hospitals. There are two managerial implications of this study; first, it will help managers to know the advantages of JIT, TQM and SCM practices, if they are not applying or applying less degree, now they will be better able to apply these approaches. Second is to know which approach is better than other in managerial levels in the hospitals in the Jordan. There are various other strategies and approaches that affect the performance, this study focuses only four, so there is a need to apply these approaches, especially leadership has negatively effected the performance, so it has become essentials to further explore the reasons.

References

Aitken, J. M. (1998). *Supply chain integration within the context of a supplier association: Case studies of four supplier associations. Ph.D. Thesis.* Cranfield university. Available: http://dspace.lib.cranfield.ac.uk/handle/1826/9990

AL-AMRI, A. A. H. (2012). The total quality management practices in Yemeni Public Universities.

Al-douri, J. A. (2018). The impact of supply chain management approaches on supply chain performance in Iraq. *International Journal of Supply Chain Management*, 7(5): 13–21.

Al-Tarawneh, D. H. A. (2011). The implementation of total quality management (TQM) on the higher educational sector in Jordan. *International Journal of Industrial Marketing*, 1(1): 1–10. Available: https://doi.org/10.5296/ijim.v1i1.771

Basu, G., Jeyasingam, J., Habib, M., Letchmana, U. and Ravindran, R. (2017). The impact of supply chain management practices on the performance of private universities in Malaysia. *International Journal of Supply Chain Management*, 6(3): 22–35.

Chena, D. Q., Prestona, D. S. and Xia, W. (2013). Enhancing hospital supply chain performance: A relational view and empirical test. *Journal of Operations Management*, 31(6): 391–408. Available: https://doi.org/10.1016/j.jom.2013.07.012

Chopra, S. and Meindl, P. (2006). *Supply chain management. Strategy, planning & operation.* Prentice Hall – 552 Seiten. https://doi.org/10.1007/978-3-8349-9320-5_22

Florian, G. L. and Constangioara, A. (2014). The impact of performances in romanian supply chains on organizational performances. Economia. *Seria Management*, 17(2): 265–75.

Fransoo, J. C., Wafler, T. and Wilson, J. R. (2011). *Behavioral operations in planning and scheduling.* Springer Heidelberg Dordrecht London New York. https://doi.org/10.1007/978-3-642-13382-4

Hair, J. F. J., Sarstedt, M., Hopkins, L. and Kuppelwieser, V. G. (2014). *A Partial least squares structural equation modeling (PLS-SEM).* SAGE Publications, Inc. : Los Angeles, London, New Delhi, Singapor and Washington DC.: https://doi.org/10.1108/EBR-10-2013-0128

Hassan, A. A. B. M., Zaharudin, A. B. and Yunus, A. B. M. (2015). *Delays in physical distribution: a case study of sony supply chain solutions Malaysia.* Umkeprints.Umk.Edu.My. 658–74.

Kanji, G. K., Malek, A. and Tambi, B. A. (2010). Total quality management in UK higher education institutions. *Total Quality Management*, 10(1): 129–53. Available: https://doi.org/10.1080/0954412998126

Kannan, V. R. and Tan, K. C. (2005). Just in time, total quality management, and supply chain management: Understanding their linkages and impact on business performance. *Omega*, 33(2): 153–62. Available: https://doi.org/10.1016/j.omega.2004.03.012

Khalili, A. A. l. and Subari, K. (2014). Understanding the importance of total quality management dimensions: critical review of soft and hard aspects. *International Journal of Services and Operations Management*, 18(4): 468. Available: https://doi.org/10.1504/IJSOM.2014.063246

Kim, M. (2010). *Impact of strategic sourcing, e-procurement and integration on supply chain risk mitigation and performance Ph.D. Thesis.* The State University of New York. https://doi.org/10.1177/0972150913501606

Kumar, S. K., Tiwari, M. K. and Babiceanu, R. F. (2010). Minimisation of supply chain cost with embedded risk using computational intelligence approaches. *International Journal of Production Research*, 48(13): 3717–39. Available: https://doi.org/10.1080/00207540902893425

Laboso, J. C. (2016). *Influence of total quality management practices on effectiveness of project management in moi teaching and referral hospital uasin gishu county , kenya by.* University of nairobi.

Leem, B. H. and Rogers, K. J. (2017). The moderating effect of supply chain role on the relationship between supply chain practices and performance: An empirical analysis. *International Journal of Services and Operations Management*, 26(1): 18–48. Available: https://doi.org/10.1108/09600031111118521

Manese, S. N. (2014). *Just in time adoption and performance of major oil companies in kenya. Ph.D. Thesis.* University of Nairobi.

Mentzer, J. T., Stank, T. P. and Esper, T. L. (2008). Supply chain management and its relationship to logistics, marketing, production, and operations management. *Journal of Business Logistics*, 29(1): 31–46. Available: https://doi.org/10.1002/j.2158-1592.2008.tb00067.x

Naser, Alolayyan, M., Anuar, M. A. K. and Idris, F. (2011). The influence of total quality management (TQM) on operational flexibility in Jordanian hospitals. *Asian Journal on Quality*, 12(2): 204–22. Available: https://doi.org/10.1108/15982681111158751

Qrunfleh, S. M. (2010). *Alignment of information systems with supply chains: Impacts on supply chain performance and organizational performance. Ph.D. Thesis.* The University of Toledo.

Rao, S. and Goldsby, T. J. (2009). Supply chain risks: A review and typology. *International Journal of Logistics Management*, 20: Available: https://doi.org/10.1108/09574090910954864

Seppänen, K., Huiskonen, J., Koivuniemi, J. and Karppinen, H. (2017). Revealing customer dominant logic in healthcare services. *International Journal of Services and Operations Management*, 26(1): 1–17. Available: https://doi.org/10.1504/IJSOM.2017.080675

Shahbaz, M. S., Rasi, R. Z. R. and Ahmad, M. F. B. (2019a). A novel classification of supply chain risks: Scale development and validation. *Journal of Industrial Engineering and Management*, 12(1): 201-18. Available: https://doi.org/http://dx.doi.org/10.3926/jiem.2792

Shahbaz, M. S., Rasi, R. Z. R. M., Ahmad, M. F. B. and Rehman, F. (2017). What is supply chain risk management? A review. *Advanced Science Letters*, 23(9): 9233–38. Available: https://doi.org/10.1166/asl.2017.10061

Shahbaz, M. S., RM Rasi, R. Z., Zulfakar, M. H., Ahmad, M. F. B. and Asad, M. M. (2018a). Theoretical framework development for supply chain risk management for Malaysian manufacturing. *International Journal of Supply Chain Management*, 7(6): 325–38.

Shahbaz, M. S., Chandio, A. F., Oad, M., Ahmed, A. and Ullah, R. (2018b). Stakeholders ' management approaches in construction supply chain: A new perspective of stakeholder's theory. *International Journal of Sustainable Construction Engineering & Technology*, 9(2): 16–26.

Shahbaz, M. S., RM Rasi, R. Z., Zulfakar, M. H., Bin Ahmad, M. F., Abbas, Z. and Mubarak, M. F. (2018c). A novel metric of measuring performance for supply chain risk management: Drawbacks and qualities of good performance. *Journal of Fundamental and Applied Sciences*, 10(35): 967–88. Available: https://doi.org/10.4314/jfas.v10i3s.83

Shahbaz, M. S., Kazi, A. G., Othman, B., Javaid, M., Hussain, K. and Rasi, R. Z. R. M. (2019b). Identification, assessment and mitigation of environment side risks for Malaysian manufacturing. *Engineering, Technology & Applied Science Research*, 9(1): 3851–57.

Shou, Y., Hu, W., Kang, M., Li, Y. and Park, Y. W. (2018). Risk management and firm performance: the moderating role of supplier integration. *Industrial Management & Data Systems*: Available: 'https://doi.org/10.1108/IMDS-09-2017-0427

Shukla, R. K. (2016). Coordination practices in supply chain management: An empirical study of Indian manufacturing firms. *Journal of Management Research*, 16(1): 44–54.

Shukla, R. K., Garg, D. and Agarwal, A. (2011). Understanding of supply chain: A literature review. *International Journal of Engineering Science and Technology*, 3(3): 2059–72.

Simchi-Levi, D., Kaminsky, P. and Simchi-Levi, E. (1999). *Designing and managing the supply chain_ concepts, strategies, and cases.* McGrae-Hill Higher Education.

Tang, C. and Tomlin, B. (2008). The power of flexibility for mitigating supply chain risks. *International Journal of Production Economics*, 116(1): 12–27. Available: https://doi.org/10.1016/j.ijpe.2008.07.008

Tenhiälä, A. (2009). *Contingency theories of order management, capacity planning, and exception processing in complex manufacturing environments. : Ph.D. Thesis.* Helsinki University of Technology. https://doi.org/URN:ISBN:978-952-248-225-9

Twaissi, N. M. M. (1998). *An evaluation of the implementation of total quality management (tqm) within the information and communications technology (ict) sector in jordan.* The university of huddersfield.

Wang, L. (2010). *Global supply chain risk management through operational and financial hedges. Ph.D. Thesis.* McGill University.

Zwain, A. A. A. (2012). *The impact of total quality management on knowledge management and organizational performance in higher education institutions in iraq doctor of philosophy universiti utara Malaysia.* Universiti Utara Malaysia.