

Investigating the Effect of Social Networks on Supply Chain in Industrial Enterprises (Food Industry) of Kermanshah Province

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Abstract

Competitive advantage of an organization depends to a large extent on the efficiency of the supply chain of that organization. Today, supply chain management is a growing body of tools and technologies for coordinating and optimizing key processes, including cost reduction, quality improvement, facilitation of distribution and increase of customer satisfaction and in this regard, supply chain management in order to achieve these goals and increase opportunities, should promote the coordination of the supply chain. With the growth of information technology in recent years, social networks have evolved in the elements of supply chain. The purpose of this study was to investigate the effect of social networks on supply chain in industrial enterprises (food industry) of Kermanshah province. The statistical population of this research included all the employees of the small and medium industrial enterprises (food industry) of the province that were equal to 272 people and using the Cochran formula, 160 people were selected as the statistical sample. A standard questionnaire has been used to perform the analysis that its formal validity and content validity has been confirmed by experts, and its reliability with Cronbach's alpha index was calculated 0.81. The hypotheses examined the impact of five dimensions of social networks (Internet advertising factor, performance factor, market share factor, competitive advantage and knowledge function) on the supply chain. Non-parametric tests of Binomial test were used to test the assumptions of the research. The results showed that all four factors had a significant effect on the supply chain and internet advertising has had the most effect. Also, the LISREL software was used for confirmatory factor analysis of the questionnaire and endorsement of the final model of research.

Keywords: Social Networks, Supply Chain, Small and Medium Enterprises, Food Industry

Introduction:

The expansion of the media and the globalization of markets and the emergence of a new generation of information and communication technologies that Internet is the most popular change the rules of markets and market dynamics by weakening the common competitive position and give many new opportunities and abilities to people. In the changing environment of market, the role of the Internet, and especially the advancements in the age of the Web and the role of the social media is very crucial. It is easy for marketing strategists to understand that survive in the age of powerful customers requires less dependence on mass marketing tactics and understanding the role of technology in shaping the market and more importantly social media as a part of the marketing toolbox has become a strategic necessity. One of the issues that social networks will absolutely affect is the supply chain of the companies, which will change it in positive directions (albeit in some negative cases). Supply chain included all activities related to the flow and conversion of goods from the stage of the raw materials to the delivery to the final consumer as well as related information flows. Supply chain management included the integration of supply chain activities and related information flows by improving chain relationships in order to achieve a reliable competitive advantage. Therefore, supply chain management is the process of integrating supply chain activities and related information flows by improving and coordinating activities in the supply chain of production and supply of product. Therefore, it can be said that social networks can lead these supply chain processes to move toward improving the situation with lower cost

Statement of problem:

What caused that today, social networks are more than ever considered has been the emergence of digital tools and their contribution to the development of social networks. Social networks changed the power structures in the market, and this has not left companies and competition between them, which are more dependent on the supply chain of companies and the role of social networks. It greatly reflects the transfer of power that is happening and persuaded or maintained the emergence of a new breed of powerful customers, suppliers, and distributors that can hardly be affected. Social networks occur when a structure of nodes associated forms to each other. Each node is an individual or group or organization. The social network means showing and studying the relationship between these nodes and the flow of knowledge and information between them. Despite the prevalence of the use of virtual social networks and the advantages and disadvantages of it, there is limited research in this field; perhaps because the social phenomenon is relatively new and there is limited opportunity for exploratory research in this field. Organizations tend to supply chain management for their success through social networking because this approach focuses on activities that there is in a value chain. The supply chain view has been based on the fact that competition rather than to be existed should be existed between supply chains and the existence of social networks will accelerate and more competitive this issue, and supply chain management is an approach to design, organize and implement these activities. The supply chain management integrates suppliers, producers, distributors, and users with the use of information technology and social networks to meet the most efficient customer expectations. Considering the above, the main question of this research is how much social networks will improve the supply chain and how will be the effect of each of the components of social networks on the supply chain?

Research objectives

Main objective

Investigating the Impact of Social Networks on Supply Chain in Industrial Enterprises (Food Industry) of Kermanshah Province

Research hypotheses

H1: Internet advertising affects the supply chain of food companies.

H2: Media performance affects the supply chain of food companies.

H3: Market share affects the supply chain of food companies.

H4: Competitive advantage affects the supply chain of food companies.

H5: Knowledge performance affects the supply chain of food companies.

Research theoretical literature: Defi and Stanak consider supply chain strategy as a concept that through the supply chain-related capabilities is following competitive advantage. A good supply chain strategy can have very positive impacts on the supply chain performance, and Yuan San and colleagues state that much research has to be done to determine what strategies in the supply chain can directly or indirectly shape the organization's performance. (Hosseini, Mohammadi, Pishvaie, 89) D. Hyltofes also raises supply chain management as a set of views that seek to integrate and collaborate effectively between materials, information and financial flows throughout the supply chain. This integration causes that the goods to be in the desired place timely, with the right amount and at the lowest possible cost and satisfy the customer's needs. In other words, supply chain management coordinates supply chain processes, and flow of materials from supplier to customer. Sow et al. emphasize the importance of quality of relationships and cooperation throughout the supply chain, and considers the relationship between supply chain elements as one of the most important success factors of the organization (Hilltofes, 2009). Shafie et al. described the factors leading the organizations towards supply chain management as follows: the need for improvement activities, increase levels of outsourcing, increase transportation costs, competitive pressures, increasing globalization, the importance of global trade, supply chain complexity and the need for the management of inventories (Shafie, 2009)

In 2009, Stelznner examines the main benefits of social media marketing, and 0.81 of the companies that participated in the study showed that their social media activities are exposing them more in the market (Nejad Farahani, 95). Boomen in 1998, conducted a research on supply chain design and analysis. This research was based on multi-stage supply chain modeling and was divided into four models: definitive models, probabilistic models, economic models, and simulation models. He also carried out studies on the quality and quantity criteria of the supply chain performance as well as the decision variables that were effective on the supply chain modeling. These variables included production scheduling, distribution, inventory level, number of stages, distribution centers, factory products, supplier relationships, or product purchasers, and number of products stored in the store. The results of this study were as follows

1. Evaluating and developing the performance criteria of the supply chain
2. Development of models that relate variables to performance criteria
3. Pay attention to topics that are related to the modeling of the supply chain.
4. Classification of supply chain systems, which expanded the amount of techniques for designing and analyzing supply chains. In a study conducted by Wondermebs and colleagues in 2002, three types

The supply chain is investigated. They stated that the type of supply chain is largely related to product specifications and customer expectations. Considering the changing environment of today, organizations need a model of the chain that is relevant to both strategic and customer oriented issues as well as operating constraints. Jawaheri and Ebrahimzadeh believe that if the main task of public relations is to transfer information to organizational contacts what reflects the performance of public relations is the perception of the audience from the quality of the information of these units. The right choice for target audiences, the use of traditional communication media along with web-based media, integrity and ethics in the transmission of organizational information and maintaining corporate social responsibility, including the factors affecting the perception of audiences of public relations programs are considered the quality of service of these units. Today, social networks are available to public relations and marketing units as new tools. Today, through virtual social networks, including Facebook, each person can communicate with 100 people in less than a day, and each of these hundreds can, in turn, communicate with more than 100 others. Jalali, Meybodi and Rezvani believe that, considering the increasing spread of services and users on social networking sites, there is a large volume of virtual activities, including socio-economic and social and educational on these websites. Marketing among users of social networks with the aim of introducing products and attracting customer is from activities that recently considered by individuals and companies (Yazdi, Yadollahi, 85). Ali Mashadi, in a research entitled "Analysis of the Effects of Social Networking on Identifying Entrepreneurship Opportunities," said that three social sources of information and informal networks, coaches, and professional communities have a positive impact on identifying entrepreneurial opportunities. There are also three personal self-efficacy variables, power of customer processing and entrepreneurial coefficient have an impact on the relationship between social networks and the identification of opportunities (Mashdi, 2011).

Research methodology:

Since this research examines the status quo, it is in the domain of descriptive research and since it has been done in a particular point in time, so it is placed in the scope of cross-sectional survey. The statistical population of this research consist the employees of the small and medium enterprises of food industry in Kermanshah including 272 active people at the time of the research. In this research, a simple random sampling method has been used. Since the statistical population of this research is a limited population, in this research, the Cochran formula is used for sampling. The statistical sample is based on simple random sampling method according to Cochran formula was obtained 160 samples, but to eliminate incomplete questionnaires, 165 questionnaires were distributed and finally 160 questionnaires were collected for analysis. Regarding the validity of the questionnaires, they are standard and in previous researches regarding the variables of this issue were used and reliability of supply chain questionnaire was measured 0.83 and social network questionnaire 0.81. This research is correlation. For the sample, Cochran formula was used and a questionnaire was used to collect the data. The following hypotheses are tested on the research method.

Normality test of variables distribution

One of the main assumptions of each research is to examine the normality of distribution of the variables under study. One of the methods to test the normalization of data is to use the distribution form or, in other words, to calculate the tilt and skewness of the research variables, which researchers believe that the distribution of variables is normal if the tilt and skewness of data is between 2 and -2 (Klein, 2010). In this research, Kolmogorov-Smirnov technique was used to determine the normality of distribution of data. Therefore, the assumption of the normality of the data at a significant level of 5% is tested with the

Kolmogorov-Smirnov technique. For this test, statistical assumptions are set as follows:
H0: Research variables have normal distribution:

H1: Research variables not have normal distribution:

The results of the normalization test of data distribution are presented in Table 1:

Table 1: results of the normalization test of data distribution

	K.S value	Degree of freedom	Position
Social networks	0.067	160	Normal
Internet advertising	0.092	160	Normal
Performance	0.78	160	Normal
Market share	0.116	160	Normal
Competitive advantage	0.091	160	Normal
Knowledge performance	0.096	160	Normal
Supply chain	0.067	160	Normal
Organizational infrastructure	0.098	160	Normal
Information technology	0.099	160	Normal
Decision Support System	0.089	160	Normal
Inter-organizational relations	0.156	160	Normal

In all cases, a meaningful value is obtained greater than 0.05. Therefore, there is no reason to reject the null hypothesis based on the normalization of the data. In other words, the distribution of research data is normal and parametric tests can be performed.

Data analysis:

Confirmatory factor analysis test of research questionnaires:

The standard factor load of the confirmatory factor analysis for measuring the power of the relationship between each factor (hidden variable) and its visible variables (items of the questionnaire) is obtained in all cases greater than 0.3. Therefore, the questionnaire's factor structure is verifiable. After calculating the

standard factor load, a meaningful test should be done. Based on t factor load results, the indexes of measuring each dimension of the study at a confidence level of 0.05 are larger than 1.96. Therefore, the observed correlation is meaningful.

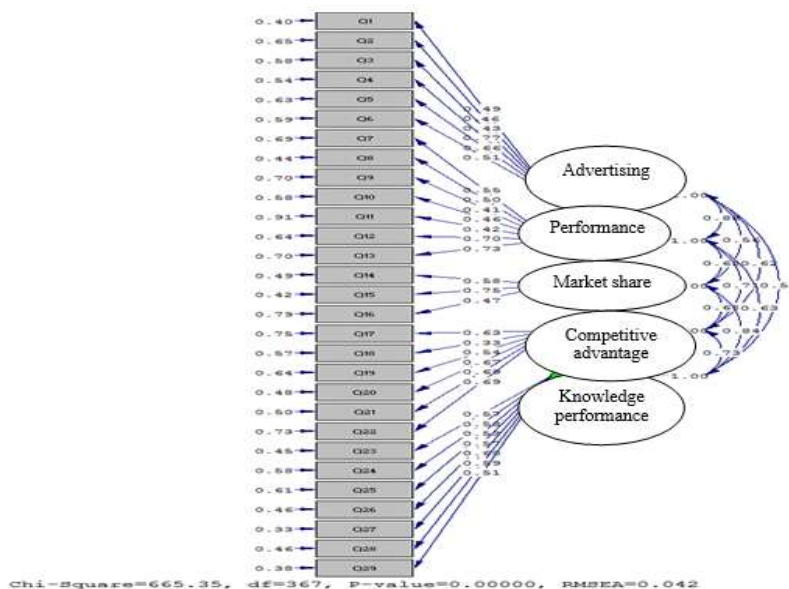


Figure 1-The standard factor load of the social media questionnaire

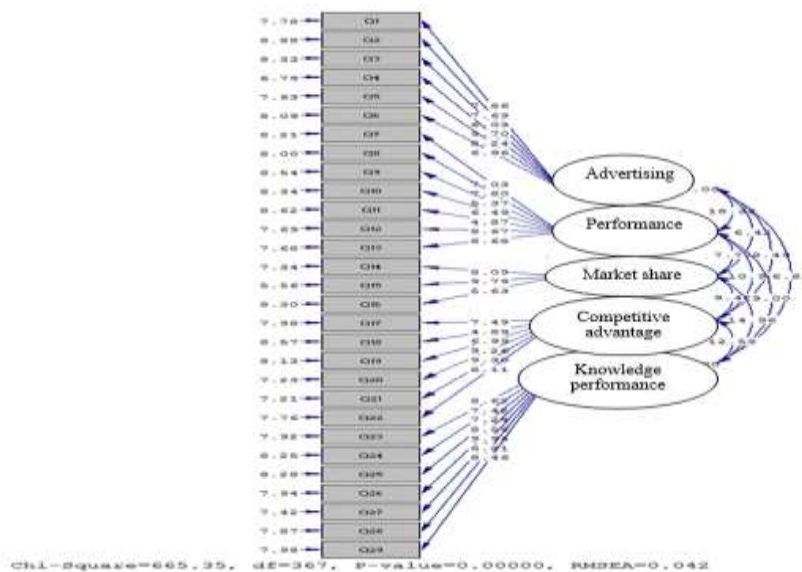


Figure 2- Significance statistical of Social Media Inventory (t-value)

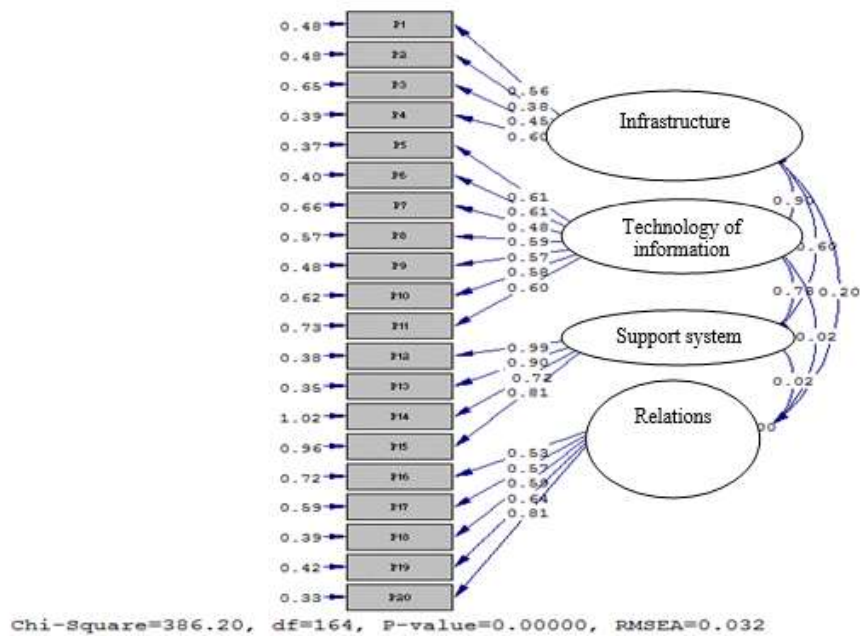


Figure 3. Standard factor load of supply chain questionnaire

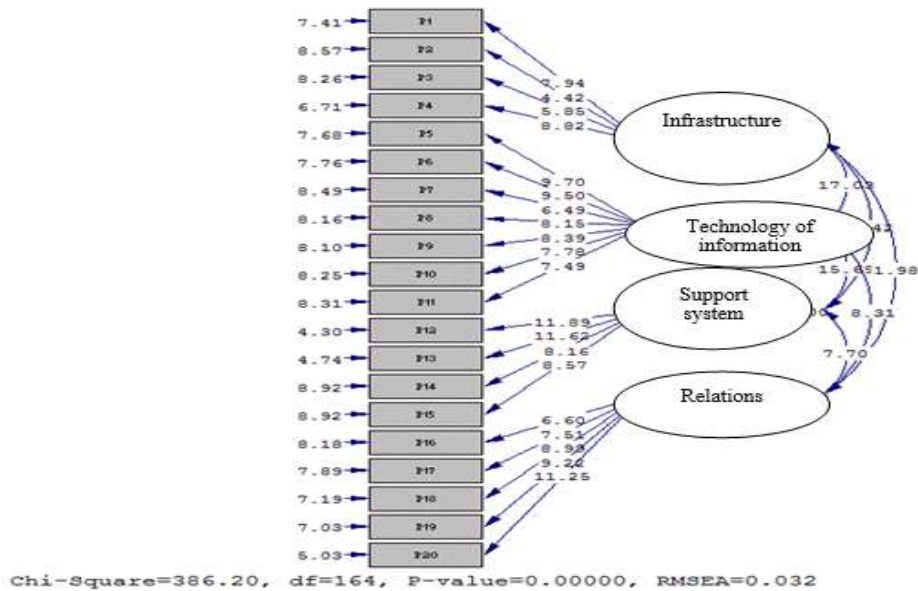


Figure 4. Significance statistics (t-value) of Supply Chain Questionnaire

Testing Hypotheses Using Structural Equation Modeling:

To investigate the research hypotheses, a structural equation model has been used to measure the relationship between variables. The final model is presented in Figures 5 and 6.

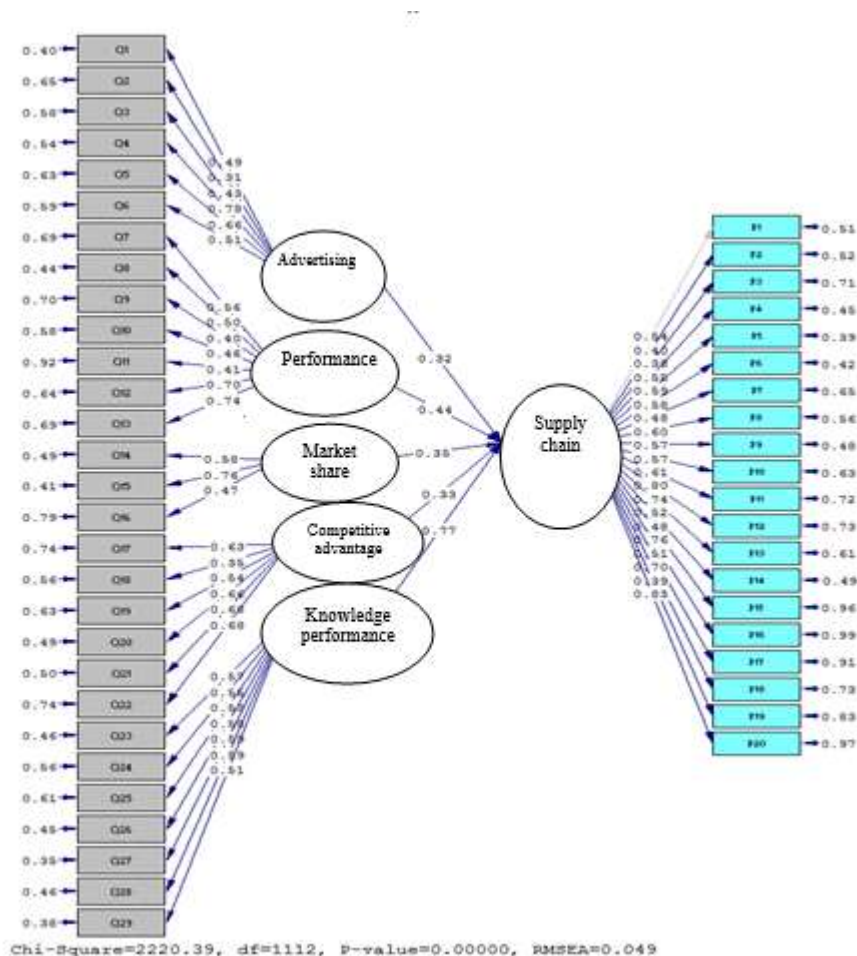


Figure 5. The results of confirmation of the final model of the relationship between the variables of the research

The results of the measurement of the significant of model data are presented in Fig. 6

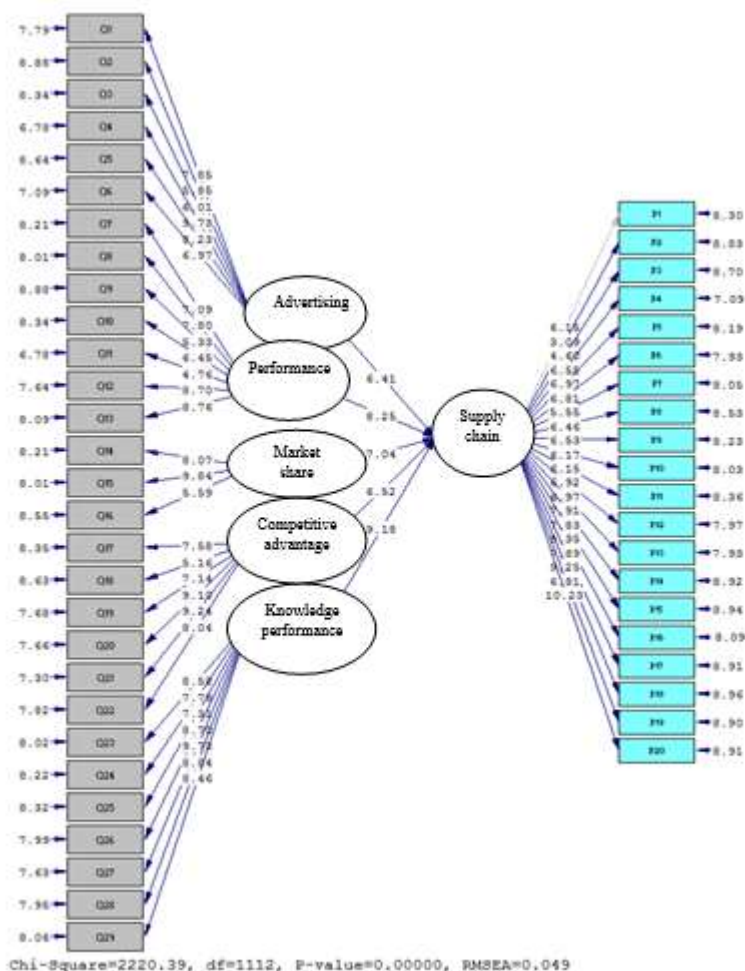


Figure 6: t-value statistics of the results of the final model confirmation of the relationship between the variables of the research

Fit goodness of the model

To fit the structural model of the main research model, a number of goodness indicators of fit have been used. One of the general indicators for calculating free parameters in calculating fit indices is the normal Chi Square index, which is calculated from the simple split of Chi-Square on the degree of freedom of the model. If this value is between 1 and 5, it is desirable. (Schumacher & Lumex, 1988; Cline, 2010)

$$\frac{\chi^2}{df} = \frac{2220.39}{1112} = 1.9967$$

Also, since the root mean square error of approximation (RMSEA) index is 0.049, the model has good fitness. Also, other goodness indicators of fit are also within acceptable range, as shown in the table below.

Table 2. Goodness indices of fit of the structural model of the research model

Fit index	RMR	RMSEA	GFI	AGFI	NFI	NNFI	IFI
Acceptable values	<0.1	<0.1	0.9>	0.9>	0.9>	0.9>	0.9>
Calculated values	0.061	0.049	0.93	0.96	0.94	0.97	0.89

According to the model obtained in the research (Fig. 5 and Fig. 6), the intensity of the relationship between the advertising variable and the supply chain is calculated 0.32, which indicates that there is a strong correlation between these two variables. The t test statistic is also 6.41, which is larger than the critical value t at the error level of 5%, ie, 1.96, and shows that the correlation observed is significant. Therefore, the first hypothesis of the research is confirmed.

The intensity of the relationship between performance variable and supply chain is calculated 0.44, which shows that there is a strong correlation between these two variables. The t test statistic is obtained also 8.25, which is larger than the critical value t at the error level of 5%, ie, 1.96, indicating that the correlation observed is significant. Therefore, the second hypothesis of the research is confirmed.

The intensity of the relationship between market share and supply chain variable is calculated 0.35, which shows that there is a strong correlation between these two variables. The t test statistic is also obtained 7.04 which are larger than the critical value t at the error level of 5%, ie, 1.96, indicating that the correlation observed is significant. Therefore, the third hypothesis of the research is confirmed.

The intensity of the relationship between competitive advantage and supply chain variable is calculated 0.33, which shows that there is a strong correlation between these two variables. The t test statistic is also obtained 6.52 which are larger than the critical value t at the error level of 5%, ie, 1.96, indicating that the correlation observed is significant. Therefore, the fourth hypothesis of the research is confirmed.

The intensity of the relationship between knowledge performance and supply chain variable is calculated 0.77, which shows that there is a strong correlation between these two variables. The t test statistic is also obtained 9.18 which are larger than the critical value t at the error level of 5%, ie, 1.96, indicating that the correlation observed is significant. Therefore, the fifth hypothesis of the research is confirmed.

1. The Internet advertising agent affects the supply chain of food companies.

Table 3: Binomial test for investigating mass media as a factor affecting the supply chain

Variable	Number	Mean	SD	Minimum	Maximum
Factor of Internet advertising	0.61	3.9504	0.41425	2.78	5.00

Binomial test					
Variable	Classification of groups	The number of observations	The probability value of observation	The probability of tested	Significant level
Factor of	First group (q)	4	0.0	0.6	0.000

Internet advertising	Second group (p)	561	1.0		
	Total	061	1.0		

According to the results of the test, for the examined dimension ($\text{Sig} = 0.000 < \alpha = 0.05$), there is a significant difference between the tested probability (0.6) and the probability value observed for the Internet advertising agent on the supply chain. It can be seen that the number of people with moderate to low views is lower than those with high and very high views. The average is also higher than the average level (3) and equal to 3.95, which itself indicates the massive influence of the mass media on the supply chain. As Table 1 shows, all people have had views on the influence (high and very high) on the mass media as an effective factor on the supply chain.

2. The performance of the media influences the supply chain of the companies.

Table 4: Binomial test for investigating performance on supply chain

Variable	Number	Mean	SD	Minimum	Maximum
Factor of performance	061	3.8425	0.41815	2.81	4.81

Binomial test					
Variable	Classification of groups	The number of observations	The probability value of observation	The probability of tested	Significant level
Factor of performance	First group (q)	3	0.0	0.6	0.000
	Second group (p)	157	1.0		
	Total	061	1.0		

3. The market share affects the supply chain of companies.

Table 5: Binomial test to examine the factor of market share as an effective factor on the supply chain

Variable	Number	Mean	SD	Minimum	Maximum
Factor of market share	0.61	3.7520	0.32413	2.55	4.70

Binomial test					
Variable	Classification of groups	The number of observations	The probability value of observation	The probability of tested	Significant level
Factor of market share	First group (q)	2	0.0	0.6	0.000
	Second group (p)	481	1.0		
	Total	061	1.0		

4. Competitive advantage affects the supply chain.

Table 6: Binomial test to examine the factor of competitive advantage as an effective factor on the supply chain

Variable	Number	Mean	SD	Minimum	Maximum
Factor of competitive advantage	0.61	0.6783	0386.5	2.33	4.67

Binomial test					
Variable	Classification of groups	The number of observations	The probability value of observation	The probability of tested	Significant level
Factor of competitive advantage	First group (q)	31	0.2	0.6	0.000
	Second group (p)	912	0.8		
	Total	061	1.0		

5. Knowledge performance affects the supply chain.

Table 7: Binomial test to examine the factor of knowledge performance as an effective factor on the supply chain

Variable	Number	Mean	SD	Minimum	Maximum
Factor of knowledge performance	0.61	0.6783	24.520	12.3	94.6

Binomial test					
Variable	Classification of groups	The number of observations	The probability value of observation	The probability of tested	Significant level
Factor of knowledge performance	First group (q)	25	0.2	0.6	0.000
	Second group (p)	351	0.8		
	Total	061	1.0		

Conclusion and suggestions:

The Internet advertising factor affects the supply chain of industrial companies.

The result for the hypothesis with ($\text{Sig} = 0.000 < \alpha = 0.05$) showed a significant difference between the tested probability (0.6) and the probability value observed for the Internet advertising agent on the supply chain. In this regard, it can be said that the factor of social media through commercial blogging and advertising, and content communications at a much lower cost than other physical ones can have a huge impact on the supply chain of companies and eventually informing them.

The factor of performance affects the supply chain of industrial companies

The result for the above hypothesis with ($\text{Sig} = 0.000 < \alpha = 0.05$) showed a significant difference between the tested probability (0.6) and the probability value observed for the performance factor on the supply chain. It can be said that by looking at the confirmation of the hypothesis, the companies could affect supply chain with their great performance in the increase of selling, and the result of these impacts is virtually changing demand of raw materials more than suppliers, and ultimately through marketers and increasing efficiency.

The market share affects the supply chain of industrial enterprises.

The result for the above hypothesis with ($\text{Sig} = 0.000 < \alpha = 0.05$) showed a significant difference between the tested probability (0.6) and the probability value observed for the market share factor on the supply chain. We conclude that increasing market share as one of the components of social networks can affect suppliers and distributors and can align with market leaders in different directions through the conclusion of long-term partnerships.

The competitive advantage factor affects the supply chain of industrial companies.

The result for the above hypothesis with ($\text{Sig} = 0.000 < \alpha = 0.05$) showed a significant difference between the tested probability (0.6) and the probability value observed for the competitive advantage factor on the supply chain. According to the hypothesis confirmation, the result can be on this basis that these companies, through the advantages that in their business have to competitors, can supply and deliver and ultimately attract more customers, which is very important in expediting things.

The factor of knowledge performance affects the supply chain of industrial companies.

The result for the above hypothesis with ($\text{Sig} = 0.000 < \alpha = 0.05$) showed a significant difference between the tested probability (0.6) and the probability value observed for the factor of knowledge performance on the supply chain. Companies through holding conferences and seminars and also, training personnel through channels and Internet groups has significant impacts on the supply chain.

With regard to the above mentioned and the results of the research hypothesis, it can be concluded that each dimension of social networks affects the supply chain. Companies, in order to survive in today's competitive world in the industry, should use social networks as a competitive advantage and use it to advance their goals to be able to be succeeding in implementing each of their strategies. A few years ago, companies could advance their goals with somewhat sophisticated solutions and communicate with suppliers and distributors, but by great expenses, but in the company's offer to manage costs a while at the same time achieving more customers and connecting with their supply chain members are inevitably using social networks to aware the supply chain from their goals in less time with lower cost and they will implement each of their strategies with their cooperation.

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