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# Knowledge management capability and supply chain management practices in the Saudi food industry

## Abstract

**Purpose** – The main goal of this research is to examine the effect of knowledge management capabilities on supply chain management practices and organizational performance in firms, in addition to examining the effect of supply chain management on organizational performance.

**Design/methodology/approach** – To demonstrate the effect of knowledge management capabilities on supply chain management practices, and organizational performance, different techniques such as factor analysis, correlation analysis, and structural equation modeling were used to verify the validity of the proposed conceptual model and to test the suggested hypotheses, using data collected from 165 companies in the Saudi food industry (representing a response rate of 74.9%).

**Findings** – According to the study's findings, supply chain management practices is positively affected by knowledge management capabilities. Moreover, organizational performance is directly affected by knowledge management capabilities and supply chain management practices.

**Research limitations/implications** -Due to the specific nature of the sample, the findings of the current research are applicable only to the food industry.

**Originality/value** – The current research introduced a conceptual model, which has been tested and verified in the Saudi food industry. The findings recommend that both knowledge management capabilities as well as supply chain management practices will contribute to improving the organizational performance. In addition, knowledge management capabilities will improve the supply chain management practices.

**Keywords** knowledge management capabilities, supply chain management practices, organizational performance, Saudi food industry

**Paper type** Research paper

## 1. Introduction

Organizations are operating in a global business environment characterized by rapid changes, technological advancements, changing customer needs and higher competition (Bolívar-Ramos et al., 2012; Patnaik et al., 2013). In order for organizations to survive in such a turbulent environment, they must promote their capacity to learn new practices and technologies and consistently improve their performance and long-term organizational success (Weldy and Gillis, 2010; Argote and Miron-Spektor, 2011). In addition, organizations attempt to introduce new business approaches including for example total quality management, just-in-time approach, business process reengineering and supply chain management to improve their performance and competitive advantage (Saad and Patel, 2006).

The resource-based view theory, which originated from the strategic management literature, suggests that firms compete based on their resources and capabilities. A

resource is referred to anything tangible or intangible possessed or acquired by a firm, while a capability is the ability to utilize resources to perform tasks or activities (Hall 1993; Yang et al., 2009). Organizations with valuable, rare, inimitable and non-substitutable resources would be able to accomplish value-creating strategies that are not easily duplicated by other competitors (Barney, 1991).

In knowledge-based era, knowledge is viewed as the key strategic resource for organizational survival, stability, growth and improvement (Hassan and Al-Hakim, 2011). In addition, knowledge is considered the basis for the development of core competencies that will create competitive advantages as well as improve organizational performance (Halley and Beaulieu, 2005). Through knowledge organizations can enhance cooperation and information sharing among employees, decision making, productivity, and innovation (Bennet and Tomblin, 2006; King, 2009; Chang and Chuang, 2011; Gharakhani and Mousakhani, 2012).

The aim of knowledge management is to develop approaches that facilitate getting the right knowledge at the right time to the right person and in the right format (Halawi et al., 2006). Also, knowledge management would assist organizations to remain competitive, through sharing information with the external partners and knowing their competitors' products, services, strategies and best practices (Kyobe, 2010). In addition, knowledge management would help organizations in acquiring, interpreting and using knowledge related resources across functional boundaries to create new knowledge (Chuang, 2004; Ju et al, 2006).

In order for organizations to compete in the global markets, they need a well-integrated supply chains. Previous studies highlighted the significant role of managing the supply chain within the firm (Ibrahim and Ogunyemi, 2012). Supply chain management is one of the tools used by organizations to improve their business performance as well as to retain their competitive advantage, since competition is among supply chains and not between individual organizations (Li et al., 2006; Ou et al., 2010; Attia 2015; Attia 2016a; Attia 2016b).

Knowledge management is considered complementary organizational capabilities that contribute to organizational success (Yang and Chen, 2009; San-Valle et al., 2011; Jain and Moreno 2015).

In addition, in order for organizations to improve their performance and survive in a competitive environment, they have to collaborate and build long-term relationships with upstream and downstream partners in the supply chain (Huo, 2012; Xu et al., 2014). Knowledge management capability is viewed as a fundamental strategic asset that facilitates the coordination and integration between supply chain members (Rashed et al., 2010; Abdul Wahab and Sardabi, 2011; Samuel et al., 2011; Tan and Cross, 2012; Xu et al., 2014). However, limited studies have examined the relationship between knowledge management capability and supply chain management practices and their effect on organizational performance (Wong and Wong, 2011).

## 2. Theory and hypothesis development

### 2.1 Knowledge management capability and supply chain management practices

Recently, researchers have shown an increased interest in exploring the role of knowledge management in the supply chain management field. A number of researchers believed that, knowledge is a fundamental strategic asset that would contribute to the improvement and success of supply chains (Halley and Beaulieu, 2005; Chen et al., 2009; Rashed et al., 2010; Abdul Wahab and Sardabi, 2011; Samuel et al., 2011). Supply chain integration between upstream and downstream members includes both tangible assets and resources as well intangible assets, i.e. knowledge resources (Wu, 2008; Wong and Wong, 2011).

In addition, supply chain members are expected to achieve mutual benefits through collaboration, mutual trust, long term commitment, partnership, frequent communication, and information sharing (Maqsood et al., 2007; Sambasivan et al., 2009; Rashed et al., 2010; Prajogo and Olhager 2012). Schoenherr et al., (2014, p. 2), defined supply chain knowledge as “the use of knowledge resources obtained from supply chain members for economic gain”.

Several researchers have argued that sharing, integrating and applying knowledge between supply chain members would lead to considerable benefits for organizations, for example reducing cost and cycle time, improving quality and customer service levels (Ofek and Sarvary, 2001; Dalpati et al., 2010). Thus, managing knowledge among supply chain members would lead to more effective and efficient supply chain processes (Schoenherr et al., 2014) as well as long term survival, competitive advantage and higher performance (Sambasivan et al., 2009; Abdul Wahab and Sardabi, 2011).

There has been considerable research on the role of knowledge management in supply chain management, which concluded that knowledge management improves supply chain management in organizations. However, this relationship has been explored from various perspectives. For example, Li et al., (2012) provided evidence that collaborative knowledge management practices (including, knowledge generation, storage, access, dissemination and application) result in enhanced supply chain integration and supply chain knowledge quality in eight manufacturing industries. Chen et al., (2009) investigated the relationship between e-business technology, organizational knowledge, supply chain practices and competitive performance in top manufacturing firms in 24 countries. They concluded that there is a positive relationship between organizational knowledge and supply chain practices which would result in improving competitive performance.

Based on empirical research among 163 Canadian manufacturing organizations, Halley and Beaulieu (2005) confirmed that effective knowledge management processes (including knowledge acquisition, knowledge capturing and knowledge sharing) would enable the integration of internal supply chain management practices with external suppliers and customers. Also, Dalpati et al., (2010) provided evidence that knowledge management processes (knowledge acquisition, knowledge conversion, knowledge application and knowledge protection) have a significant positive impact on supply chain flexibility performance in 88 Indian manufacturing organizations. They concluded that knowledge sharing among supply chain members would lead to enhanced supply chain practices and thus better performance.

In addition, Sambasivan et al., (2009) investigated knowledge acquisition and knowledge application as supply chain knowledge processes and their relationship with supply chain learning and organizational performance in Malaysian manufacturing organizations. They suggested that effective knowledge creation and application requires learning among supply chain members. Recently, Schoenherr et al., (2014) examined supply chain knowledge management capability (including knowledge acquisition, knowledge conversion, and knowledge application and knowledge protection) in 195 small-and medium-sized enterprises in the USA. They concluded that supply chain knowledge management capability is a dynamic capability, which could lead to effective decision making process as well as improved supply chain performance.

Moreover, several researchers have examined the role of organizational conditions and infrastructures in creating and sharing knowledge between supply chain partners. For example, Wu (2008) concluded that technology adoption, supplier relationship management and customer relationship management are essential for supply chain management implementation. Similarly, Youn et al. (2013) argued that effective information sharing; i.e. with quality and accuracy, between supply chain partners could be achieved through mutual trust, organizational compatibility and top management support. Moreover, Maqsood et al., (2007) introduced the “Knowledge Advantage framework” that could be applied across supply chain members. This framework included three components: knowledge leadership, people infrastructure and Information Communication Technologies infrastructure.

As shown above, previous research has focused on knowledge management processes or organizational capabilities on different supply chain constructs. For example, researchers have examined the relationship between knowledge management and supply chain integration and supply chain knowledge quality (Li et al., 2012); supply chain performance (Schoenherr et al., 2014); supply chain flexibility performance (Dalpati et al., 2010); supplier’s operational performance (Rashed et al., 2010); supply chain technologies (Collins et al., 2010); supply chain integration (Prajogo and Olhager, 2012); supply chain agility (Liu et al., 2013); and e-business adoption in the supply chain (Chong et al., 2014).

To date, only a few studies have examined the relationship between knowledge management infrastructure capability and supply chain management practices. The most relevant work to this research is the study conducted by Wong and Wong (2011) in Malaysia. They examined the impact of both knowledge management capability and supply chain management practices on organizational performance. They argued that supply chain management practices require knowledge management capability. knowledge management capability model was based on Gold et al., (2001), including both knowledge management infrastructure (technology, structure and culture) and knowledge management process capability. They concluded that technological and process capabilities facilitate knowledge sharing as well as building long-term relationships between supply chain partners. In addition, results showed that these knowledge management capabilities have direct impact on organizational performance as well as indirect impact, through supply chain management practices.

***H1: Knowledge management capability has an impact on supply chain management practices.***

## *2.2 Knowledge management capability and organizational performance*

Researchers have argued that organizations can enhance their performance or build up competitive advantage through effective management of their valuable as well as rare knowledge resources and capabilities (Tseng and Lee, 2014). As discussed before, previous research has divided knowledge management into two broad perspectives: knowledge infrastructure capabilities (enablers) and knowledge processes. Numerous studies have examined the relationship between knowledge management capability and organizational performance. However, these studies could be categorized based on their definition and perspective of the knowledge management capability construct.

Some studies have considered both knowledge management infrastructure capability and knowledge management processes in investigating the relationship between knowledge management and organizational performance. For example, Mills and Smith (2011) adopted Gold et al., (2001) knowledge management capability measures (including knowledge infrastructure capability and knowledge process capability) using data from both service and manufacturing organizations in Jamaica. The results indicated that some knowledge resources, i.e. organizational structure and knowledge application have a significant effect on organizational performance. However, these studies did not examine the relationship between knowledge management infrastructure and knowledge management processes.

Also, Tanriverdi (2005) applied his research on 250 large multi-business organizations from both service and manufacturing sectors. He provided evidence that knowledge management capability (including knowledge management resources and processes) has a significant positive effect on market and financial organizational performance. In addition, the results showed that knowledge management capability mediates the relationship between IT relatedness and organizational performance.

Other studies have investigated the relationship between knowledge management capability and organizational performance. For example, Andreeva and Kianto (2012) introduced a framework for knowledge management practices including human resources management and information communication technology (ICT). An empirical study was conducted using a survey data of 234 organizations located in Finland, Russia and China. They demonstrated a significant impact of human resources management and ICT on financial performance and organizational competitiveness. In addition, the results showed that ICT has an effect on financial performance, through human resources management practices.

Similarly, based on empirical research among 177 manufacturing firms in Taiwan, Chuang (2004) investigated the relationship between knowledge management capability (technology, structure, culture and human resources) and competitive advantage. He concluded that social knowledge management resources (i.e. structure, culture and human resources) have an impact on competitive advantage, while technical knowledge management resource has a negative impact.

Furthermore, researchers have examined the mediating effect of knowledge management processes on the relationship between knowledge infrastructure capability and organizational performance. For example, Chang and Chuang (2011) provided evidence that knowledge infrastructure capability (including: culture, structure, technology and human resources) has an impact on organizational performance, through knowledge

management processes (including: knowledge choice, access, storage and sharing) in 135 large manufacturing organizations in Taiwan.

Similarly, Lee and Lee (2007) examined this relationship using a survey in 68 organizations in Korea. They found that knowledge management capability (including organizational structure, culture and IT support) all have a positive effect on knowledge processes, which in turn affect organizational performance (customer and financial performance). However, the results showed no effect of human knowledge management capability on knowledge processes.

Knowledge management capability is considered by other researchers as a set of knowledge processes. They include, for example, knowledge acquisition, sharing and application (Gharakhani and Mousakhani, 2012); knowledge documentation, acquisition and creation (Liang et al., 2007) and knowledge transfer and protection (Tseng and Lee, 2014). These three studies provided evidence that knowledge management capability has a significant and direct impact on organizational performance.

The studies of Gharakhani and Mousakhani (2012) and Tseng and Lee (2014) were applied on SMEs, while Liang et al. (2007) applied their study on traditional manufacturing, high-Tech manufacturing and service organizations. In addition, Liang et al., (2007) concluded that the type of industry determines what knowledge management capability is substantial for enhancing organizational performance.

In sum, a number of issues arise from reviewing previous studies that examined the relationship between knowledge management capability and organizational performance. First, in the reviewed studies the term knowledge management capability is defined from different perspectives. Specifically, researchers refer to it as: knowledge management infrastructure and knowledge management processes (Gold et al, 2001; Tanriverdi, 2005; Mills and Smith, 2011); knowledge management infrastructure or enablers (Chuang, 2004; Lee and Lee, 2007; Chang and Chuang, 2011; Andreeva and Kianto, 2012); or knowledge management processes (Liang et al., 2007; Gharakhani and Mousakhani, 2012; Tseng and Lee, 2014).

Second, previous empirical studies provided evidence that not all knowledge resources have an effect on organizational performance. Moreover, some knowledge management resources have an indirect effect on performance through other knowledge management capability and processes. Accordingly, it is essential for an organization to obtain and deploy the appropriate knowledge management capability and processes that would enable it to achieve its goals and objectives (Gharakhani and Mousakhani, 2012). Third, the majority of the reviewed studies have focused on developed countries to examine the relationship between knowledge management capability and organizational performance, indicating a need to examine this linkage in developing countries as well.

***H2:** Knowledge management capability has an impact on organizational performance.*

### *2.3 Supply chain management practices and organizational performance*

A considerable amount of literature has been published on the relationship between supply chain management practices and organizational performance. For example, Tan (2002)

considered 25 supply chain management practices, which are classified into six factors, including: supply chain integration, supply chain characteristics, information sharing, strategic location, customer service management and just-in-time capability. The results indicated that supply chain management practices have significant positive impact on organizational performance, including product quality, competitive position and customer service.

Kim (2006) investigated the relationships between supply chain management practices, competitive capability, the level of supply chain integration and organizational performance in small and large manufacturing organizations in Korea and Japan. The sample included consumer product, basic industrial material, and electric and machinery industries. The results showed that in large organizations supply chain management practices and competition capability have significant direct impacts on firm performance. However, indirect effects were found in small organizations.

Also, Li et al., (2006) examined the relationship between supply chain management practices, competitive advantage and organizational performance in 196 manufacturing firms from six selected industries in the USA. They came to the conclusion that effective supply chain management practices can promote competitive advantage and enhance organizational performance. Likewise, Robb et al., (2008) demonstrated the positive impact of supply chain practices on operational and financial performance using a one-industry research consisting of 72 furniture manufacturers in China.

Furthermore, Chow et al., (2008) conducted a comparative study to investigate the relationship between supply chain management components (including competencies, practices and concerns) and organizational performance. The data was collected through an empirical survey of middle-line managers in the USA and Taiwan. They measured supply chain management practices using Tan's (2002) 25 survey items. The results showed that supply chain management practices have a direct and positive impact on organizational performance in Taiwan, but no direct relation in the USA. In addition, they found that the most important practices in Taiwan are supply chain features, supply chain integration and customer service management. It was concluded that supply chain management practices-performance link depends on each country's situation and is influenced by cultural differences among countries, i.e. "one size doesn't fit all" (Chow et al., 2008, p. 675).

Cook et al., (2011) provided evidence that the impact of supply chain management practices on organizational performance differs according to the position of the organization within its supply chain, i.e. not all practices are equally effective and important for all supply chain members. They examined the supply chain role of a company (whether manufacturer, distributor, retailer or service provider) as a moderator between supply chain management practices (including, information sharing, long term relationships, advanced planning systems, leveraging the internet, supply network structure, and distribution network structure) and organizational performance. They found that all supply chain management practices have significant direct impact on organizational performance; however information sharing and distribution network structure resulted in the highest positive correlation with organizational performance.

In addition, they concluded that each supply chain member should concentrate on supply chain management practices according to its organizational role in the supply chain in

order to increase performance. For example, distributors should apply practices related to planning, distribution, transportation and inventory decisions. Also, manufacturers should consider practices including information sharing, distribution structure and long term-relationships with downstream and upstream members. Moreover, service providers should consider information sharing with supply chain members. However, the results showed that supply chain management practices didn't significantly differentiate the retailers' performance. Accordingly, the general link between supply chain management practices and performance may be erroneous without considering the specific context of the company concerned.

Similar results were found in emerging markets. For example, Sundram et al., (2011) showed that efficient supply chain management practices enhance supply chain performance. This study used a convenience sampling of 125 firms in the electronics industry in Malaysia. They used supply chain management practices based on the work of Li et al., (2006) and Min and Mentzer (2004) including strategic supplier partnership, strategic customer relationship, information sharing, information quality, postponement, agreed vision and goals and risk and reward sharing. The results showed that all supply chain management practices have a significant positive effect except strategic customer relationship and that agreed vision and goals have the superior impact on supply chain performance.

Based on empirical research among 203 manufacturing small and medium size enterprises (SMEs) in Turkey, Koh et al., (2007) and Bayraktar et al., (2009) identified twelve supply chain management practices relevant to SMEs. They included close partnership with customers, just-in-time supply, e-procurement, outsourcing, subcontracting, third-party logistics, strategic planning, supply chain benchmarking, few suppliers, many suppliers and holding safety stock. Both studies found a positive and significant effect of supply chain management practices on operational performance in SMEs.

In addition, researchers have examined the relationship between supply chain management practices and organizational performance in retail organizations. Singh et al., (2010) considered the effect of supply chain management practices, which include the use of technology, supply chain speed, customer satisfaction, supply chain integration and inventory management on organizational performance in India. The results indicated that using supply chain management practices doesn't have an impact on organizational performance. This is due to several factors including for example, location disadvantage, personal relationships, product variety, high operational cost and high employee turnover.

However, Hamister (2012) conducted an empirical study at 79 small retail firms and reported a positive relationship between supply chain management practices and organizational performance at both retail and supplier levels in Upstate New York. supply chain management practices included strategic supplier partnership, level of information sharing, quality of information sharing and integration intensity. Results showed that information sharing and information quality have the highest impact on performance, which is similar to the results of other studies in the manufacturing sector (Li et al., 2006).

The relationship between supply chain management practices and organizational performance was also investigated in the service industry. For example, Khang et al., (2010) conducted a study in the Malaysian service industry and provided evidence that

customer orientation, IT adoption, leadership and training have significant impact on the performance of the service organization. They concluded that successful implementation of supply chain management depends on several factors. First, top management support and good leadership are necessary for changing business processes and organizational culture in order to achieve integration between all supply chain partners.

Second, IT adoption is important for internal integration, communication, coordination and long term commitment between supply chain members. Third, organizations should have close relationship with customers in order to understand their needs and to deliver the right products to them. Finally, training is important to ensure that employees have the essential skills needed for integration with other supply chain partners. However, results showed that knowledge sharing and partnership have no significant influence on organizational performance in the service industry.

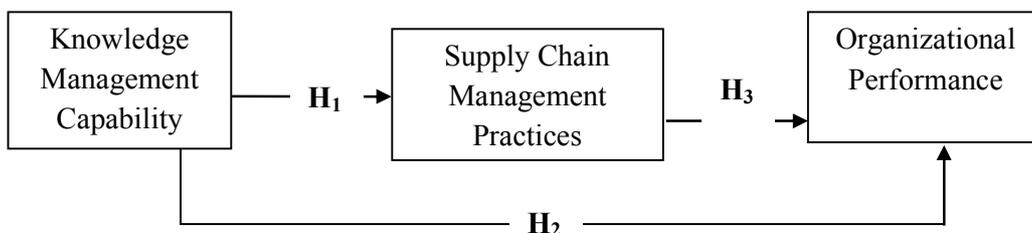
Chong et al., (2011) scrutinized the relationship between supply chain management practices, measured through strategic supplier partnership, customer relationship, information sharing, IT, training and internal operations and operational performance in both manufacturing and service organizations in Malaysia. The results confirmed that supply chain management practices have a direct and significant impact on organizational performance. In addition, the study provided no significant difference in the supply chain management practices of manufacturing and service firms in Malaysia.

In sum, the results of the reviewed studies on supply chain management practices depend on the context of the study, i.e. supply chain management practices may differ in accordance with the industry, firm size, supply chain length and the position of the firm in the supply chain (Ibrahim and Ogunyemi, 2012). Moreover, there is a lack of studies of supply chain management practices and their effect on organizational performance in developing countries (Saad and Patel, 2006).

*H<sub>3</sub>: Supply chain management practices have an impact on organizational performance.*

### 3. Research model

The interrelationships among variables as represented by the above hypotheses can be displayed in the following proposed research model (Figure 1):



**Figure (1) Proposed research model**

#### 4. Methodology

The research model and hypotheses were tested in the food industry in the Kingdom of Saudi Arabia, which comprises a total of 732 working companies, according to data published by the Ministry of Commerce and Investment (2016).

(<http://mci.gov.sa/MediaCenter/Reports/Statistics/Pages/stat-075.aspx>).

Krejcie and Morgan (1970) developed a table for determining the sample size; by using their table, it was determined that this study's sample size would be 254. Around 59% of the food companies that are large and well-established are located in five cities (see Table 3). The researcher, therefore, concentrated on collecting data from companies based in these five cities, successfully collecting valid surveys from 165 companies, representing a response rate of 74.9% (see Table 1).

**Table 1.** The geographical distribution of the Saudi food companies

City	Jeddah	Riyadh	Dammam	Al-Kharj	Al-Ahsa	Other cities	Total
No. of companies	149	146	59	37	36	305	732
Percentage	20.36%	19.95%	8.06%	5.05%	4.92%	41.67%	100 %

The food industry in Saudi Arabia is one of the kingdom's leading industries, as it is ranked second in terms of job numbers, accounting for 15% of local employment in 2015. In addition, it is ranked fourth in terms of investment, accounting for 5.2% of total investment in the Kingdom of Saudi Arabia (Ministry of Commerce and Investment, 2016). A questionnaire was prepared to test the research model and hypotheses (see Table 3). To collect the data, the questionnaire was posted by mails and emails to 254 companies in the five main industrial cities in Saudi (Jeddah, Riyadh, Dammam, Al-Kharj, and Al-Ahsa).

**Table 2.** Summary of the response rate

City	Response number	Response rate
Jeddah	86	52.12%
Riyadh	51	30.9%
Dammam	12	7.28%
Al-Kharj	8	4.85%
Al-Ahsa	8	4.85%
Total	165	100%

**Table 3.** Variables measures contained in the research questionnaire

For each of the categories explored in this questionnaire, a five point Likert scale was used, in which 1 represents “strongly disagree” and 5 “strongly agree”.

**Knowledge Management Capability:** The surveyed managers were asked to evaluate the company’s current practices. The items used in the questionnaire were as follows:

1. Our organization has clear rules for formatting or categorizing its product knowledge.
2. Our organization has clear rules for formatting or categorizing process knowledge
3. Our organization members use technology to cooperate with other persons inside the organization
4. Our organization members use technology to search for new knowledge
5. Our organization members use technology to retrieve knowledge about its products and processes.
6. Our organization members use technology to retrieve knowledge about its markets and competition.
7. Our organization structure facilitates the discovery of new knowledge
8. Our organization structure facilitates the creation of new knowledge.
9. Our organization has reward system for sharing knowledge.
10. Our organization facilitates knowledge exchange across functional boundaries.
11. Our organization employees are readily accessible.
12. Our organization members understand the importance of knowledge.
13. Our organization members are valued for their individual expertise
14. Our organization members are encouraged to interact with other groups
15. The benefits of sharing knowledge outweigh the costs.
16. Our organization members are encouraged to explore and experiment.
17. Our organization members can understand not only their own tasks but also others’ tasks.
18. Our organization members can make suggestion about others’ task.
19. Our organization members can communicate well not only with their department members but also with other department members.
20. Our organization members are specialists in their own part.

The knowledge management capability scale consists of four dimensions that contains twenty statements selected from (Gold et al., 2001; Lee and Choi, 2003; Wong and Wong, 2011)

- (i) Technical KM resource (6 statements)
- (ii) Structural KM resource (5 statements)
- (iii) Cultural KM resource (5 statements)
- (iv) Human KM resource (4 statements)

**Supply Chain Management Practices:** The surveyed managers were asked to evaluate their company’s current practices. The items used in the questionnaire were as follows:

1. We consider quality as our number one criterion in selecting suppliers.
2. We regularly solve problems jointly with our suppliers.
3. We have helped our suppliers to improve their product quality.
4. We have continuous improvement programs that include our key suppliers
5. We include our key suppliers in our planning and goal-setting activities.
6. We actively involve our key suppliers in new product development processes.

7. We frequently interact with customers to set reliability, responsiveness, and other standards for us.
8. We frequently measure and evaluate customer satisfaction
9. We frequently determine future customer expectations.
10. We facilitate customers' ability to seek assistance from us.
11. We periodically evaluate the importance of our relationship with our customers.
12. We inform trading partners in advance of changing needs.
13. Our trading partners share proprietary information with us.
14. Our trading partners keep us fully informed about issues that affect our business.

The supply chain practices had been measured by 14 statements selected from (Li et al., 2005, 2006)

**Organizational performance:** The surveyed managers were asked to evaluate their company's business performance. The items used in the questionnaire were as follows:

1. Market share.
2. Return on investment.
3. The growth of market share.
4. The growth of sales.
5. Growth in return on investment.
6. Profit margin on sales.
7. Overall competitive position.

The organizational performance scale had been measured by 7 statements selected from (Attia, 2015, 2016a, 2016b)

## 5. Results

### 5.1 Scale validity and reliability

The quality of the research outputs depends mainly on the variables measures; to ensure the achievement of quality outputs, all measures must show predictive, convergent and discriminant validity, in addition to reliability (Garver and Mentzer 1999). Moreover, the measurement model must suit the data relatively well (Koufteros, 1999). Convergent validity is measured by the normed-fit index (NFI) coefficient; if the NFI coefficient value is greater than 0.9, there is strong convergent validity for the measures (Ahire et al. 1996). The NFI coefficient value was found to be above 0.9 for all of the variables in the research model; accordingly, the variables measures show a strong convergent validity (Table 4).

The correlation coefficient is used to measure the discriminant validity: if the correlation coefficient value between any two variables equals either 1 or -1 or is very close either, there is poor discriminant validity (Kenny 2012). Table 5 demonstrates that the range of correlation values of the model is between 0.475 and 0.601, indicating high discriminant validity.

Predictive validity is the other aspect of the correlation relationship: with a correlation between all the variables, there is predictive validity (Ahire et al. 1996; Garver and Mentzer 1999). Accordingly, a correlation matrix was constructed between all of the research variables. Table 5 shows that correlations exist between all of the study variables, confirming the existence of predictive validity for the study measures. Moreover, Cronbach's alpha has been used to measure the reliability of the variables: if the alpha exceeds 0.9 for all the variables, this indicates sufficient reliability (Garver and Mentzer

1999). The alpha figures for all of the current study variables are above 0.9, thereby confirming sufficient reliability.

A confirmatory analysis has been used to evaluate the fit between the measurement model and the collected data. As detailed in Table 6, the results of the confirmatory analysis for the study's three variables were as follows: RMSEA=0.096; Chi-square=2.729; SRMR=0.073; NFI=0.925; NNFI=0.906; IFI=0.928; CFI=0.939.

For knowledge management capability (KMC), a factor analysis was conducted using the twenty items used to measure the variable. The standardized coefficients for all the items are at least 0.886. The supply chain management practices (SCMP) construct was initially represented by fourteen items. The factor analysis indicated that all the items of SCMP had standardized coefficients of at least 0.852. In addition, the factor analysis for the seven items used to measure organizational performance (OP) indicated that all of these items had standardized coefficients of at least 0.855. According to Kline (1998) and Koufteros (1999) and the previous results, there is good fit between the measurement model and the data.

**Table 4.** Scale validity and reliability results

Scale	RMSEA	NFI	NNFI	CFI	GFI	SRMR	Relative $\chi^2$
Knowledge Management Capability	0.989	0.95	0.93	0.91	0.88	0.66	3.01
Supply Chain Management Practices	0.971	0.94	0.91	0.89	0.87	0.64	2.96
Organizational Performance	0.956	0.94	0.91	0.89	0.87	0.64	2.96
<b>Reliability assessment results</b>							
Scale	Cronbach's alpha		Construct reliability		Variance extracted		
Knowledge Management Capability	0.089		0.95		0.93		
Supply Chain Management Practices	0.088		0.94		0.91		
Organizational Performance	0.087		0.94		0.91		

**Table 5** Correlation results

Scale	Knowledge Management Capability	Supply Chain Management Practices	Organizational Performance
Knowledge Management Capability	1		
Supply Chain Management Practices	0.475*	1	
Organizational Performance	0.601*	0.492*	1

*Note:* Correlation is significant at \*0.01 levels (two-tailed).

**Table 6** Confirmatory analysis results

Construct/ measures	<i>t</i> -value	Standardized coefficients
Knowledge Management Capability		
KMC1	13.661	0.931
KMC2	12.377	0.902
KMC3	12.005	0.882
KMC4	12.711	0.911
KMC5	11.652	0.872
KMC6	12.365	0.925
KMC7	10.986	0.843
KMC8	13.220	0.921
KMC9	13.632	0.931
KMC10	11.417	0.862
KMC11	12.456	0.915
KMC12	12.632	0.911
KMC13	12.417	0.902
KMC14	13.083	0.921
KMC15	11.978	0.879
KMC16	12.658	0.967
KMC17	13.589	0.989
KMC18	10.973	0.849
KMC19	10.868	0.876
KMC20	13.694	0.996
Supply Chain Management Practices		
SCMP1	13.547	0.823
SCMP2	11.238	0.904
SCMP3	12.676	0.922
SCMP4	12.527	0.874
SCMP5	12.645	0.927
SCMP6	13.168	0.954
SCMP7	11.997	0.956
SCMP8	12.662	0.924
SCMP9	13.576	0.987
SCMP10	10.949	0.956
SCMP11	10.789	0.870
SCMP12	13.278	0.949
SCMP13	10.782	0.854
SCMP14	12.378	0.989
Organizational performance		
OP1	13.658	0.953
OP2	12.578	0.911
OP3	10.897	0.864
OP4	11.094	0.921
OP5	12.524	0.976
OP6	12.687	0.981
OP7	10.354	0.893

Notes: RMSEA=0.096; Chi-square=2.729; SRMR=0.073; NFI=0.925; NNFI=0.906; IFI=0.928; CFI=0.939.

### 5.2 Correlation analysis

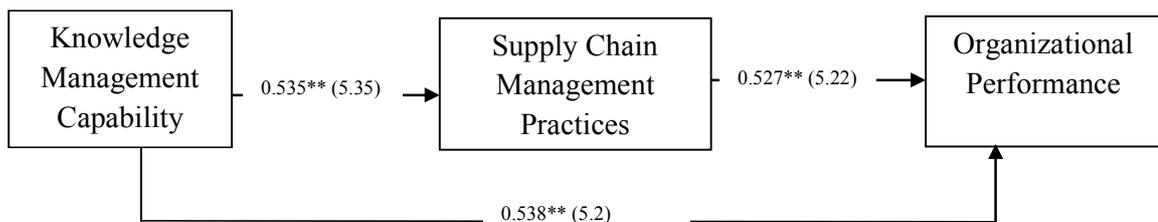
To measure the strength and direction of a linear relationship between the different variables of a conceptual model, correlation analysis could be used. Here, the 99% confidence level produced through the correlation analysis results shows a significant positive relationship between all the research model variables (Table 5). It was found that there are significant positive relationships both between knowledge management capability and supply chain management practices and between knowledge management capability and organizational performance; moreover, there is also a significant positive relationship between supply chain management practices and organizational performance.

### 5.3 Structural relationship model

One of the acceptance standards for a conceptual model is the chi-square, which should be over 2 for the validity of the model to be accepted. In addition, the CFI and NNFI values should also be over 0.9 for the model to be accepted (Garver and Mentzer 1999; Koufteros 1999). The chi-square for the suggested study model is 2.7295; in addition, the CFI and the NNFI values are 0.939 and 0.906 respectively; accordingly, the suggested research model has been accepted.

According to the previously mentioned results for the current study and the model standardized coefficients shown in Figure 2, the study's three hypotheses were accepted. The relationship between knowledge management capability and organizational performance was statistically significant (0.538 at  $p < 0.01$ ); in addition, the relationship between supply chain management practices and organizational performance was also statistically significant (0.527 at  $p < 0.01$ ). Moreover, a statistically significant relationship between knowledge management capability and supply chain management practices was found (0.535 at  $p < 0.01$ ).

**Figure 2.** Structural relationship model with standardized coefficients and (t-value)



Notes: RMSEA=0.094; Chi-square= 2.275; SRMR=0.072; NFI=0.916; NNFI=0.908; IFI=0.939; CFI=0.936.

\* $t > 1.96$  or  $p < 0.05$ ; \*\* $t > 2.51$  or  $p < 0.01$

## 6. Discussion and conclusions

According to the previous results the knowledge management capabilities play a major in improving the supply chain management practices. Thus, H1 is accepted. This result is consistent with that of previous studies for example (Wong and Wong 2011; Youn et al., 2013).

Knowledge management capabilities are considered a driver and key success factor in supply chains (Rashed et al., 2010; Samuel et al., 2011). Wong and Wong (2011) provided evidence that knowledge management capabilities (including technology and processes) would influence supply chain management practices. They concluded that knowledge management capabilities enables knowledge sharing among the employees as well as between organizations. In addition, they facilitate information sharing, cooperation and long-term relationships among supply chain members, which would result in creating value-added products and services to the customers.

Similarly Dalpati et al., (2010) proposed that sharing knowledge between supply chain members can speed up the flow of knowledge in the supply chain, improve the efficiency and effectiveness of the supply chain, and enables the organizations to respond quickly to customers changing needs. In addition, Youn et al., (2013) argued that effective information sharing among supply chain members requires mutual trust, top management support as well as organizational compatibility.

The second hypothesis tests the effect of knowledge management capabilities on organizational performance. The results of current research support the acceptance of H2. This result consistent with previous research findings, which provided evidence that consistent has both direct and indirect impact on organizational performance (Tanriverdi, 2005; Lee and Lee, 2007; Chang and Chuang, 2011; Mills and Smith, 2011; Andreeva and Kianto, 2012).

Researchers have argued that consistent is the most important resource of an organization that would enable it to innovate, take advantage of business opportunities, manage both internal and external resources, offer new products and services and cope with the dynamic business environment. Organizations should be able to obtain the right knowledge as well as coordinate internal and external knowledge in order to enhance its organizational performance (Tseng and Lee, 2014).

The third hypothesis suggests that supply chain management practices are driver of organizational performance. The current research results recommended the acceptance of H3. This result consistent with previous research findings, which reported a direct and significant effect of supply chain management practices on organizational performance, including for example (Kim, 2006; Li et al., 2006; Robb et al., 2008; Chong et al., 2011; Cook et al., 2011; Sundram et al., 2011).

The main theory of this research is the resource-based view theory, which was first introduced by Wernerfelt (1984). It originated from the strategic management literature. The fundamental theme of this theory is “why do some firms persistently outperform other firms?” (Barney and Clark, 2007,). According to Rungtusanatham et al., 2003, the RBV theory of the firm is the “theoretical perspective that attempts to describe, explain, and predict how firms can achieve a sustainable competitive advantage through acquisition of and control over resources”. The resource-based view theory of the firm is concerned with linking a firm’s internal resources with its performance (Yazadanparast et al., 2010).

In addition, this theory suggests that an organization is a bundle of unique tangible and intangible resources that should be configured effectively to generate the capabilities required by the organization (Bitar and Hafsi, 2007; Hitt, 2011). Firms should establish and

use their core resources to develop unique products in a way that would prevent duplication by competitors (Hsu et al., 2014).

According to this theory, the nature and type of resources and capabilities are essential characteristics for generating profit (Yazdanparast et al., 2010). However, the role of the firm is not only to acquire a variety of resources and capabilities, but it should combine individual skills, social expertise, accumulated knowledge as well as organizational processes to offer valuable products and services (Kogut and Zander, 1992).

Previous research studies in the area of resource-based view theory have proposed that resources are not equally significant in determining the organizational success and performance. According to the resource-based view theory, tangible assets are not strategic resources as they can be obtained or imitated by competitors (Rungtusanatham et al., 2003). In addition, research findings have concluded that intangible resources are important determinants for organizational success, because they are characterized as being scarce, specialized and difficult to be imitated or traded (Abu Bakar and Ahmad, 2010).

The results of the current study represent a contribution to the resource-based view theory especially the effect of intangible assets on improving the company performance.

Another theory related to this research is the social capital theory, which focuses on the “softer side” of the organizational activities (Ketchen and Hult, 2007). It is considered a valuable asset, which includes social relationships and cooperation between organizations (Carey and Lawson, 2011). Social capital consists of “knowledge and organizational resources that enhance the potential for individual and collective action in human social systems” (McElroy et al., 2006, p. 125).

According to the social capital theory, the firms that engage in mutually beneficial relationships with customers and suppliers can respond proactively to changes in the marketplace. This would enable them to decrease their supplier base, enhance demand forecasts and deliveries, and as a result achieve superior performance (Hsu et al., 2014). Social capital focuses on the communication and personal relationships between employees as well as the relationships with members of other external organizations (Abdul Wahab and Sardabi, 2011). It concentrates on determining and describing the behavioral processes that underlie the relationships among supply chain members (Hsu et al., 2014).

The results of the current study represent a contribution to the social capital theory by showing the effect of different supply chain practices on the company performance.

The study findings are important not only for its contribution to academic theories but it also for its contribution for the practitioners. Practitioners can use our results to identify and implement knowledge management capabilities with a reasonable expectation based on empirical evidence that these initiatives will be in alignment with their organizational strategy. This study also encourages practitioners to focus their knowledge management initiatives on improving their supply chain practices to reach a better company

performance. It is important for knowledge management professionals to understand the systemic relationship between these concepts and the value that it can generate in respect of creating and maintaining sustainable competitive advantage for organizations. SMEs should ponder how knowledge management can be implemented successfully. This would include strategies and programs for implementing knowledge management, and encouraging learning and knowledge sharing among employees. A key element of knowledge management is to enhance the learning capacity of the firm.

#### 7 Limitations and further research

The current study has four principal limitations, all of which present opportunities for future research. First, the current study focused only upon the Saudi food industry; therefore, there is a need to re-study the hypothesized relationships between the variables in different Saudi industrial sectors and in different developed and developing countries. Second, the impact of other internal practices and factors on the hypothesized model need to be considered and tested in different industries and countries. Third, there is a need to collect data from more respondents within the Saudi food industry (the present study collected data from only 165 respondents from a total of 732 companies in this industry) to generate more representative results (Jasti and Kodali 2014). Finally, it would be useful to repeat the study's methodology by collecting data from multiple supply chain partners, rather than only from the buyer or the focal firm.

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