

Investigating the mediating role of information sharing strategy on agile supply chain

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ABSTRACT

Supply chains need to redesign their existing strategies and must develop new strategies to effectively face the challenges posed by certain disruptions, both man-made and natural. This requires the supply chains to be highly flexible, visible, reliable and cost-effective leading to the achievement of Agile Supply Chain (ASC). In today's competitive market, achieving agility in supply chain needs dynamic leadership, strategic vision, mutual cooperation from all members and effective utilization of information technology through customer focus. In spite of their initiatives to achieve ASC for improving their organizational performance, barring a few large companies, the medium and small size manufacturing companies have not yet been able to adopt and design supply chains which lead to ASC. This may be due to various challenges in the process of achieving agility. Also, the published literature in this area is very scanty. Therefore, to fill this gap, the purpose of this study is to determine the mediating role of Information Sharing Strategy (ISS) on Agile Supply Chain (ASC) practices for achieving Supply Chain Performance (SCP) in medium size manufacturing companies in UAE. An empirical survey of supply chain managers in UAE is conducted for this purpose. It is found that information sharing plays a major mediating role in ASC to achieve superior supply chain performance.

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1. Introduction

Supply chains must adopt new strategies to improve their ability to respond rapidly and cost effectively to unpredictable changes in markets and increasing levels of environmental turbulence, both in terms of volume and variety. That is, supply chains need to have an agile approach to deal with all these changes. Agile Supply Chain (ASC) has been identified as one of the most important issues of contemporary supply chain management (Lee, 2004). In today's constantly changing environment, medium size organization's supply chain agility is a critical element affecting its performance in terms of global competitiveness and providing sustainability (Lee, 2004; Swafford et al., 2006; Mehralian et al., 2015). The agile approach is responsible for quick reaction to demand variations, generating an important competitive advantage. Along with many other strategies, sharing of information among their supply chain entities is the major strategy for achieving ASC (Azevedo et al., 2008; Stevens & Johnson, 2016).

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The MSMCs face some issues and challenges for the implementation of ASC practices worldwide and in UAE too. Some of these issues are lack of complete awareness, lack of resources to implement updated technology, lack of interest and expertise, scarcity of funds, lack of innovation and myths about benefits of implementation of ASC. These companies focus more on survival of their businesses and find no time in understanding and implementing concepts like SCM and ASCM (Tan 2001; Curry & Moore, 2003; Pagell & Krause, 2004; Arend & Wisner, 2005; Koh et al., 2007; Vaaland, & Heide, 2007; Chong et al., 2011; Cook et al., 2011; Ramakrishna, 2016). This study focuses on the role of information sharing and processing in agile supply chain practices, and its influence on the performance of medium size manufacturing companies. In addition to emphasizing the role of information sharing, this study also evaluates the relationships among agile supply chain practices and the information sharing strategies on organizational supply chain performance.

2. Literature review

The literature review is carried out to analyse the previous works related to ASC Practices, its impact on organizational performance and the role of information sharing in achieving ASC have been studied through literature review.

2.1 Agile Supply Chain Strategies Practices

Agile Supply Chain (ASC) or Supply Chain Agility (SCA) has been a contemporary research topic during the last two decades and it is one of mostly widely studied area. In spite of this, there is no consensus on what are all included as the dimensions of ASC (Li et al., 2008). Many authors have included various aspects of business strategies as ASC strategies in addition to strategies related to supply chain exclusively. Stank et al. (1996) and van Hoek et al. (2001) viewed agility from flexibility angle and identified that flexible response to customer needs through information sharing is one of the supply chain agile component. Sambamurthy et al. (2003) considered ASC as the ability to detect and seize competitive market opportunities by assembling requisite assets, knowledge, and relationships with speed and surprise and concluded it is comprised of three interrelated capabilities: customer agility: ability to co-opt customers in the exploration and exploitation of opportunities for innovation and competitive action moves.

The ASC approach is designed to create the ability to respond rapidly and cost effectively to unpredictable changes in markets and environmental turbulence, both in terms of volume and variety (Christopher, 2000). Emphasizing speed as a component of agility, Frayret et al. (2001) and Sambamurthy et al. (2003) asserted that computer technologies are platforms for agility which would result in the reduction of time taken for product design and development. Yet others contended that a timely awareness to changes is a necessary component of agility and emphasized the role of knowledge management in providing awareness to changes (Dove, 2005; Holsapple & Jones, 2005).

Agarwal et al. (2007) opined that ASC approach depends on variables such as, market sensitivity, customer satisfaction, quality improvement, delivery speed, data accuracy, new product introduction, centralized and collaborative planning, process integration, use of IT tools, lead-time reduction, service-level improvement, cost minimization, uncertainty minimization, trust development and the minimization of resistance to uncertainty. It is an integration of business partners to enable new competencies in order to respond to rapidly changing and increasingly fragmented markets (Baramichai et al., 2007). Li et al. (2008) introduced a unifying general-purpose definition of ASC as the result of integrating the supply chain's alertness to changes (opportunities/challenges) – both internal and environmental – with the supply chain's capability to use resources in responding (proactively/reactively) to such changes, all in a timely and flexible manner. Some of the agile practices which lead to improved Supply Chain Performance are use of IT to coordinate / integrate activities in procurement., information sharing, and ability to change quantity and delivery time of a supplier's order (Carvalho et al, 2012). It is characterized by aspects like Flexibility, Velocity, Responsiveness, Competence, Visibility, Collaboration (Carvalho et al., 2012). Christopher (2000) identified three key

enablers of supply chain agility; i) quality of supplier relationships, ii) a high level of shared information, and iii) a high level of connectivity between firms in the supply chain. Lin et al. (2006) suggested four categories of supply chain agility enablers like i) collaborative relationship (strategy), ii) process integration (foundation), iii) information integration (infrastructure) and iv) customer/marketing sensitivity (mechanism).

Virtual Integration, one of the most effective components of the ASC has enabled organizations to determine the demand effectively, leading to improved customer satisfaction (Ferne & Sparks 2018; Ngai et al., 2011, Kumar Sharma & Bhat, 2013).

Alertness, Speed, Response capability, Flexibility, Pro-activity, Quality / Accuracy, Profitability / Cost relevancy, Accommodation/Adaptation, Changes/uncertainty and Competitiveness were mentioned by majority of the authors as components of ASC (Sharifi & Zhang, 2001; van Hoek et al., 2001; Sambamurthy, et al., 2003; Swafford et al., 2006; Li et al., 2008).

Some of the common elements of Supply Chain Agility from literature are review are, Responsiveness (Christopher, 2000; van Hoek et al., 2001; Ismail & Sharifi, 2006; Swafford et al., 2006; Li et al., 2008), Change as opportunity (Sharifi & Zhang, 2001), Flexibility (Li et al., 2008), Customer enrichment / Customization (Gunasekaran & Yusuf, 2002), Mobilization of Core competencies (Li et al., 2008), Integration (Gunasekaran & Yusuf, 2002; Li et al., 2008), Organizational Structure (Gunasekaran & Yusuf, 2002), and Speed (Swafford et al., 2006; Li et al., 2008).

2.2 Impact of ASC on Organizational Performance

Many authors agree on the positive impact of ASC on organizational performance as discussed in this section of literature review. Agility enables a firm to respond in a timely and effective manner to market volatility and other uncertainties, thereby allowing the firm to establish a superior competitive position (Swafford et al., 2006). ASC increases the speed and flexibility with which activities can be performed; the faster the flow is achieved throughout the supply chain, the quicker customer needs can be satisfied (Gligor, 2010) and profit can be improved (Gligor et al., 2015; Malakouti et al., 2017). The agile approach makes it possible to improve the supply chain's responsiveness to customer requirements, to make it more flexible, to enhance its ability to market high quality products successfully with short lead times and in varying volumes that provide enhanced value to customers (Khan, 2008; Tarafdar & Qrunfleh, 2017). It will also influence the supply chain's performance with respect to customer satisfaction, average process changeover time, productivity, on-time delivery fulfilment and the ratio of annual sales to average total stocks (Carvalho et al., 2012) and it increases operational performance (Eckstein et al., 2015). ASC is an advanced form of supply chain strategy that helps the organizations to speed up their processes for the enhancement of their competitiveness (Cheung et al., 2018; Hasan et al., 2018) and enables organizations to improve the product and service quality. It also develops a culture which makes acceptance of change quickly by the employees for achieving positive outcomes (Christopher et al., 2016).

Organizational performance through supply chain consists of two major aspects. One is operational performance (Fawcett et al., 2007; Eckstein et al., 2015) and the other is competitive performance (Fawcett et al., 2007; Ramakrishna, 2016). In this study, these two variables of performance are studied.

2.3 Information Sharing and Agile Supply Chain

Information Sharing in supply chain influences significantly the achievement of ASC approach. This aspect has been dealt widely by many authors as mentioned in this section of literature review. Many authors opined that sharing of right and updated information enables organizations to achieve competitiveness and develops capabilities to achieve sustainability (Fawcett et al., 2007; Ramakrishna, 2016, Ciccullo et al., 2018), enhances SCA by preparing firms to quickly respond to the unexpected disruptions effectively (Li et al., 2007; Ghazal Bargshady, 2016; Mustafid, et al., 2018). It is a widely

applied strategy in supply chain to achieve agility (García-Alcaraz et al., 2017). Implementation of ASC related practices becomes very easy and takes less time through IT enabled information sharing applications. Superior IT integration advances the capability of supply chain systems (Angeles, 2009). Electronic Data Integration (EDI), is one such application which enables quick sharing of huge information and decreases ambiguity, intensifies supplier shipment performance and boosts supply chain system performance (Shatat & Udin, 2012). Ability of an organization to respond quickly to the dynamic needs of market becomes easier through a well-organized flow of information sharing. IT integration permits real-time information exchange and sharing among supply chain partners, and enhances the speed in supply chain systems. Hence, it is concluded that there exists a relationship between IT integration and supply chain management systems.

Due to increased competition in the recent past, it has become essential for organizations to adopt innovative strategies using IT applications to mitigate the risks and threats (Yip, 2015; Haq & Boddu, 2017). Innovative approaches of sharing information will allow the organization to develop their knowledge and experiences on different aspects of the business (Wang et al., 2016). It will also allow them to develop the unique and complex strategies that are hard to replicate by the competitors. The enhanced and advanced information will also enable the organizations to develop their SC by developing their production methodologies and processes in an effective as well as enhanced manner. Connectivity and willingness as two variables of information sharing are found to influence the supply chain performance of an organization (Fawcett et al., 2007). Information Systems is studied for its influence on performance using these two variables of connectivity and willingness in this paper. To summarize, based on the above discussion, this study establishes a relationship between ASC and supply chain performance with information sharing playing a mediating role.

3. Research methodology and problem

While many authors have emphasized and agreed upon the positive influence of supply chain agility on organizational performance (Giachetti et al., 2003; Sharifi & Zhang, 2001; van Hoek, 1998), there is still no consensus on components of supply chain agility (Giachetti et al., 2003; Li et al., 2008). Moreover, studies related to information sharing as a mediating variable between ASC and Organizational Performance are very few. Therefore, the present study fills the gap in the existing body of knowledge in this aspect. As emphasized in the literature review section, information sharing is found to play a major role in achieving ASC which would enable organizations to improve their organizational performance. In order to develop a sustainable business model ASC is a strategic alternative for medium size manufacturing organizations. Scholars along with companies arrive at a consensus that ASC practices and strategies aid in augmenting efficiency, generating superior profits and reducing repercussive business-based expenditures. Moreover, companies, in the recent competitive environment need to employ agile and flexible supply chain strategies, which facilitate the company to employ a productive supply chain information mechanism. Therefore, the influence of agile practices on creating a productive Information system strategy is a debatable topic. Companies often strive to ascertain the relevant needs to suffice the requirement of creating a seamless and productive information strategy, which aids in enhancing the business's competitive scope. Therefore, in order address this argumentative gap, the researchers intend to investigate relationships among Agile supply chain practices, Information sharing strategy, Supply chain performance. Hence, the assumptions made in this paper are based on investigating the impact of Agile supply chain practices on Supply chain performance with the mediating role of Information sharing strategy in select medium size manufacturing organizations in UAE.

3.1 Construct Dimensions

Based on the above literature review, three dimensions were considered for this study as dimensions of ASC. The first one is alertness (Sharifi & Zhang, 2001; van Hoek et al., 2001; Sambamurthy et al., 2003; Swafford et al., 2006) and responsiveness (Christopher, 2000; van Hoek et al., 2001; Sharifi &

Zhang 2001; Ismail & Sharifi, 2006; Swafford et al., 2006; Li et al., 2008). The second dimension is decisiveness (Helena et al., 2012) and the third one is operations' flexibility (Stank et al., 1996; van Hoek et al., 2001; Sharifi & Zhang 2001; Li et al., 2008; Gligor, 2010). Two dimensions were considered as information sharing strategy which would enable ASC. These are connectivity and willingness (Fawcett et al., 2007). To measure supply chain performance through ASC, two dimensions are considered based on the literature review. These are operational performance and competitive performance (Fawcett et al., 2007).

3.2 *The Hypotheses of the study*

The agile SC is the updated and advanced process of developing the SC strategy of the organization. The agile Supply Chain is more responsive, competitive and flexible. Thus, it allows the company to develop their Supply Chain management and strategies. The information sharing strategy is essential as it allows the organization to develop their knowledge. In order to survive in the modern market, the companies have adopted the information sharing. The agile Supply Chain and information sharing together would improve performances of the SC of the organization.

Therefore, the construct of the study builds upon the validation of the model, while the following hypotheses driven from the model:

Hypotheses (Null Hypotheses)

H₀₁: Information sharing strategy has no statistical impact on Agile supply chain Practices in medium size manufacturing companies in UAE at ($\alpha \leq 0.05$) level.

H₀₂: Information sharing strategy has no statistical impact on Supply chain performance in medium size manufacturing companies in UAE at ($\alpha \leq 0.05$) level.

H₀₃: Agile supply chain Practices has no statistical impact on Supply chain performance in medium size manufacturing companies in UAE at ($\alpha \leq 0.05$) level.

H₀₄: Information sharing strategy has no statistical impact on Supply chain performance with the mediating effect of Agile supply chain Practices in medium size manufacturing companies in UAE at ($\alpha \leq 0.05$) level.

3.3 *Conceptual Model of the study*

Based on the literature review, it is found that ASC practices improve the supply chain performance of an organization with information sharing playing the mediating role. Therefore, this study proposes that alertness, decisiveness and flexibility of ASC improve the operational and competitive performance through connectivity and willingness of information systems. The proposed conceptual model for study is presented in Fig 1.

3.4 *Methodology and study Design*

In order to examine the validity of the study model, both the primary the secondary data collection method have been adopted. The secondary data is obtained through systematic review of literature published in leading international journals using relevant key words. On the other hand, the primary data was collected through an empirical survey using questionnaire as a data collection instrument and analysed using statistical techniques. Questionnaire consisted 21 different questions to cover the study variables and dimensions. The questionnaire was distributed to the middle and upper level supply chain managers of medium size manufacturing companies in UAE. Out of all the distributed questionnaires, the responses were received from 132 managers. The hypotheses were tested using statistical tests and the analysis was done using SEM. A relationship model was developed with information sharing as a mediating variable between ASC and Organizational Performance.

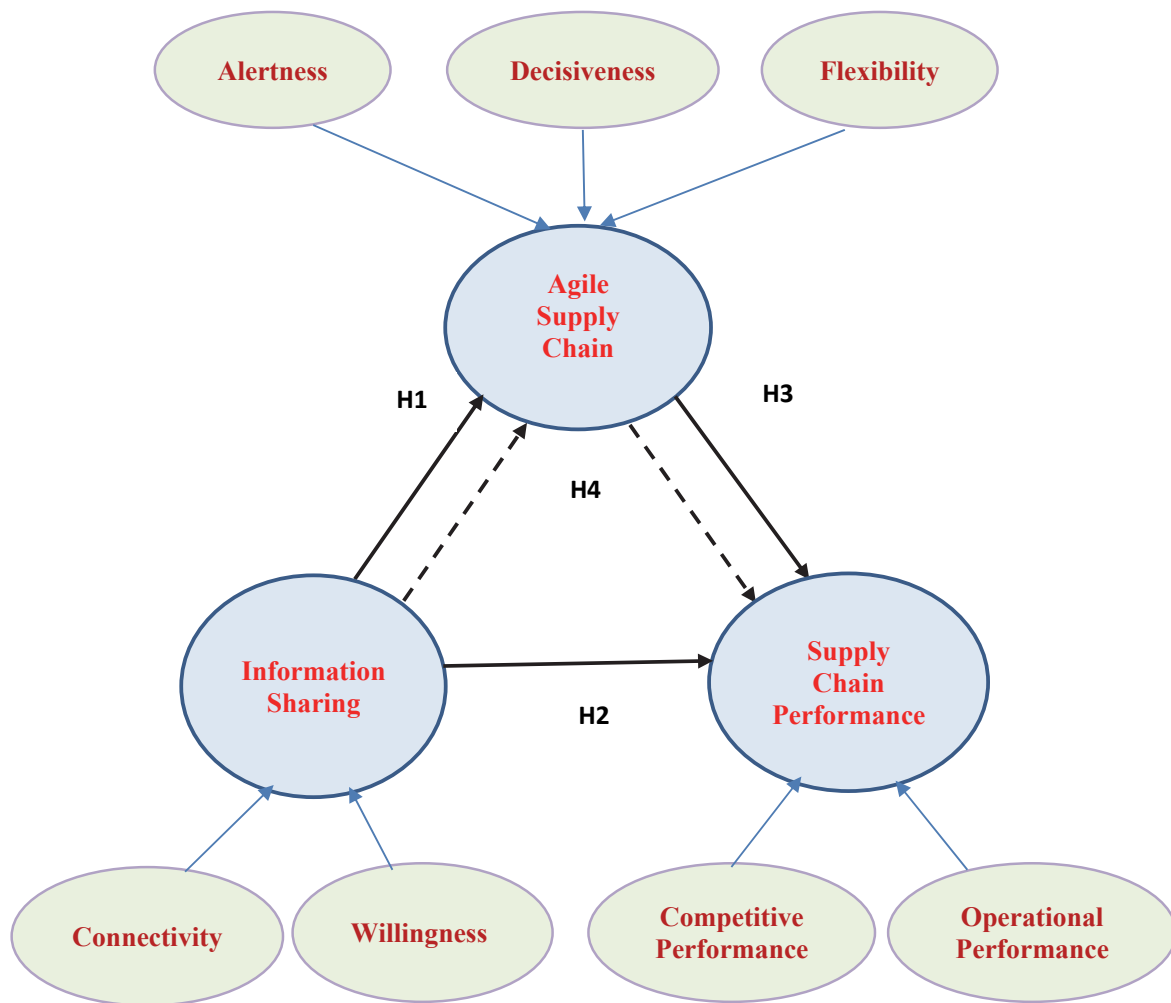


Fig. 1. Conceptual Model of the Study

4. Data analysis

A statistical SmartPLS software package was used to (Partial Least Square Structure Equation Modeling) SEM analysis of data in order to understand the direct and indirect effect to Information sharing strategy on Supply chain performance with the mediating effect of Agile supply chain Practices at Etisalat in Dubai. The questionnaire was considered as the study tool to measure the study variables, and been constructed on a five-point Likert-type scale with anchors of (1 = 'strongly disagree') and (5 = 'strongly agree'). However, Agile supply chain Practices variable is composed of three dimensions (Alertness, Decisiveness and Flexibility) and was assessed with (9) items. Information sharing strategy variable is composed of two dimensions (Connectivity and Willingness) and was assessed with (7) items. Supply chain performance variable is composed of two dimensions (Operational and Competitive) and was assessed with (6) items. Exploratory factor analysis was used to describe and examine the measures. Cronbach's alpha was also used to measure the consistency of each part of the measure, varimax rotation of exploratory factor analysis helped to determine which questions considered to be best to measure the study variables and dimensions, then deleting a cross-loaded item from the scale.

4.1 Validity and Reliability

In this section, Cronbach's alpha coefficient used to examine the internal consistency for each item of the study model. Table 1 shows acceptable levels of reliability to all study constructs, where the reliability coefficient was ranging between (0.779-0.908), and all constructs were above (0.7) (Hair et

al., 2010), this indicator helps us to know that the design and scale of the questionnaire was able to measure the study variables and dimensions, and the items in the questionnaire were able to represent each variable of the study.

Table 1
Cronbach's Alpha Coefficient for Study variables

Construct	Cronbach's Alpha	Construct	Cronbach's Alpha
Alertness	0.779	Operational	0.888
Decisiveness	0.856	Competitive	0.832
Flexibility	0.901	Agile Supply Chain	0.858
Connectivity	0.832	Information Sharing Strategy	0.908
Willingness	0.831	Supply Chain Performance	0.855

Average Variance Extracted (AVE) was also assess the validity of the measurement model. Results showed in Table 2 below indicates that all of these values are above the standard point of .50.

Table 2
Average variance extracted (AVE)

Construct	Average variance extracted (AVE)	Construct	Average variance extracted (AVE)
Alertness	0.774	Operational	0.601
Decisiveness	0.665	Competitive	0.860
Flexibility	0.733	Agile Supply Chain	0.621
Connectivity	0.736	Information Sharing Strategy	0.609
Willingness	0.608	Supply Chain Performance	0.642

4.2 Descriptive analysis

Table 3) shows the description analysis for study's variables and dimensions. The means and standard deviations are used to verify the items' significance according to the respondents' perception at Etisalat company in Dubai. All items got high significance level since the means ranged from (3.812) to (4.266). The dimension "Competitive" has come as the highest in the significance level with mean and standard deviation of (4.266: 0.761). Then "Flexibility" with mean and standard deviation of (4.215: 0.935). Then "Alertness", with mean and standard deviation of (4.184: 0.846) respectively. Based on the data of the goodness-of-fit that showed in Table 4 for the path model, we conclude that the measurement models provided an acceptable fit to the data, and this improve that the structural equation model of the study fits the sample data.

Table 3
Descriptive analysis to Agile Supply Chain, Information Sharing Strategy and Supply Chain Performance

Variables and dimensions of study		M	Std.	Sig rank	Sig level
Agile Supply Chain	Alertness	4.184	0.846	3	High
	Decisiveness	3.832	0.939	6	High
	Flexibility	4.215	0.935	2	High
Information Sharing Strategy	Connectivity	3.957	0.880	5	High
	Willingness	4.084	0.913	4	High
Supply Chain Performance	Operational	3.812	0.8183	7	High
	Competitive	4.266	0.761	1	High

Table 4
Goodness of Fit statistics for the structural model

Chi χ^2 Square	D.F	Chi Square / D.F	Sig	NFI	CFI	GFI	RAMSA
34.912	7	4.987	.000	.787	.891	.848	.108

GFI: Goodness of fit index; NFI: The Bentler-Bonett normed fit index; CFI: The comparative fit index; RMSEA: Root Mean Square Error of Approximation

4.3 Hypotheses Testing

To start testing the hypotheses and before doing path analysis, we conducted the multi-collinearity test to make sure there is no high correlation between dimensions of each variable. Results of multi-collinearity showed that there is no abnormal correlation between dimensions of variables. To test the hypotheses and to examine the effect and the significance level of each path in the model, we ran a structural equation modelling as shown in Fig. 2. The path model indices indicate the model's goodness-of-fit, that ensure an acceptable fit to the data to the model which presented in Table (4) as the following: Chi square/D.F (34.912/7) was (4.987), while (GFI) Goodness of fit index was (0.848) (range between 0 to 5, the fewer the better), (NFI) Normed fit index was (0.787), (CFI) Comparative fit index (the revised form of the NFI) was (0.891) (both NFI, CFI range between 0 to 1, values closer to 1 indicating good model fit), and the Root mean square error of approximation (RMSEA) was (0.108) (values range between 0 to 1, values closer to 0 indicating good model fit) (Hair et al. 2010). Therefore, we conclude from all model fit indices that the overall fit of the model is approved for continuing with hypothesis testing to examine the causal relationships between the study variables.

Table 5

Direct, Indirect, & total effect for path analysis

From To	Direct Effect		Indirect Effect		Total Effect	
	Information Sharing Strategy	Agile Supply Chain	Information Sharing Strategy	Agile Supply Chain	Information Sharing Strategy	Agile Supply Chain
Agile Supply Chain	.445	.000	.000	.000	.445	.000
Supply Chain Performance	.198	.472	.187	.000	.374	.382

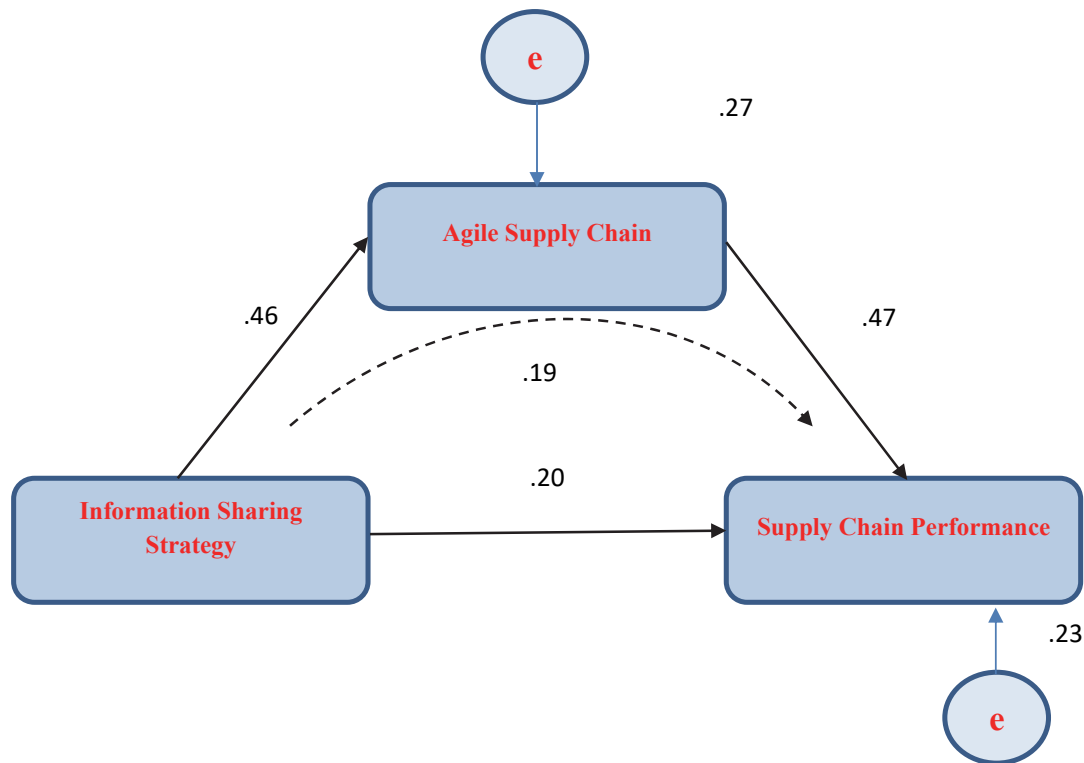


Fig. 2. Result of path analysis

To test the study hypotheses, we established two structural models; the main effect model to test the direct relationship between Information sharing strategy and Supply chain performance and the mediation model to test the mediating role of Agile supply chain between Information sharing strategy and Supply Chain Performance. The analysis shown in Table 5, presents standardized path coefficients of the study model (beta coefficients in which the estimates results taken from a regression analysis). Table 5 and Fig. 2 illustrate that the path coefficient from Information Sharing Strategy to Agile Supply Chain was positive and significant (Standardized coefficient = 0.445; $p < 0.05$), the path coefficient from Information Sharing Strategy to Supply Chain Performance was positive and significant (Standardized coefficient = 0.198; $p < 0.05$). Therefore, there is enough evidence to support H₁ and H₂. The path coefficients from Agile supply chain to Supply chain performance was also positive and significant (Standardized coefficient = 0.472; $p < 0.05$), Therefore, there we can support H₃. The indirect effects of Information Sharing Strategy on Supply chain performance through Agile supply chain as mediator was also positive and significant (indirect standardized coefficient = 0.187; $p < 0.05$), that's mean H₄ also supported. Therefore, the results supported all hypotheses.

Table 6
Hypotheses testing results

Hypothesis	Causal path	Standardized Coefficients	Test result
H1	Information Sharing Strategy on Agile Supply Chain	0.46*	supported
H2	Information Sharing Strategy on Supply Chain Performance	0.20*	supported
H3	Agile Supply Chain on Supply Chain Performance	0.47*	supported
H4	Indirect effect to Information Sharing Strategy on Supply Chain Performance through Agile Supply Chain as mediator	0.19*	supported

* Significant at a level of ($\alpha \leq 0.05$).

Fig. 2 shows coefficient of determination (R^2) (the part of the variance in the dependent variable that is predictable from the independent variable, range between 0 and 1 the highest the better). The results which are illustrated in Fig. 2 show that Information Sharing Strategy account for 27% of variance in Agile Supply Chain; Information Sharing Strategy and Agile Supply Chain, account for 23% of variance in Supply Chain Performance.

5. Discussion

This paper captures and addresses the overall impacts of IT system in numerous ways in a supply chain for any sector. The results of this paper indicate that IS through mechanisms such as DA (Data accuracy tools), DS (Delivery Speed), UIT (IT usage) and PI (process integration) tolls aid in enhancing the performance of the supply chain's mechanism. Moreover, such affirmation validates the role IT plays in enhancing supply chain performance, availing superior productivity and profitability, majorly in terms of communication amongst the supply chain stakeholders and increased customer satisfaction. It is further stated increased customer satisfaction is one of the major ways of comparing the efficiency that is imparted by supply chain. An efficient supply chain looks for strategies where the inventory storing time and lead time are properly managed. Moreover, such aspects are properly managed; one may suffice the requirements of customers in a superior manner. This further adds more competitive advantage to the firm, as witnessed from numerous exemplifications.

Results of the study provide evidence that adopting Information sharing strategy and following Agility in supply chain operations will improve the performance of supply chain, hypotheses testing confirm the relationship between Information sharing strategy and Agile supply chain and its impact on supply chain performance. This is also consistent with the results of Li et al. (2007) and García-Alcaraz et al. (2017). Furthermore, results found that Alertness, Decisiveness and Flexibility, contribute to Agile supply chain, the "t" statistics and the importance level were all significant, and this aligned with results of Sharifi and Zhang (2001), Sambamurthy et al. (2003), Swafford et al. (2006) and Li et al. (2008).

6. Conclusions

The results of this research have provided some very interesting insights about the role of information sharing in agile supply chain (ASC) to achieve a better supply chain performance in medium sized manufacturing companies in UAE. Therefore, the study recommends that these companies should focus on redesigning their supply chains towards agility by using information sharing as a key aspect. This can happen only when these companies invest more on building their abilities related to information technology to enable faster sharing of information across their supply chains. This investment would also increase their abilities to improve their overall organizational performance by achieving agility in supply chain. The results can also be generalized to medium size manufacturing companies in other parts of the world as the challenges faced by them are more or less similar. Expanding the scope of study to other sectors for analysing the influence of agile supply chain on organizational performance by including other aspects and practices of it will be the area for future research.

References

- Agarwal, A., Shankar, R., & Tiwari, M. K. (2007). Modeling agility of supply chain. *Industrial Marketing Management*, 36(4), 443-457.
- Alzoubi, H. (2010). Applying electronic supply chain management using multi-agent system: A managerial perspective. *International Arab Journal of e-Technology*, 1(3), 106-113.
- Alzoubi, H. (2018). The role of intelligent information system in e-supply chain management performance. *International Journal of Multidisciplinary Thought*, 7(2), 363–370.
- Alzoubi, H., Ahmed, G., Al-Gasaymeh, A., & Alkurdi, B. (2019). Empirical study on sustainable supply chain strategies and its impact on competitive priorities: The mediating role of supply chain collaboration. *Management Science Letters*, 10(3), 703-708.
- Angeles, R. (2009). Anticipated IT infrastructure and supply chain integration capabilities for RFID and their associated deployment outcomes. *International Journal of Information Management*, 29(3), 219-231.
- Arend R.J., & Wisner, J.D. (2005). Small business and supply chain management: Is there a fit? *Journal of Business Venturing*, 20(3), 403-36.
- Khan K, A., & Pillania, R. K. (2008). Strategic sourcing for supply chain agility and firms' performance: A study of Indian manufacturing sector. *Management Decision*, 46(10), 1508-1530.
- Azevedo, S. G., Machado, V. H., Barroso, A. P., & Cruz-Machado, V. (2008). Supply chain vulnerability: environment changes and dependencies. *International Journal of Logistics and Transport*, 2(1), 41-55.
- Baramichai, M., Zimmers Jr, E. W., & Marangos, C. A. (2007). Agile supply chain transformation matrix: an integrated tool for creating an agile enterprise. *Supply Chain Management: An International Journal*, 12(5), 334-348.
- Cheung, W., Chiang, A. H., Sambamurthy, V., & Setia, P. (2018). Lean vs. agile supply chain: The effect of IT architectures on supply chain capabilities and performance. *Pacific Asia Journal of the Association for Information Systems*, 10(1).
- Chong, A. Y., Chan, F. T., Ooi, K. B., & Sim, J. J. (2011). Can Malaysian firms improve organizational/innovation performance via SCM?. *Industrial Management & Data Systems*, 111(3), 410-431.
- Christopher, M. (2000). The agile supply chain: competing in volatile markets. *Industrial Marketing management*, 29(1), 37-44.
- Christopher, M. (2016). *Logistics & supply chain management*. Pearson UK.
- Christopher, M., Harrison, A., & van Hoek, R. (2016). Creating the agile supply chain: issues and challenges. In *Developments in logistics and supply chain management* (pp. 61-68). Palgrave Macmillan, London.
- Christopher, M., Lawson, R., & Peck, H. (2004). Creating agile supply chains in the fashion industry. *International Journal of Retail & Distribution Management*, 32(8), 367-376.
- Ciccullo, F., Pero, M., Caridi, M., Gosling, J., & Purvis, L. (2018). Integrating the environmental and social sustainability pillars into the lean and agile supply chain management paradigms: A literature review and future research directions. *Journal of Cleaner Production*, 172, 2336-2350.
- Cook, L. S., Heiser, D. R., & Sengupta, K. (2011). The moderating effect of supply chain role on the relationship between supply chain practices and performance: An empirical analysis. *International Journal of Physical Distribution & Logistics Management*, 41(2), 104-134.
- Curry, A., & Moore, C. (2003). Assessing information culture—an exploratory model. *International journal of information management*, 23(2), 91-110.

- Dove, R. (2005, May). Agile enterprise cornerstones: knowledge, values, and response ability. In *IFIP International Working Conference on Business Agility and Information Technology Diffusion* (pp. 313-330). Springer, Boston, MA.
- Eckstein, D., Goellner, M., Blome, C., & Henke, M. (2015). The performance impact of supply chain agility and supply chain adaptability: the moderating effect of product complexity. *International Journal of Production Research*, 53(10), 3028-3046.
- Fawcett, S. E., Osterhaus, P., Magnan, G. M., Brau, J. C., & McCarter, M. W. (2007). Information sharing and supply chain performance: the role of connectivity and willingness. *Supply Chain Management: An International Journal*, 12(5), 358-368.
- Fernie, J., & Sparks, L. (Eds.). (2018). *Logistics and retail management: emerging issues and new challenges in the retail supply chain*. Kogan page publishers.
- Frayret, J. M., D'Amours, S., Montreuil, B., & Cloutier, L. (2001). A network approach to operate agile manufacturing systems. *International Journal of Production Economics*, 74(1-3), 239-259.
- Li, G., Lin, Y., Wang, S., & Yan, H. (2006). Enhancing agility by timely sharing of supply information. *Supply Chain Management: An International Journal*, 11(5), 425-435.
- García-Alcaraz, J. L., Maldonado-Macías, A. A., Alor-Hernández, G., & Sánchez-Ramírez, C. (2017). The impact of information and communication technologies (ICT) on agility, operating, and economical performance of supply chain. *Advances in Production Engineering & Management*, 12(1).
- Bargshady, G., Zahraee, S. M., Ahmadi, M., & Parto, A. (2016). The effect of information technology on the agility of the supply chain in the Iranian power plant industry. *Journal of Manufacturing Technology Management*, 27(3), 427-442.
- Giachetti, R. E., Martinez, L. D., Sáenz, O. A., & Chen, C. S. (2003). Analysis of the structural measures of flexibility and agility using a measurement theoretical framework. *International Journal of Production Economics*, 86(1), 47-62.
- Gligor, D. M., & Holcomb, M. C. (2012). Understanding the role of logistics capabilities in achieving supply chain agility: a systematic literature review. *Supply Chain Management: An International Journal*, 17(4), 438-453.
- Gligor, D. M., Esmark, C. L., & Holcomb, M. C. (2015). Performance outcomes of supply chain agility: when should you be agile?. *Journal of Operations Management*, 33, 71-82.
- Gunasekaran, A., & Yusuf, Y. Y. (2002). Agile manufacturing: a taxonomy of strategic and technological imperatives. *International Journal of Production Research*, 40(6), 1357-1385.
- Gunasekaran, A., Papadopoulos, T., Dubey, R., Wamba, S. F., Childe, S. J., Hazen, B., & Akter, S. (2017). Big data and predictive analytics for supply chain and organizational performance. *Journal of Business Research*, 70, 308-317.
- Güner, H. M., Çemberci, M., & Civelek, M. E. (2018). The effect of supply chain agility on firm performance. *Journal of International Trade, Logistics and Law*, 4(2), 25-34.
- Carvalho, H., Azevedo, S. G., & Cruz-Machado, V. (2012). Agile and resilient approaches to supply chain management: influence on performance and competitiveness. *Logistics research*, 4(1-2), 49-62.
- Haq, A. N., & Boddu, V. (2017). Analysis of enablers for the implementation of leagile supply chain management using an integrated fuzzy QFD approach. *Journal of Intelligent Manufacturing*, 28(1), 1-12.
- Holsapple, C., & Jones, K. (2005). Exploring secondary activities of the knowledge chain. *Knowledge and Process Management*, 12(1), 3-31.
- Kumar Sharma, S., & Bhat, A. (2014). Modelling supply chain agility enablers using ISM. *Journal of Modelling in Management*, 9(2), 200-214.
- Lee, H. L. (2004). The triple-A supply chain. *Harvard Business Review*, 82(10), 102-113.
- Li, X., Goldsby, T. J., & Holsapple, C. W. (2009). Supply chain agility: scale development. *The International Journal of Logistics Management*, 20(3), 408-424.
- Li, X., Chung, C., Goldsby, T. J., & Holsapple, C. W. (2008). A unified model of supply chain agility: the work-design perspective. *The International Journal of Logistics Management*, 19(3), 408-435.
- Lin, C. T., Chiu, H., & Chu, P. Y. (2006). Agility index in the supply chain. *International Journal of production economics*, 100(2), 285-299.
- Malakouti, M., Rezaei, S., & Shahijan, M. K. (2017). Agile supply chain management (ASCM): a management decision-making approach. *Asia Pacific Journal of Marketing and Logistics*, 29(1), 171-182.
- Mehralian, G., Zarenezhad, F., & Ghatari, A. R. (2015). Developing a model for an agile supply chain in pharmaceutical industry. *International Journal of Pharmaceutical and Healthcare Marketing*, 9(1), 74-91.
- Mustafid, Karimariza, S. A., & Jie, F. (2018). Supply chain agility information systems with key factors for fashion industry competitiveness. *International Journal of Agile Systems and Management*, 11(1), 1-22.

- Ngai, E. W., Chau, D. C., & Chan, T. L. A. (2011). Information technology, operational, and management competencies for supply chain agility: Findings from case studies. *The Journal of Strategic Information Systems*, 20(3), 232-249.
- Pagell, M., & Krause, D. R. (2004). Re-exploring the relationship between flexibility and the external environment. *Journal of Operations Management*, 21(6), 629-649.
- Ramakrishna, Y. (2016). Supply Chain Management: Large vs. Small and Medium Enterprises (SMEs). In *Innovative Solutions for Implementing Global Supply Chains in Emerging Markets* (pp. 141-151). IGI Global.
- Rasi, R. E., Abbasi, R., & Hatami, D. (2019). The effect of supply chain agility based on supplier innovation and environmental uncertainty. *International Journal of Supply and Operations Management*, 6(2), 94-109.
- Saleh Shatat, A., & Mohamed Udin, Z. (2012). The relationship between ERP system and supply chain management performance in Malaysian manufacturing companies. *Journal of Enterprise Information Management*, 25(6), 576-604.
- Sambamurthy, V., Bharadwaj, A., & Grover, V. (2003). Shaping agility through digital options: Reconceptualizing the role of information technology in contemporary firms. *MIS quarterly*, 237-263.
- Sharifi, H., & Zhang, Z. (2001). Agile manufacturing in practice-Application of a methodology. *International Journal of Operations & Production Management*, 21(5/6), 772-794.
- Stank, T. P., Daugherty, P. J., & Ellinger, A. E. (1996). Information exchange, responsiveness and logistics provider performance. *The International Journal of Logistics Management*, 7(2), 43-58.
- Stevens, G. C., & Johnson, M. (2016). Integrating the supply chain... 25 years on. *International Journal of Physical Distribution & Logistics Management*, 46(1), 19-42.
- Swafford, P. M., Ghosh, S., & Murthy, N. (2008). Achieving supply chain agility through IT integration and flexibility. *International Journal of Production Economics*, 116(2), 288-297.
- Swafford, P. M., Ghosh, S., & Murthy, N. (2006). The antecedents of supply chain agility of a firm: scale development and model testing. *Journal of Operations Management*, 24(2), 170-188.
- Tan, K. C. (2001). A framework of supply chain management literature. *European Journal of Purchasing & Supply Management*, 7(1), 39-48.
- Tarafdar, M., & Qrunfleh, S. (2017). Agile supply chain strategy and supply chain performance: complementary roles of supply chain practices and information systems capability for agility. *International Journal of Production Research*, 55(4), 925-938.
- Vaaland, T. I., & Heide, M. (2007). Can the SME survive the supply chain challenges?. *Supply chain management: an International Journal*, 12(1), 20-31.
- van Hoek, R., Harrison, A., & Christopher, M. (2001). Measuring agile capabilities in the supply chain. *International Journal of Operations & Production Management*, 21(1/2), 126-148.
- Wang, G., Gunasekaran, A., Ngai, E. W., & Papadopoulos, T. (2016). Big data analytics in logistics and supply chain management: Certain investigations for research and applications. *International Journal of Production Economics*, 176, 98-110.
- Yip, N. S. M. S. (2015). *The Effect of Cyber Supply Chain Security Towards Lean and Agile Supply Chain Performance in Healthcare Industry: The Mediating Effect of Organizational Capabilities* (Doctoral dissertation, Universiti Sains Malaysia).

