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Financial supply chain, inventory management and supply chain efficiency: An empirical insight from Kuwait

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A B S T R A C T

This study focuses on the factors of financial supply chain (FSC), financial institutions, and inventory for supply chain efficiency through various cost dimensions. To address this objective, a questionnaire is developed, based on various items of selected variables and it is presented to a targeted sample of supply chain practitioners, business managers and industry experts. A final sample of 216 respondents is observed for both descriptive and inferential analysis. To check the significance of each indicator under FSC, financial institutions and inventory factors, confirmatory factor analysis is conducted. Empirical facts explain that factors like financial supply chain as risk prevention strategy had a significant influence on supply chain efficiency. Through inventory factors, communication with vendors for raw material also indicate a significant impact on efficiency of Supply Chain (SC). This study would help both industry experts and business managers integrate financial supply chain, inventory factors and financial institutions for cost efficiency of supply chain. The limitations of the study includes a limited sample size and restricted indicators of inventory management. Future studies can be implemented while addressing these limitations through improved econometric methods.

1. Introduction

During the last decade, financial crisis has put significant pressure on services of the financial institutions such as issuance of new loan facility for firms. This has increased the borrowing cost for both manufacturing and trading concerns in the world economy (Ivashina & Scharfstein, 2010). Under the situation of tough financial times, business organizations try to get financing facilities from the suppliers through supplement funds sources (Garcia-Appendini & Montoriol-Garriga, 2013; Seck et al., 2013). Such issues have achieved significant attention towards various accounts in the balance sheet of the business under the title of working capital. Among various factors, financial supply chain is under reasonable attention as explained by Petr et al. (2012) with the core objective to work for the flow of finances within the organization (Hofmann, 2005). Moreover, almost all types of business organizations are dealing with the financial idea of supply chain to integrate financial supply chain (FSC) with the product and information flows (Lambert & Cooper, 2000; Lamoureux & Evans, 2011). Among various academic writers, gradual interest is developed for financial supply chain or FSC which

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has resulted in numerous publications during the last decade (Cattaneo et al., 2010). This literature has significantly highlighted different issues and perspectives of financial supply chain with solutions (Barth et al., 2001; Croom et al., 2000; Srivastava, 2007; Vickery et al., 2003).

Along with the expansion of the concept of financial supply chain in the current literature, the role of the financial institutions in expanding and helping financial matters has been considered. Previous theoretical and empirical findings indicate two perspectives for financial supply chain: the first one considers the financial activities that defines financial trends in SC about monetary rewards (More & Basu, 2013) while the second view predicts that financial supply chain is not only merely to focus on financial activities in various parties, but also to study their relationships with each other (Burgess et al., 2006; Christopher & Ryals, 1999; Cooper et al., 1997; Dekker, 2003; Huselid, 1995; Meixell & Gargeya, 2005; Peppard, 2000; Vickery et al., 2003). They also assume that financial supply chain develops a factor of trust, delivery of products on time for the customers, level of commitment from organization, payment schedules and relevant negotiation, informing sharing among the parties, and dealing with the current customers' needs. In their study, More and Basu (2013) explained that financial supply chain focuses on core concepts of getting financial benefits while taking working capital under significant consideration. In this regard, financial institutions are very much essential for the survival of business (Allen & Santomero, 2001; Clarkson, 1995; Storey, 2016). Based on the stated factors, the present study has extended its contribution in existing literature while integrating the factors of financial supply chain, financial institutions, and inventory management for supply chain efficiency.

The rest of the study is as follows. The present segment encompasses introduction and background knowledge on financial supply chain. Next section deals with the theoretical and empirical evaluation of previous studies. Section three presents a description of variables. Section four & five provide a look into the methodology adopted and the findings of the study. The last section concludes the study.

2. Literature review

Finance in supply chain considers various tools and techniques which can be measured in financial matters, ensuring the operational activities of business to move in a smooth direction. As per the findings of Pfohl and Gomm (2009), financial supply chain keeps financial and physical flow for business enterprises. Under SCF, overall system is developed through the provision of capital facility by any party like financial institutions. This idea is reflected in the empirical findings of Hofmann (2005) who claim that financial supply chain presumes smooth utilization of working capital in business. However, various challenges and issues are also associated with the financial aspect of supply chain and significant attention is required for its solution (Melo et al., 2009; Papageorgiou, 2009; Sell, 1999; Srivastava, 2007). The point of discussion is to address those factors and challenges that exert ultimate influence on different facets of financial supply chain. While developing business planning, some organizations have skipped the analysis of financial supply chain. Meanwhile, FSC explains the association between upstream and downstream business units in many industries. Value of SC reflects through the processing of business transactions, getting low cost debt facilities and better collaboration for new opportunities in the market place (Ascari, 2015; Bellusci & Beretta, 2016). In addition, financing activities in supply chain increase the level of commitments, and financial rewards for all the parties who are associated to each other (Ali et al., 2018). In their work, Cooper and Ellram (1993) expressed that a close relationship with the SC role players results in better outcome over longer time. Christopher and Towill (2002) also focused on market specific supply chain strategies and provided enough evidence for the significance of supply chain and effective results over long run.

Besides, in recent years studies like Lekkakos and Serrano (2016) reviewed the concept of operational performance of business. They explained that supplier is directly associated with reverse factoring technique. Another study by Zhu et al. (2017) assumed the credit risk in business organizations through financial supply chain while taking six approaches into their evaluation process. They elucidated that credit risk for the selected firms can be reviewed through corporate level of lending from financial institutions. A detailed review of literature was conducted by Gelsomino et al. (2016) for two major

objectives. The first one reviewed the contribution by earlier researchers in the field of financial supply chain while the second one worked for future directions. The time duration for the review of existing literature on supply chain financing is based on the period 2000-2014, taking 119 studies as core sample. It is articulated that overall literature on FSC explains two major definitions under finance orientation and supply chain orientation. The contribution of their study can be reviewed through presentation of summary vision of existing studies and those points which are highlighted for future studies. In addition, some studies have emphasized on the idea of supply chain effectiveness through various models. For instance, Liang et al. (2006) focused on data envelopment analysis(DEA) and similar fact was investigated by Cooper et al. (2004) and Narasimhan et al. (2001) for the efficiency evaluation of the supply chain. A significant contribution of their study can be viewed through buyer-seller relationship with the framework of supply chain through leader-follower assumption. It is expressed that leader-follower structure provides better efficiency and new insight for the assessment of business problems. Stephens (2001) considered supply chain operation reference (SCOR) model, which is the product of SC council in the world economy. This model has proved to be a primary tool for providing a reference of business process, and providing technological solution to supply chain issues. As per the discussion, SCOR model promised the best solution to various companies and business units at the global level. The idea of inventory management is also under significant attention of researchers. For example, Tersine and Tersine (1988) provided an argument for inventory and material management. They indicated that inventory management covers cost classification, forecasting, variance analysis, reliability of inventory, and order quantities. Wild (2017) explained the best practices in inventory management. His contribution emphasizes on inventory control, customer services and shaping the inventory. However, some researchers consider just in time (JIT) and electronic data interchange (EDI) concepts for inventory management in electronic industry of Taiwan. Some other studies like Kregel et al. (2016) concentrated on inventory factor analysis, communication with customers for inventory management (Wild, 2017), and communication with the suppliers (Salehi et al., 2018). Numerous research studies have also integrated the concept of inventory management (Billah, 2016; Brin, 2017; Khanapurkar et al., 2014; Owele & Makokeyo, 2015; Shin et al., 2015; Tanaratnachai, 2009; Zhang et al., 2016).

3. The proposed model

3.1. Description of Variables

3.1.1 Financial supply chain (FSC)

Zhang (2015) defines financial supply chain as a core business activity, measured in financial terms and essential for business success. Vickery et al. (2003) indicated FSC as an essential tool for business operations to be kept at the right track. For every business organization financial supply chain is known as a challenging task to unite both physical and financial supply chain together. Besides, Haseeb et al. (2018) and Zhang (2015) defined five dimensions through survey scale. These dimensions cover the FSC as risk prevention strategy, causing an increase of capital flow for the business, bringing high level of SC efficiency, holding risk prevention capabilities, and requiring high mark of technology for the application of SC. The present study takes all these five dimensions as significant indicators of FSC measured through Likert Scale, ranging from Strongly Disagree to Strongly Agree.

3.1.2. Financial Institutions (FINI)

In overall environment of business, financial institutions (FINIs) are significant players, providing financial and monetary services to firms. It suggests that management decisions taken by these FINIs can affect the supply chain financial structure. In their study, Zhang et al. (2016) emphasized on Shenzhen development bank of China, dealing with the financing supply chain activities and providing significant investment in the shape of loans to business firms (Simchi-Levi et al., 2015). Hence, the relationship between suppliers of a business, customers and the business itself can be viewed through financial terms and role of FINIs. Besides, Ali and Haseeb (2019), Simchi-Levi et al. (2015) and

Suryanto (2018) also explained the risk mitigation and management strategies in the field of supply chain automotive industry. The role of FINI can also be accepted as positive or negative on financial dimensions of supply chain and its effectiveness. In his study, Zhang (2015) defined three factors for financial institutions, measured on five point Likert Scale. These factors include supportive attitude of FINIs, when applied to financial dimensions of supply chain, provision of easy supply chain finance by commercial banks, and perfection of risk management system when there is an application of financial supply chain. The present study has adopted all these three measures to reflect the role of FINIs in supply chain.

3.1.3. Inventory Management (IM)

The concept of inventory management covers all those steps which help the business organization properly manage and improve overall inventory system. For this purpose, various items have been presented in previous literature as "inventory factors". For instance, Lancioni et al. (2000) defined electronic data interchange(EDI) as significant tool for inventory management. Besides, their focus was also on techniques like Just in Time (JIT) for inventory delivery program. Another factor under the title of inventory management considers "communication with the customer at the time of out of stock". It suggests that a business firm is regularly communicating with its customers even if they are facing stock out. However, the factor of notification about delays can also be used as inventory management technique (McLaughlin & Lyon, 2016). Besides, communication with the vendors for inventory and raw material (Taleizadeh & Noori-daryan, 2016), and with customers at emergency time are two other factors under inventory management (de Souza et al., 2015). Laudon and Laudon (2015) defined inventory management as a kind of communication between suppliers/vendor about finished goods and the warehouses. Similarly, Rosenkranz et al. (2017) mentioned about two other features namely inventory supervision and management. The present study has considered all these items as inventory factors (IF) to examine their impact on supply chain effectiveness (SCE).

3.1.6. Supply Chain Efficiency (SCE)

Supply chain efficiency assumes such factors or sets of activities that reflect the overall performance of supply chain for a business firm. Fugate et al. (2009) defined various cost factors integrated with supply chain effectiveness. These factors are transportation cost, necessary for the delivery of products; cost of warehousing of products; overall cost associated with inventory; logistic & administration cost; cost of products; and cost of the delivery of products to customers at right time and in right quantity. These six dimensions are widely accepted in the field of business and supply chain (Ali et al., 2018). The present study considers all these items to reflect supply chain efficiency.

3.1.7. Data Collection and Methodology

This study collected primary data through questionnaire items entitled as supply chain efficiency (six dimensions), financial supply chain (three dimensions), financial institutions (three dimensions) and inventory factors (nine items). After the development of questionnaire, it was presented for validity purposes to various industry experts and business mangers dealing with financial supply chain and related factors. A sample of 216 respondents was acquired with no missing responses and analyzed through SPSS-22 version along AMOS. In the first step, descriptive statistics was calculated to examine trends of feedback from targeted individuals. Next, correlation and VIF tolerance analysis were applied to check interdependency among various dimensions. Consequently, empirical findings were generated for six dimensions of supply chain effectiveness which also helped to accept Causal relationship between the variables.

3.2. Regression Models of the Study

Based on the developed questionnaire, the present study derived a causal relationship between supply chain effectiveness items, supply chain financing, financial institutions and finally inventory factors which is as follows:

Eq. (1) deals with the transportation cost as SCE first proxy and its association with key various items of regressors. Eq. (2) assumes warehouse cost as 2nd proxy for SCE and the same items of regressors as under Eq. (1). While Eq. (3) and Eq. (4) assume inventory and logistic administration cost. The fifth and sixth dimensions of SCE are deemed as product cost and ordered delivery at right time. The findings of these equations are presented under Table 4.

$$\begin{aligned} &supply\ chain\ effectinvess\ (SCE: Transportation\ Cost) \\ &= \partial + B1(FSC1) + B2(FSC2) + B3(FSC3) + B4(FSC4) + B5(FSC5) \\ &+ B6(FIN1) + B7(FIN1) + B8(FIN3) + B9(IF1) + B10(IF2) \\ &+ B10(IF3) + B11(IF4) + B12(IF5) + B13(IF6) + B14(IF6) \\ &+ B15(IF7) + B16(IF8) + B17(IF9) + E \end{aligned} \tag{1}$$

$$\begin{aligned} &supply\ chain\ effectinvess\ (SCE: Warehouse\ Cost) \\ &= \partial + B1(FSC1) + B2(FSC2) + B3(FSC3) + B4(FSC4) + B5(FSC5) \\ &+ B6(FIN1) + B7(FIN1) + B8(FIN3) + B9(IF1) + B10(IF2) \\ &+ B10(IF3) + B11(IF4) + B12(IF5) + B13(IF6) + B14(IF6) \\ &+ B15(IF7) + B16(IF8) + B17(IF9) + E \end{aligned} \tag{2}$$

$$\begin{aligned} &supply\ chain\ effectinvess\ (SCE: Inventory\ Cost) \\ &= \partial + B1(FSC1) + B2(FSC2) + B3(FSC3) + B4(FSC4) + B5(FSC5) \\ &+ B6(FIN1) + B7(FIN1) + B8(FIN3) + B9(IF1) + B10(IF2) \\ &+ B10(IF3) + B11(IF4) + B12(IF5) + B13(IF6) + B14(IF6) \\ &+ B15(IF7) + B16(IF8) + B17(IF9) + E \end{aligned} \tag{3}$$

$$\begin{aligned} &supply\ chain\ effectinvess\ (SCE: Logestic\ Adminstration\ Cost) \\ &= \partial + B1(FSC1) + B2(FSC2) + B3(FSC3) + B4(FSC4) + B5(FSC5) \\ &+ B6(FIN1) + B7(FIN1) + B8(FIN3) + B9(IF1) + B10(IF2) \\ &+ B10(IF3) + B11(IF4) + B12(IF5) + B13(IF6) + B14(IF6) \\ &+ B15(IF7) + B16(IF8) + B17(IF9) + E \end{aligned} \tag{4}$$

$$\begin{aligned} &supply\ chain\ effectinvess\ (SCE: Product\ Cost) \\ &= \partial + B1(FSC1) + B2(FSC2) + B3(FSC3) + B4(FSC4) + B5(FSC5) \\ &+ B6(FIN1) + B7(FIN1) + B8(FIN3) + B9(IF1) + B10(IF2) \\ &+ B10(IF3) + B11(IF4) + B12(IF5) + B13(IF6) + B14(IF6) \\ &+ B15(IF7) + B16(IF8) + B17(IF9) + E \end{aligned} \tag{5}$$

$$\begin{aligned} &supply\ chain\ effectinvess\ (SCE: Ordered\ Delivery\ at\ right\ time) \\ &= \partial + B1(FSC1) + B2(FSC2) + B3(FSC3) + B4(FSC4) + B5(FSC5) \\ &+ B6(FIN1) + B7(FIN1) + B8(FIN3) + B9(IF1) + B10(IF2) \\ &+ B10(IF3) + B11(IF4) + B12(IF5) + B13(IF6) + B14(IF6) \\ &+ B15(IF7) + B16(IF8) + B17(IF9) + E \end{aligned} \tag{6}$$

4. Results and discussion

Table 1 provides an overview of the descriptive results of financial supply chain, inventory factors, and supply chain effectiveness. Key facts are presented under the titles of range, mean score, deviation from the mean, skewness and kurtosis. These findings shed light into the trends in the data set value. For financial supply chain, five items have been added as FSC1 to FSC5. The mean score for FSCI1 is 4.83 with the deviation of 1.21, approximately. It explains the fact that total respondents of 216 in the dataset agree with the statement that supply chain finances seem to be the risk prevention strategy. The average score of 4.81 for FSC2 is close to Strongly Agree with the argument that capital flow coordination increases because of financial supply chain. While for FSC3, it is observed that higher level of overall supply chain efficiency is still to be investigated as respondents are neutral on the Likert Scale (mean=3.013). For FSC4, an agreed response is achieved for the statement that supply chain finance

reflects as high-risk controlling ability for the business firm. However, FSC5 predicts that respondents disagreed with the supposition that there is a greater need for high technology in the application of financial supply chain (mean score is 2.37). The factor of financial Institutions is observed through the mean scores from FINI1 to FINI3. For example, the mean score of 4.42 for FINI1 reflects that respondents receive a supportive role from the financial institutions in the application of financial supply chain. However, for FINI2, the mean value is 3.94. It explained that on average respondents agree with the argument that commercial banks provide financial services to key role players in SC. Finally, for FINI3, the mean score of 2.96 indicate a neutral response for "Risk prevention system is perfect when applying supply chain finance" as highlighted in the study of Zhang (2015). In addition, inventory factors (IF) are also added in the model ranging from IF1 to IF9, considering various factors. For instance, IF1 considers the factor of electronic data in-charge program with vendors for inventory management. Five-point scale for inventory factor ranges from 1 to 5 (1= not at all, 5=A lot). IF1 has a mean score of 2.90 which indicates an average EDI with vendors. IF2 explains the coordination of just in time (JIT) programs with the mean value of 4.04 reflecting a great EDI programs with vendors. IF3 and IF4, however, measure the communication level with customers at a time when business is out of stock, and notification are made for delays in shipments to customers. Both factors imply a mean score of 3 which is evident of respondents' accepting an average trend by business for both factors. For IF5 and IF6 similar average trend is observed for communication with vendors regarding raw material, and communication with customers in emergency situations respectively. IF7 defines the level of communication with supplier for finished goods and also reflects an average trend (mean score of 3). For IF8 and IF9, a great level of communication is observed with field warehouses for both normal and out of stock conditions. Supply chain effectiveness is measured through 6 items under the title of SCE1-6 and measured on the scale of Strongly Disagree to Strongly Agree. For SCE1, transportation cost shows an average score of 2.65 that reflects a neutral feedback. For SCE2, warehousing cost is observed, and respondents agree that this cost is effectively managed for supply chain. For SCE3 and SCE4, inventory cost and logistics administration cost factors exhibit a neutral view of the respondents. However, for product cost or SCE5, it is observed that respondents are closer to Strongly Agree with the mean score of 4.86 approximately. The last proxy for supply chain effectiveness is delivery of order with the exact quantity (SCE6) which implies that respondents agree with the notion that exact and accurate delivery is required to be conducted by their respective business firms. Deviation in the mean point, with the variance is also presented under Table 1 which reflects their dispersion and normality of the data set is reflected through skewness and kurtosis.

Table 1
Descriptive Results of the study

	N	Range	Minimum	Maximum	Sum	Mean	Std. Deviation	Variance	Skewness		Kurtosis	
	Statistic	Statistic	Statistic	Statistic	Statistic	Statistic	Statistic	Statistic	Statistic	Std. Error	Statistic	Std. Error
FSC1	216	4.00	1.00	5.00	829.00	4.8380	1.21489	1.476	-.832	.166	-.287	.330
FSC2	216	4.00	1.00	5.00	607.00	4.8102	1.34893	1.820	.064	.166	-1.183	.330
FSC3	216	4.00	1.00	5.00	651.00	3.0139	1.22181	1.493	.020	.166	-.887	.330
FSC4	216	4.00	1.00	5.00	693.00	4.2083	1.20778	1.459	-.248	.166	-.870	.330
FSC5	216	4.00	1.00	5.00	730.00	2.3796	1.28836	1.660	-.448	.166	-.791	.330
FINI1	216	4.00	1.00	5.00	739.00	4.4213	1.25506	1.575	-.326	.166	-.913	.330
FINI2	216	4.00	1.00	5.00	676.00	3.9496	1.23584	1.527	-.085	.166	-.942	.330
FINI3	216	4.00	1.00	5.00	639.00	2.9683	1.19422	1.426	-.134	.166	-.908	.330
IF1	216	4.00	1.00	5.00	628.00	2.9074	1.32971	1.768	.063	.166	-1.166	.330
IF2	216	4.00	1.00	5.00	658.00	4.0463	1.39023	1.933	-.073	.166	-1.293	.330
IF3	216	4.00	1.00	5.00	793.00	3.0713	1.25691	1.580	-.663	.166	-.628	.330
IF4	216	4.00	1.00	5.00	675.00	3.0250	1.28611	1.654	-.116	.166	-1.021	.330
IF5	216	4.00	1.00	5.00	635.00	2.9398	1.35752	1.843	.076	.166	-1.147	.330
IF6	216	4.00	1.00	5.00	725.00	3.3565	1.21531	1.477	-.336	.166	-.844	.330
IF7	216	4.00	1.00	5.00	650.00	3.0093	1.35369	1.832	-.017	.166	-1.216	.330
IF8	216	4.00	1.00	5.00	732.00	4.3889	1.24888	1.560	-.467	.166	-.706	.330
IF9	216	4.00	1.00	5.00	744.00	4.4444	1.13984	1.299	-.385	.166	-.542	.330
SCE1	216	4.00	1.00	5.00	573.00	2.6528	1.39260	1.939	.286	.166	-1.142	.330
SCE2	216	4.00	1.00	5.00	653.00	4.0231	1.27020	1.613	-.167	.166	-.961	.330
SCE3	216	4.00	1.00	5.00	678.00	3.0189	1.26828	1.609	-.236	.166	-.989	.330
SCE4	216	4.00	1.00	5.00	715.00	3.1302	1.25052	1.564	-.318	.166	-.905	.330
SCE5	216	4.00	1.00	5.00	673.00	4.8557	1.31557	1.731	-.240	.166	-1.064	.330
SCE6	216	4.00	1.00	5.00	705.00	4.5639	1.24257	1.544	-.366	.166	-.769	.330

4.1. Descriptive Statistics

A correlation matrix was also generated during the study and presented under Table 2. It shows individual level of association between key items of financial supply chain, financial institutions, and inventory factors of the study. As per these correlational findings, associations among all explanatory variables and their items were found to be below moderate level of 50 percent. All items are related to each other at low level, which suggests that there was no issue of high correlation among them. To express the issue of multicollinearity between set of variables, tolerance test is also applied under the title of variance inflation factor. It is used to identify the problematic level of high correlation between selected variables. Individual and mean score of VIF is also presented under Table 3. It is observed that mean and individual VIF is less than 5, hence no issue of interdependency is found between them.

Table 2
Pairwise correlations

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)
(1) FSC1	1.000																
(2) FSC2	0.149	1.000															
(3) FSC3	0.258	0.227	1.000														
(4) FSC4	0.223	0.176	0.121	1.000													
(5) FSC5	0.057	0.095	0.136	0.134	1.000												
(6) FINI1	0.271	-.013	0.136	0.141	0.292	1.000											
(7) FINI2	0.327	0.107	0.230	0.181	0.159	0.543	1.000										
(8) FINI3	0.069	0.163	0.348	0.035	0.128	0.170	0.158	1.000									
(9) IF1	0.296	0.169	0.195	0.087	-.039	0.391	0.469	0.326	1.000								
(10) IF2	0.189	0.134	0.260	0.177	0.120	0.381	0.392	0.166	0.345	1.000							
(11) IF3	0.233	0.150	0.191	0.336	0.146	0.236	0.264	0.109	0.257	0.192	1.000						
(12) IF4	0.123	0.126	0.126	0.151	0.030	0.244	0.271	0.143	0.385	0.280	0.267	1.000					
(13) IF5	0.050	0.271	0.205	0.104	0.088	0.146	0.265	0.142	0.221	0.194	0.223	0.257	1.000				
(14) IF6	0.159	0.022	0.285	-.020	0.192	0.270	0.276	0.273	0.199	0.230	0.071	0.269	0.216	1.000			
(15) IF7	0.173	0.215	0.295	0.113	0.158	0.203	0.327	0.268	0.329	0.262	0.174	0.331	0.281	0.343	1.000		
(16) IF8	0.272	0.047	0.216	0.177	0.075	0.218	0.211	0.192	0.237	0.332	0.346	0.236	0.178	0.273	0.179	1.000	
(17) IF9	0.220	0.022	0.186	0.132	0.160	0.077	0.154	0.109	0.098	0.145	0.223	0.127	0.099	0.164	0.157	0.267	1.000

Table 3
Variance inflation factor

Items	VIF	1/VIF
FINI2	1.802	.555
FINI1	1.753	.57
IF1	1.745	.573
IF2	1.423	.703
IF7	1.412	.708
IF3	1.398	.715
IF6	1.396	.716
IF8	1.391	.719
FSC3	1.37	.73
IF4	1.369	.73
FSC1	1.346	.743
FINI3	1.328	.753
IF5	1.263	.792
FSC5	1.241	.806
FSC2	1.23	.813
FSC4	1.215	.823
IF9	1.173	.852
Mean VIF	1.403	.712

A confirmatory factor analysis or CFA was then conducted to check the factor loading and their individual significance in the model. For FSC, five items and for financial Institutions three items have been selected for the structural model. Likewise, to reflect inventory factors, 9 items have been added. Fig. 2 explains the structure of the latent variables along with their indicators and error terms ranging from e1 to e17 on left side. While the left part of the figure explains the factor loading through CFA in AMOS-22 version, the factor loading for all the items under FSC is above .50 and highest loading of .73 belongs to FSC5. For financial institutions, factor loading is above .65 and the highest loading of .83 belongs to FINI3. For inventory factors, highest loading is .81, linked to IF8. All the items under

inventory factors have a factor loading above .50, hence providing enough evidence for their final consideration to do the empirical analysis.

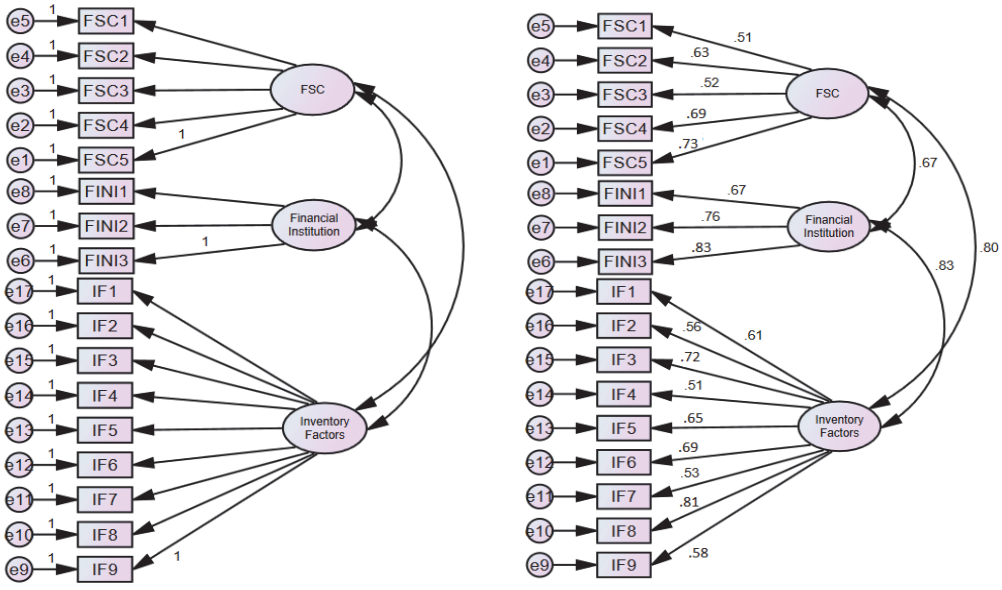

Fig. 2. Structural Model of confirmatory factor analysis with loadings

Finally, empirical findings are explained under Table 4 taking transportation cost, warehousing cost, inventory cost, logistic administration cost, product cost and order delivery cost as key dependent variables to measure supply chain effectiveness. The financial supply chain items from FSC1 to FSC5, financial institutions FIN1 to FIN3, inventory factors IF1 to IF9 are considered as key proxies for independent variables. FSCI1 indicates its positive and significant influence on transportation cost, while insignificant for warehousing and inventory cost. For logistic administration, there is a significant and positive influence of .251 at 1 percent level of significance. For product cost FSC1 expresses negative but insignificant impact. Finally, for ordered delivered at right time, it shows positive and highly significant impact of .225. For FSC2, all the items of supply chain effectiveness are insignificantly associated with both positive and negative coefficients. Similar insignificant impact is recorded for FSC3. For FSC4, it is observed that due to higher risk prevention capabilities of supply chain financing, significantly positive influence is observed on inventory cost with the coefficient of .132. However, for product cost, the effect of -.150 is observed under full sample assumption. The fifth factor of supply chain finance explains requirement of higher technology of its application and has a positive and significant relationship with ordered delivered at right time. It suggests that higher level of technological requirements can make an effective and significant impact on delivery of products to the customers at right time.

From the items related to financial institutions (FINI), a significant and positive impact of .130 is seen for warehousing cost. It suggests that when commercial banking firms provide easy supply chain financing, there is a positive effect on the warehousing cost, resulting in the increase of the supply chain effectiveness. For logistic administration cost it shows the effect of .148, significant at 10 percent. For FINI3, none of the supply chain cost effective items are significantly associated to it. For inventory factors, IF1 indicates that warehousing cost has a significant but positive relationship of .193. It means that increasing level of EDI programs with the vendors for inventory management can be significantly and positively associated to the cost of warehouse. For inventory cost, EDI programs have a similar positive and significant relationship with the coefficient of .173. The rest of the indicators under IF1 predict negative but insignificant association with supply chain effectiveness. The IF2 coefficient of .107 explains that L.A Cost is significantly and positively associated with it. Meanwhile, factor of

product delivery on time has a coefficient of .111, assuming that coordination of JIT programs has their significant relationship with supply chain effectiveness. IF3 reflects communication with customers at the time of stock out. For all the factors of supply chain effectiveness, insignificant association is observed with IF3. Under IF4, a significantly positive impact of .213 is found for product cost, which suggests that a higher notification of delays to customers can influence the cost of product. The Item 5 for IF reflects communication with vendors and shows its significant but positive influence on transportation, warehousing, inventory, logistic administration and product cost. It also explains that a proper communication for raw material inventory level with supplier/vendor can positively influence all the factors of supply chain except delivery of order at right time. While the Item 6 of inventory IF6 assures the communication level with the customers at the time of emergency. However, none of the supply chain effectiveness (SCE) is significantly associated to it. In addition, communication with the vendor about finished goods inventory is entitled under IF7. It is found that factors like T. cost, W. cost, L.A cost and cost of ordered delivery at right time are significantly and positively associated to IF7. To explain this relationship, a view point can be accepted that the higher communication and level of interaction with the vendor for finished goods inventory can increase the SCE but not the I. cost and product cost. Next, the factor of IF8 has a significant and positive influence on product cost, ordered delivery at exact time. The last item of inventory is shown as communication level at the time of out of stock situation entitled as IF9. For SCE, it has insignificant impression on all the dimensions, except on O.D.R.T. It suggests that a higher stock out situation can lead to create a negative impact on order delivery.

Table 4
Empirical Findings for effectiveness of supply chain through Financial Supply chain and Inventory Factors

	(1)	(2)	(3)	(4)	(5)	(6)
VARIABLES	T. Cost	W. Cost	I. Cost	L.A. Cost	P. Cost	O.D.R. T
FSC1	0.146*	0.0714	0.100	0.251***	-0.0268	0.225***
	(0.0875)	(0.0693)	(0.0738)	(0.0707)	(0.0735)	(0.0717)
FSC2	0.123	-0.0247	0.0801	0.0544	0.0888	-0.0158
	(0.0753)	(0.0596)	(0.0635)	(0.0609)	(0.0632)	(0.0617)
FSC3	0.0297	-0.0136	0.00925	0.0148	0.105	0.0249
	(0.0878)	(0.0695)	(0.0740)	(0.0710)	(0.0737)	(0.0720)
FSC4	0.0396	-0.0473	0.132*	-0.0780	-0.150**	0.0213
	(0.0836)	(0.0662)	(0.0705)	(0.0676)	(0.0702)	(0.0685)
FSC5	0.00269	0.0469	0.0586	-0.0601	-0.0229	0.0610**
	(0.0792)	(0.0627)	(0.0668)	(0.0640)	(0.0665)	(0.0649)
FINI1	-0.131	0.130*	-0.0373	0.148*	0.0941	0.0912
	(0.0966)	(0.0765)	(0.0815)	(0.0781)	(0.0812)	(0.0792)
FINI2	-0.0397	0.0577	-0.0304	0.0263	0.123	-0.0186
	(0.0995)	(0.0788)	(0.0839)	(0.0805)	(0.0836)	(0.0816)
FINI3	-0.00387	0.0703	0.0550	-0.0905	-0.107	-0.0311
	(0.0884)	(0.0700)	(0.0745)	(0.0715)	(0.0742)	(0.0725)
IF1	0.0799	0.193***	0.173**	-0.0455	-0.0536	-0.0506
	(0.0910)	(0.0720)	(0.0768)	(0.0736)	(0.0764)	(0.0746)
IF2	-0.00490	0.0642	0.0786	0.107*	0.0653	0.111*
	(0.0786)	(0.0622)	(0.0663)	(0.0636)	(0.0660)	(0.0644)
IF3	-0.108	0.0685	0.0262	0.0346	0.0147	-0.0212
	(0.0862)	(0.0682)	(0.0727)	(0.0697)	(0.0724)	(0.0706)
IF4	-0.0426	-0.00183	0.0320	0.0718	0.213***	0.101
	(0.0833)	(0.0660)	(0.0703)	(0.0674)	(0.0700)	(0.0683)
IF5	0.136*	0.164***	0.164**	0.123**	0.127**	-0.00285
	(0.0758)	(0.0600)	(0.0640)	(0.0613)	(0.0637)	(0.0622)
IF6	0.119	0.0167	0.0338	-0.0231	0.114	-0.0613
	(0.0890)	(0.0705)	(0.0751)	(0.0720)	(0.0748)	(0.0730)
IF7	0.143*	0.109*	0.0841	0.205***	0.111	0.226***
	(0.0804)	(0.0637)	(0.0678)	(0.0650)	(0.0675)	(0.0659)
IF8	0.00313	0.0701	-0.00783	0.0484	0.137*	0.183**
	(0.0865)	(0.0685)	(0.0729)	(0.0699)	(0.0726)	(0.0709)
IF9	0.0659	-0.00382	-0.0102	-0.0533	-0.0253	-0.142**
	(0.0870)	(0.0689)	(0.0734)	(0.0704)	(0.0731)	(0.0714)
Constant	0.947*	-0.0756	0.213	0.852**	0.594	0.909**
	(0.523)	(0.414)	(0.441)	(0.423)	(0.439)	(0.429)
Observations	216	216	216	216	216	216
R-squared	0.143	0.355	0.265	0.305	0.323	0.277

Significant findings are presented through *** p<0.01, ** p<0.05, * p<0.1

5. Conclusion and future recommendations

This study has discussed how the financial supply chain emerged over time and significant attention has been shown by experts. It also suggests how effectiveness and efficiency of supply chain can be viewed from various factors under the title of cost efficiency and delivery of products to customers. Besides, inventory factors play their significant role to explore the relationship between SCE and financial supply chain. The present study has considered supply chain finances, financial institutions, inventory factors and SCE in the context of Kuwait. To explore their relationships, this study has developed a questionnaire, based on various items for each of the explanatory and outcome variables. Grounded on the developed sample, both descriptive and empirical analysis have been conducted, and significant discussion has been made. Descriptive facts indicate the respondents' view about each of the selected items, while correlation suggests the level of relationship among various factors. For empirical analysis, six dimensions were identified under the title of transportation cost, warehousing cost, logistic administration cost, product cost, and delivery of order at right time without any damage. Through inferential statistics, findings indicate that supply chain financing was a risk prevention strategy and it had significant but positive influence on transportation, logistics and delivery of order cost. For FSC4, impact on inventory cost was significantly positive, and for product cost, its effect was significantly negative under full sample. While FSC5 reflects "requirement of high degree of technology for the application purposes," it had a significant but positive impact on delivery of the product to customers without any damage.

FINI1 explains supportive attitude from financial institutions for application of supply chain finance. It indicates a significant and positive influence on warehouse, inventory, and logistic administration cost. FIIN2 and FINI3 also explain their insignificant influences on all dimensions of SCE. For IF, the fifth dimension reflects level of communication with the vendor for raw material, and a significant and positive impact was observed on all the indicators of supply chain effectiveness except order delivery. IF7 defined significant influence on all the items of SCE except product cost and inventory cost. These findings offer a new look for both business managers and industry analysts, interested in the integration of financial supply chain, financial institutions, inventory factors and supply chain cost efficiency.

Although literature is available for these variables but not in a comprehensive manner. In this regard, the contribution of present study can be viewed from its practical originality in the field of finance and supply chain. Business managers can take significant strategic decisions to control the cost of supply chain through financial supply chain. Besides, industry experts, working as business advisors can also get significant assistance from empirical findings of present study. These facts provide a new insight and meaning for students of financial management and supply chain, to assimilate both factors. However, this study faced a few limitations. First, sample size was restricted to a few business firms only, working in the region of Kuwait, while ignoring some other domestic and multinational firms. Second, efficiency of supply chain has considered very few and limited cost factors. These factors can be expanded in terms of e-business activities, supply chain enablers, benefits to business through SC enablers, SC performance and various attributes of SC under e-business activities. Future studies can be conducted while addressing these limitations.

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