

# Investigating the Relationships Between Sustainable Management Activities, Technology Commercialization Capabilities, Sustainable Competitive Advantage and Market Performance: The Moderating Role of Supply Chain Impact

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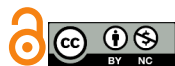
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## ABSTRACT

**Objective:** In today's complex environment, designing strategies that can help them improve market performance is essential.

**Method:** The research is applied in terms of methodology and the type of reasoning is deductive. Data collection is based on numerical information and questionnaires and is quantitative. The study's statistical population includes managers and experts of 11 major dairy companies located in Tehran and Fars provinces in Iran. Among the distributed questionnaires, 306 questionnaires were returned to the researcher. In order to investigate descriptive statistics and preprocessing, SPSS 26 software and Smart PLS 3 software have been used for data analysis and statistics. Structural equation modelling (SEM) method is used to test the relationships between variables.

**Results:** The results showed that sustainable management activities, technology commercialization capabilities (TCC) and sustainable competitive advantage (SCA) positively and significantly affect market performance. Also, the impact of the supply chain positively adjusts the causal relationship between TCC and market performance.

**Conclusion:** Considering that the mentioned model in the research has a good fit and improves the market performance and SCA of the company, it can be concluded that companies can increase the company's market performance by paying much attention to the components of sustainable management activities.

**Keywords:** *Quality Management Activities, Knowledge Management Activities, Competitive Intelligence Activities, Technology Commercialization Capabilities, Supply Chain Impact, Market Performance*

## 1 Introduction

In sustainable management activities, the company's efforts to create profit do not only refer to increasing the quantity of profit, but companies should try to grow in the process of profitability. In fact, companies should create new values and achieve competitive advantage through technological innovation such as technology commercialization capability and sustainable competitive advantage, while developing new products and services to customers through investment in research and development and quality improvement try to achieve management goals (Lakhal, 2009).

In this research, three main factors are used as sustainable management activities: knowledge management activities (KMA), quality management activities (QMA), and competitive intelligence activities (CIA). These three activities are required to chart a superior market performance (Asif, de Vries, & Ahmad, 2013). In other words, these activities can provide the right direction for the management of the company to achieve the organization's key goals. In addition, they can form the basis of evaluating the internal capabilities of a management team and adapting to the dynamics of the growing market (Taghian & Shaw, 2010).

KMA plays an important role in innovation processes. Knowledge management is multi-dimensional and according to experts, it is defined in terms of different functions. The main components of knowledge management are creation, preservation and transfer of knowledge (Grant, 1996).

Establishing quality management has enabled companies to improve their competitiveness while increasing productivity (Deming, 1982). In today's world, the highest cost that a company incurs is the cost of the low quality of products and services, which is caused by the low quality of processes, which causes the loss of customers (Koopman & Wierdsma, 1998).

Since competitive intelligence has become one of the important concepts of company management and has become intertwined with their cultures, companies that use a suitable competitive intelligence program have a better understanding of the competitive landscape and by moving towards management strategies, the program suitable for increasing competitive advantage (Mehran et al., 2015).

The perspective of the organizational capability of technology commercialization is the ability to absorb and re-adapt new technology for use in production and marketing (Kim et al., 2011). The capability-based theory states that

companies can gain a competitive advantage through specific and distinct capabilities. Different companies' capabilities lead to different performance and competitiveness levels in these companies. Commercialization of technology is one of the factors that, by improving its performance, the ability to innovate in creating a competitive advantage can be strengthened because technology commercialization performance is under the environment's dynamic conditions and technological developments (Shirazi et al., 2019).

The basis of competitive advantage is value, the value that a company can create for its customers and must be more than the cost it incurs. (Song et al., 2018). A company has a competitive advantage if its activities create economic value in a market where many competing companies perform similar activities (Younis, Sundarakani, & Vel, 2016).

Additionally, large companies and many small companies also benefit from the benefits of competitive intelligence. Many companies use competitive intelligence to gain market share and gain the share of unknown competitors. They use competitive intelligence to understand the current market environment, predict the future market environment, analyze political, technological, and economic factors related to their industry, identify weak points and find solutions for it, change the current strategy or modify it (Sharifzadegan & Nourai, 2015).

Activity integration allows coordinating various supply chain management activities with customers and suppliers. Coordination between organizations requires establishing a strategic relationship with the company's supply chain partners. Strategic relationships with suppliers are an important criterion for achieving long-term relationships between suppliers and buyers (Sharma & Modgil, 2020).

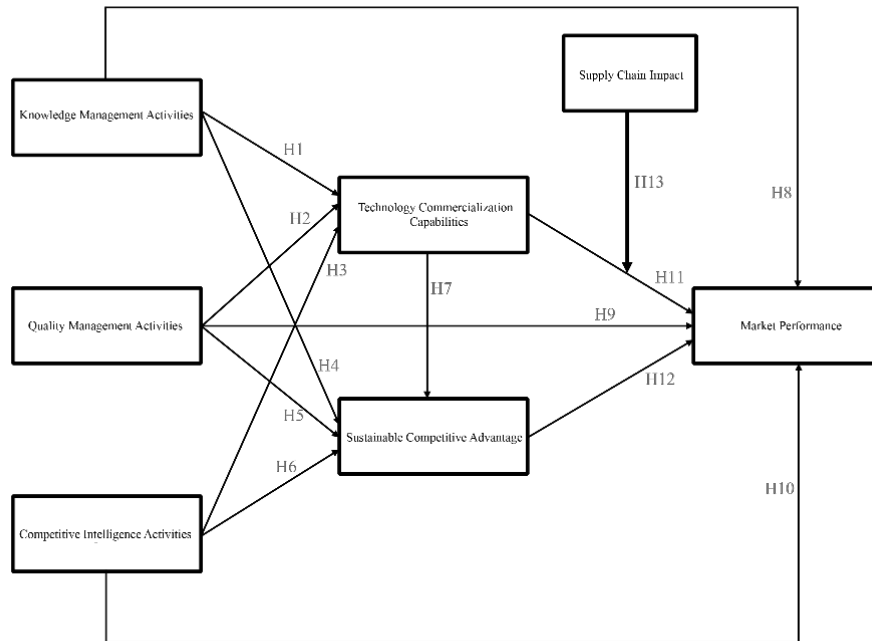
According to the mentioned materials, the main problem of the research is whether sustainable management activities affect the relationship between technology commercialization capabilities, SCA and market performance with the moderating role of the supply chain in Iran's dairy industry. Based on theoretical studies, researchers have a consensus about the relationship between the concepts of sustainable management activities on the relationships between technology commercialization capabilities, sustainable competitive advantage, and market performance (Kim et al., 2020; Lim, Darley, & Marion, 2017).

Therefore, in the current study, a new conceptual model for sustainable management activities is proposed on the relationship between technology commercialization

capabilities, SCA and market performance with the moderating role of supply chain impact (Figure 1).

Figure 1

Conceptual model



## 2 Methods and Materials

### 2.1 Study design and Participant

This research has been done in an applied manner, and the type of reasoning is deductive. In order to collect information in the theoretical foundations and research literature, from articles, books related to the subject, online resources and library resources related to the topics of sustainable management activities, knowledge management, quality management, competitive intelligence, technology commercialization, competitive advantage sustainable, supply chain and market performance have been used and to collect data from the opinions of managers and experts in the departments of research and development, quality, information technology, commerce, marketing, sales, training, production and human resources of 11 dairy companies located in the provinces Tehran and Fars have been used. GPower software was used to determine the sample size. A total of 306 questionnaires were returned with complete and usable answers among the distributed questionnaires. Among the distributed questionnaires, 306 questionnaires were returned to the researcher.

### 2.2 Measures

In this research, a questionnaire was used to collect data. Based on the questionnaire that reports the items of each variable, 52 items were finalized, to measure the factors affecting KMA with 7 items, QMA with 8 items, CIA with 10 items, TCC with 11 items, SCA with 8 items, market performance with 4 items and supply chain impact with 4 items are used.

### 2.3 Data Analysis

In order to investigate descriptive statistics and preprocessing, SPSS 26 software and Smart PLS 3 software have been used for data analysis and statistics. Structural equation modelling (SEM) method is used to test the relationships between variables.

## 3 Findings and Results

At the beginning of the questionnaire, questions related to the demographic variables of managers and experts, such as gender, age, education level, organizational unit and

organizational position, are specified as related options, which divide each index into groups.

The distribution of the demographic frequency of the respondents of the questionnaire is as described in Table 1.

**Table 1**

*Demographic frequency distribution of participants*

		Percentage	Frequency
Gender	Male	77.8	238
	Female	22.2	68
Age	Less than 30ys	22.9	70
	31-40ys	58.8	180
	41-50ys	16.7	51
	More than 50ys	1.6	5
Level of Education	Diploma	8.5	26
	B. A	47.7	146
	M.A	40.5	124
	Ph.D.	3.3	10
	R & D	7.5	23
	Quality	14.1	43
Organizational Unit	Information technology	7.8	24
	Business	6.2	19
	Marketing	13.4	41
	Sale	19.6	60
	Training	6.9	21
	Production	15.4	47
	Human resources	9.2	28
	Manager	24.5	75
Organizational position	Master manager	5.6	17
	Expert	59.8	183
	Master expert	10.1	31

The collected data were first evaluated and pre-processed in SPSS software, and their descriptive statistics were analyzed. Then, all hypotheses and relations were tested according to the method of structural rate modelling in Smart PLS software. After completing the model test, the moderating role of the supply chain effect on the causal

relationship between TCC variables and market performance is investigated.

According to the causal model, the researcher goes towards the SEM method and uses the second generation of structural equation modelling, or partial least squares.

**Table 2**

*Reliability tests*

Local variables	Cronbach's Alpha	Composite Reliability	RHO A	Communality
KMA	0.902	0.922	0.921	0.629
QMA	0.887	0.923	0.893	0.751
CIA	0.878	0.909	0.897	0.629
TCC	0.953	0.959	0.956	0.681
SCA	0.845	0.891	0.849	0.621
Market Performance	0.887	0.923	0.894	0.751

According to Table 2: all the Cronbach's alpha coefficients of the variables are above 0.7, and the model is reliable from the point of view of this coefficient. The combined reliability rate for all structures is more than 0.7 and indicates the appropriate internal stability of the research variables in the model. The reliability of RHO\_A for all

research variables has met the cut point of 0.7 according to the research model, and the reliability of the research model is also confirmed based on this index. All the variables of this research have an average commonality index above 0.5. Therefore, it can be claimed that the external model has reliability according to the shared reliability and then

according to other reliability coefficients including Cronbach's alpha, combined reliability and RHO\_A. The

summary of four reliability tests shows that the reliability of causal research results is confirmed based on its model.

**Table 3**

*Average Variance Extracted index and composite reliability coefficient*

Local variables	AVE	Composite Reliability
KMA	0.629	0.922
QMA	0.751	0.923
CIA	0.629	0.909
TCC	0.681	0.959
SCA	0.621	0.891
Market Performance	0.751	0.923

AVE shows the degree of correlation of a variable with its indicators. According to Table 3, the AVE values for all variables are more than 0.5. This means confirming the first condition of convergent validity for the research model. The

second condition of convergent validity, which is related to the fact that the value of the combined reliability coefficient is greater than the indicate of the extracted variance, is also confirmed in the Table 3.

**Table 4**

*Path coefficients of the relationship between structures and their corresponding components*

hypothesis	T VALUE	P-VALUE	Path coefficients	Interpretation
H1	3.749	0.000	0.136	Confirmed
H2	4.107	0.000	0.461	Confirmed
H3	4.423	0.000	0.292	Confirmed
H4	5.758	0.000	0.133	Confirmed
H5	6.298	0.000	0.219	Confirmed
H6	4.451	0.000	0.485	Confirmed
H7	2.742	0.000	0.116	Confirmed
H8	2.923	0.000	0.180	Confirmed
H9	6.536	0.000	0.281	Confirmed
H10	2.901	0.000	0.340	Confirmed
H11	3.734	0.000	0.125	Confirmed
H12	5.490	0.000	0.437	Confirmed

According to Table 4, all hypotheses with appropriate P-value and T-value at the significance level of 99% were confirmed and significant.

Next, the SRMR index is first calculated and compared with the cut-off point of 0.08. If this index is smaller than 0.08, the model is suitable. The value of the SRMR index is 0.061, which is smaller than 0.08, and it can be said that the model is suitable and the observations of the sample are consistent with reality. Then the GOF criterion is examined; which is the geometric mean of the determination coefficients of the endogenous variables and the average of the shared values of the research variables. To check the

values of this criterion, three values of 0.01, 0.25 and 0.36 is used.

$$GOF = \sqrt{0.58 * 0.31} = 0.424$$

Considering that the GOF value is more than 0.36, it can be said that the overall research model has a good fit.

Figure 2 is the general model implemented in Smart PLS software.

Figure 2

General research model

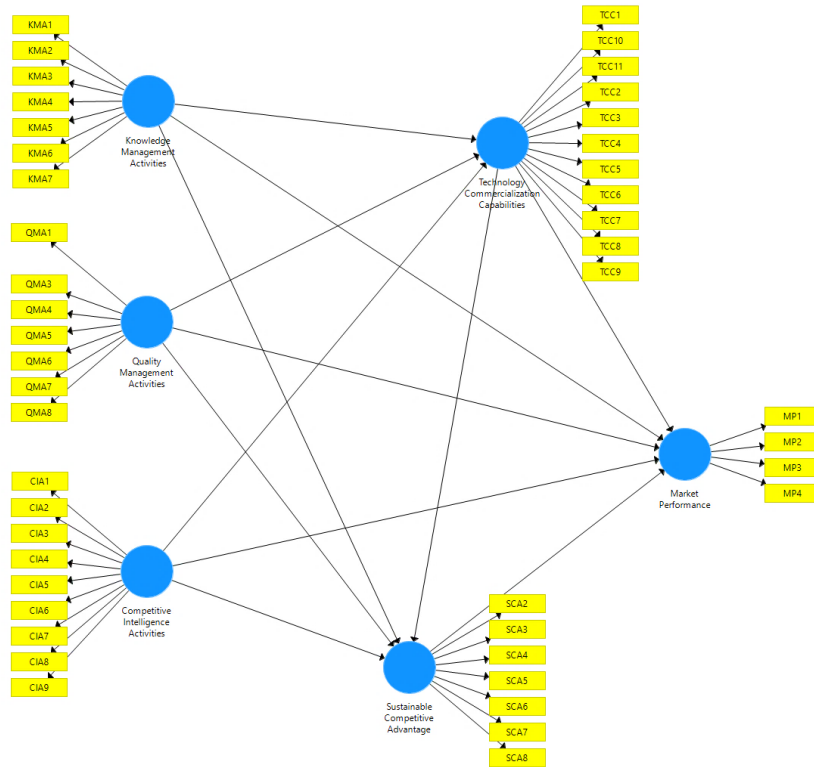


Figure 3 of the model is based on the moderating role of the impact of the supply chain.

Figure 3

The moderating role of supply chain influence on the causal relationship of TCC and market performance

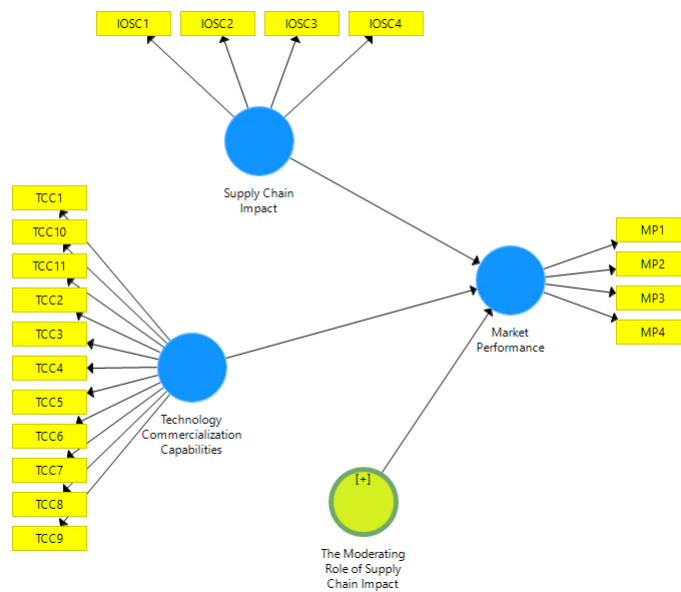




Table 5

Significance of research moderator

hypothesis	T-VALUE	P-VALUE	$\beta$	Interpretation
H13	4.001	0.000	0.134	Confirmed

In Table 5, the significance of the moderating role of the supply chain effect on the causal relationship between TCC and market performance is analyzed.

According to the mentioned cases, the effect of the supply chain moderates the causal relationship between TCC and market performance. After that,  $\beta$  is examined. Considering its positive value of 0.134, it can be said that the effect of the supply chain strengthens the causal relationship between TCC and market performance. So, as a result, the effect of the supply chain moderates and strengthens the causal relationship between TCC and market performance.

#### 4 Discussion and Conclusion

Sustainable management activities are the efforts of companies to improve quality of environmental, economic and social sustainability. Companies use different types of these activities to minimize risks and increase company value (Stead & Stead, 2014). Companies should use their management resources well so that they can generate profit in all stages of management activities (Schaltegger, Lüdeke-Freund, & Hansen, 2012). Companies should invest in research and development by creating and achieving competitive advantage through innovation and technology, such as TCC and SCA while creating development in their products and services, and improve their quality and in Finally, create profit in the company (Lakhal, 2009). Considering the above, it can be said that this research mentions three main factors as sustainable management activities. These factors include KMA, QMA and CIA. The mentioned activities can provide the right direction for the company to achieve the key goals of the company. They can also be the basis for evaluating the internal capabilities of the management team and its compatibility with the company's market performance (Taghian & Shaw, 2010). In the following, these three key factors of sustainable management activities are examined.

One of the most important concepts for any company is market performance measurement, which plays a very prominent role in the company's success. Market performance is one of the important characteristics of company results (Momeni & Mousavi, 2020). Market performance refers to the company's achievement of market

results according to competitors' performance and criteria such as customer satisfaction and loyalty, customer attraction and use of opportunities in the market (Gök & Peker, 2017). Therefore, it can be said that in the end, the goal of every company is to obtain a favorable situation in its market performance. According to the mentioned cases, this research defines market performance as the level of performance provided by individuals, departments and the entire company, and according to the results of the research, it can be stated that the market performance variable is a final variable. The variable and among all research variables, the positive and meaningful face is affected.

Finally, according to the presented model and research results, it can be stated that sustainable management activities include KMA, QMA, and CIA. The variable of KMA has a positive and significant effect on TCC, SCA, and market performance. The variable of QMA has a positive and significant effect on TCC, SCA and market performance. The variable of CIA has a positive and significant effect on TCC, SCA, and market performance. TCC have a positive and significant effect on SCA and market performance. SCA has a positive and significant effect on market performance. Also, by examining the moderating role of the supply chain effect, it can be realized that the causal relationship moderates and strengthens the capabilities of technology commercialization.

#### 5 Suggestions

According to the results, in order to strengthen the hypotheses and components of the model, the following suggestions are presented:

- In companies, special information and knowledge related to market trends and new products should be constantly reflected.
- All practices should be evaluated and best practices should be used in the workplace.
- Performance measurement indicators should be developed and managed for internal operations of companies.
- The company should have the ability to implement product ideas on time, product development, timely introduction of products, create products tailored to different

demographic markets, improve products tailored to population markets, create products tailored to different regional markets and improve products tailored to regional markets.

- Considering the importance of supply chain effectiveness, it is suggested that strategic decisions of companies be guided by the supply chain.
- Holding continuous courses to evaluate the company's performance in order to improve the quality.
- Providing new modified manufacturing processes for the production of innovative products or services is recommended.
- It is suggested to conduct similar research on other manufacturing industries to compare with the results of this research.
- It is suggested that other researchers increase the Generalizability of the research by using qualitative strategies.
- Smart PLS software is used in a small part of this research. Other quantitative analysis software can be used in other researches.

The results of this study show that sustainable management activities include: KMA, QMA and CIA, SCA and TCC, followed by the influence of the supply chain as a moderator of important factors. The success of the market

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performance of dairy companies. Therefore, sustainable management activities in companies should be carefully considered and lead to the improvement of the mentioned factors with proper planning. This study shows that companies should pay a substantial amount of attention to sustainable management activities in order to gain SCA, improve TCC, and ultimately increase their market share. Managers and experts should include KMA, QMA, and CIA in their strategic planning and implement them regularly in the company to witness the growth of TCC and SCA and market performance of the company.

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## Declaration of Interest

The authors of this article declared no conflict of interest.

## Ethics principles

In this research, ethical standards including obtaining informed consent, ensuring privacy and confidentiality were observed.



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