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The impact of business intelligence on the marketing with emphasis on cooperative learning: Case-study on the insurance companies

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ABSTRACT

Business Intelligence involves the strategies and technologies employed by businesses for the data analysis of business information. This study investigates the impact of Business Intelligence on the Marketing with emphasis on cooperative Learning. Descriptive-survey research method and field study were employed. 186 samples of employees from insurance companies are statistical population. The face validity and the experts' opinions were employed to determine the validity of the questionnaire for data investigating. Cronbach's alpha and Composite reliability were employed to appraised the accuracy of questions. The methods employed in descriptive statistics as Absolute Frequency Distribution tables, are mean for confirmatory factor. The results revealed that Business Intelligence has a certain and critical impact on marketing through cooperative Learning (Value of Statistics was greater than 1.96), Financial Performance (VoS was greater than 2.57), and Customer Behavior (VoS was greater than 2.57). Also, Business Intelligence teams have a certain and critical impact on Financial Performance (VoS was greater than 2.57), and Customer Behavior (VoS was greater than 2.57). Despite, Business Intelligence does not have a notable impact on Marketing (VoS was less than 1.64).

1. Introduction

Despite the fierce competition in the global business environment, organizations must constantly seek accurate information to make the right decisions and thus maintain their competitive advantage over other competitors (Chen & Lin, 2021; Yiu, Yeung & Cheng, 2021). Therefore, any business organization needs to analyze and predict market behavior to be stable in the face of market changes and its ability to manage (Muntean, Dănăiaţă, Hurbean & Jude, 2021; Nithya & Kiruthika, 2021). To this end, it must update the processes in its business, using an intelligent business approach and the use of modern technologies such as business intelligence and data mining (Das, Ray & Nag, 2009). Conclusive information about business intelligence can be the basis for important changes and the adoption of fundamental decisions, including establishing new areas for cooperation, gaining new customers, identifying new

Abbreviations: RMSEA, root mean square error of approximation; RMR, root mean square residual; AGFI, adjusted goodness of fit index; GFI, goodness of fit index; CFI, comparative fit index; VoS, value of statistics.

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markets and offering new products to customers in an organization (Awamleh, Evans & Mahate, 2003; Molla-Adankew & Al-Sabbagh, 2004).

Business intelligence for sales performance can provide sales managers and their representatives with appropriate analytical information about product, price fluctuations, customers, customer demographics, regions and sales teams. This information can be accompanied by details of the number of sales made in different time periods, which ultimately leads to making the right decision in the time required to provide the right product and maintain the amount and level of sales of the organization, which leads to prevention (Lings & Greenley, 2009; Liu & Hung, 2006; Sahut & Kucerova, 2003). It decreases the amount of sales and increases or keeps the amount of profit from the sales of the organization. Business intelligence in the sales system can also be effective in assessing how close the organization is to the set goals (Cobb-Walgren, Ruble & Donthu, 1995; Crocker, 1986; Grover & Srinivasan, 1992).

In order to adapt to competitive changes in the existing market, organizations should periodically review changes in their customers' purchasing behavior (Hamad, Al-Aamr, Jabbar & Fakhuri, 2021; Klein, 1998; Ng, David, & Dagger, 2011). A complete

Table 1
Marketing and organizational learning questionnaire.

No.	Items	Number	Minimum value	Maximum value
Marketing				
1	The number of branch employees is enough to respond to customers	186	1	5
2	I am satisfied with the speed of services provided by the insurance branch / organization	186	1	5
3	The space inside the insurance branch / organization is pleasant for me	186	1	5
4	The location of the insurance branch / organization is convenient	186	1	5
5	Customer service is provided at the promised time	186	1	5
6	I can easily communicate with the employees of the insurance branch / organization	186	1	5
7	The staff is trustworthy and trusted	186	1	5
8	The customer service process is standard	186	1	5
9	The variety of services provided by the insurance branch / organization is tailored to the needs of customers at different times of the day	186	1	5
10	I am satisfied with the quality of services provided by this insurance branch / organization	186	1	5
11	This insurance branch / organization has a high reputation and credibility	186	1	5
12	New insurance / organizational services provided by this insurance branch / organization are reliable	186	1	5
13	The principle of customer orientation is observed in the best possible way in this insurance branch / organization	186	1	5
14	The services provided by the insurance branch / organization are in line with political, economic, etc. changes	186	1	5
15	I am always informed of changes in accounts and required services through the insurance branch / organization	186	1	5
Dimension	Items	Number	Minimum value	Maximum value
Organizational Learning				
Individual skills	I have the opportunity to work on challenging situations in the organization	186	1	5
	In my work, I fully use my skills and abilities	186	1	5
	In my job I have opportunities to improve my knowledge, skills, and abilities through which I can take on a new position.	186	1	5
	The skills training that I receive can be used to improve my work instantly	186	1	5
	The organization emphasizes staff training at all levels and equally	186	1	5
	In this organization, employees need to continuously increase their knowledge and level of education	186	1	5
Mental models	Employees often share assumptions about the organization's performance with other employees to ensure that they are on track to comply with organizational principles.	186	1	5
	Employees inquire about the appropriateness of their programs to the goals of the organization	186	1	5
	Employees often learn from feedback and change their reactions	186	1	5
	Employees often use important events in the organization to think about their ideas about work	186	1	5
	Employees often make changes to old ways of implementing new and better approaches	186	1	5
	Employees often seek to discover each other's ideas and assumptions about better performance	186	1	5
Common vision	The organization's vision statement sets out the values that all employees must conform to	186	1	5
	In the organization, the vision statement is approved and accepted by the majority of people	186	1	5
	Managers and employees in this organization have a common vision of how things should be done	186	1	5
	We have opportunities for self-assessment on the way to the goal	186	1	5
Team learning	The current functions of the organization encourage employees to resolve issues with each other before referring it to the supervisor	186	1	5
	Most problem-solving groups in this organization include employees from different areas or departments	186	1	5
	There is a lot of overlap in the work between different units in the organization	186	1	5
	Training in this organization is done through working teams	186	1	5
Systematic thinking	In problem solving, we not only seek solutions but also identify how the problem arises and how it can be prevented	186	1	5
	Individuals and teams are encouraged to reflect on actions that lead to success or failure	186	1	5
	Employees are aware of how their role influences the overall process of the organization	186	1	5
	Employees are encouraged to understand people's views in other situations	186	1	5

business intelligence system in marketing processes requires accurate and relevant information about the market. Of course, this type of information is always there, but because this data is in different systems, access to it is complicated, therefore, obtaining the right information requires analyzing the data in different systems (Elbashir, Sutton, Mahama & Arnold, 2021; Nuseir, Aljumah & Alshurideh, 2021).

Continuous improvement programs, which are now quoted in management circles, are rapidly spreading to all organizations (Fashanu, 2021; Sadiku & Musa, 2021; Varshovi, Azami & Jalilian, 2018). Managers put such programs (sometimes at great cost to the organization) on the agenda in the hope that they can enable the organization to compete in the global market and withstand increasing complexity (Zhang, Vinodhini, & Maragatham, 2021). Continuous improvement programs and techniques are very diverse. The theory of learning organizations, which was first practically used by a number of intelligent and experienced managers in the business environment and then developed by theorists in academic environments, seeks to find the answer to this problem (Alikhani, Naderi, & Kazemi, 2021; Arabiyeh & Omidi, 2019; Sjarif, Azmi, Yuhaniz & Wong, 2021).

In this research, the method is descriptive-survey research and field study. The statistical population were employees of insurance companies who were investigated in a 186-sample people. For data investigating, a questionnaire was employed. The face validity was employed to determine the validity of the questionnaire. The experts' opinions as well as standard scales, lead to the value validity of the study was predicted to be beneficial, as well as the convergent validity of the study, aside the help of the mean variance developed. The accuracy of questions was also appraised employing two standard Cronbach's alpha and CR reliability. Based on the stated standards, the accuracy and reliability of the study with all the criteria mentioned is superb. The methods employed in descriptive statistics as Absolute Frequency Distribution tables, are mean for confirmatory factor (Table 1).

2. Problem statement and methods

This research is of applied research type. Descriptive-survey research method is often used in conducting similar research. The goal in research is to describe objectively, realistically, and systematically the characteristics of a situation or subject. In descriptive-survey research, the study population can be studied and tested through a survey. Survey is the collection of information that is done with a plan and as a practical guide to describe or predict or to analyze the relationships of some variables. Fig. 1 shows the conceptual model of research.

2.1. Statistical sample

2.1.1. Statistical society

The statistical population of the present study consisted of 186 employees of the insurance company.

2.1.2. Sampling and determining the sample size

In this study, due to the small number of employees, the census method was used for the sample. Therefore, the statistical sample was considered as the same number of people in the statistical population.

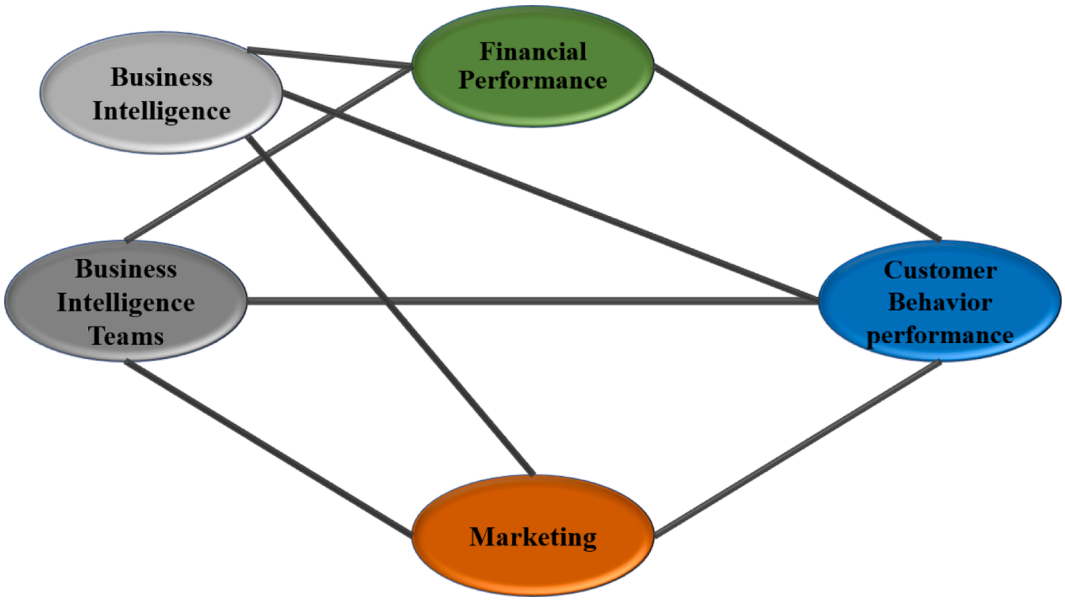

Fig. 1. Conceptual model of research (Varshovi et al., 2018).

2.1.3. Methods of data collection

Data collection in the research should be done according to the research objectives, research method and characteristics of the selected sample. Therefore, various methods have been used to collect the data required for this research:

2.1.4. Library method

In this research, published articles, books and authoritative dissertations (Ahmad, Miskon, Alabdan, & Tlili, 2020a,b; Ahmad, Miskon, Alkanhal, & Tlili, 2020; Ahmad, Miskon, Alabdan, & Tlili, 2021) were used to gather information to establish the general principles of research such as defining key concepts, outlining necessities, expressing applications and explaining the importance of the subject.

2.1.5. Field method

In this research, research data were obtained using a questionnaire. Questionnaires of this research include: - Business intelligence, - Marketing, - Organizational learning. To design this section, a range of five options was used, which "completely disagree" has a score of one and "completely agree" has a score of five.

2.2. Determining the validity and reliability of measuring instruments

After compiling the preliminary design of the questionnaire, an attempt was made to determine the validity and reliability of the questionnaire. In this research, in order to determine the reliability, considering the quality of the type of research and the type of questions raised, it is better to consider the importance of the research audit strategy used in the research process so that validity and reliability are actively achieved.

2.2.1. Validity

In order for the adjusted questionnaire to have the necessary validity and provide the desired data, experts (Varshovi et al., 2018) were assisted in designing and setting the questions. Thus, some questions were removed and some were corrected.

2.2.2. Reliability

The reliability of the tool, which is interpreted as reliability, accuracy and reliability. Cronbach's alpha coefficient was interviewed to obtain the reliability of the questionnaire. Cronbach's alpha or coefficient alpha, is the most common test score reliability coefficient for single administration (Varshovi et al., 2018). Reliability coefficients based on structural equation modeling (SEM) are often recommended as its alternative.

According to the results of Table 2, since the Cronbach's alpha value for all hypotheses is above 0.7, then, the questionnaire is reliable, meaning that the answers were not due to chance, but it is because of the effect of the variable that has been tested.

2.3. Statistical analysis methods

The collected data are meaningless numbers that statistics are used to make them meaningful in order to achieve the goals of the research. Information analysis as part of the process of scientific research method is one of the main foundations of any study that in the current research, descriptive and inferential statistical methods were used.

The analysis of the results of this study was performed using statistical SMART.PLS software V.3.3 (Partial Least Squares method) and S.P.S.S. software V. 26 at both descriptive and inferential levels. At the level of descriptive statistics, statistics such as frequency, percentage, mean, and standard deviation were used. Multivariate regression method in structural equations is also used to analyze inferential information.

3. Results and discussion

The obtained raw data, were analyzed by S.P.S.S. and LISREL software. Data analysis was presented as descriptive and inferential statistics. The acceptable error in the test of research hypotheses is 0.05.

3.1. Descriptive statistics

Fig. 2a, shows that most of research samples, based on age, are 36 to 40 years old. Further, in Fig. 2b, based on education, most of

Table 2
Results of the reliability test of the first questionnaire (Cronbach's alpha) (Varshovi et al., 2018).

Questions	Cronbach's alpha coefficient
Business Intelligence	0.777
Marketing	0.829
Organizational Learning	0.742
The whole questionnaire	0.811

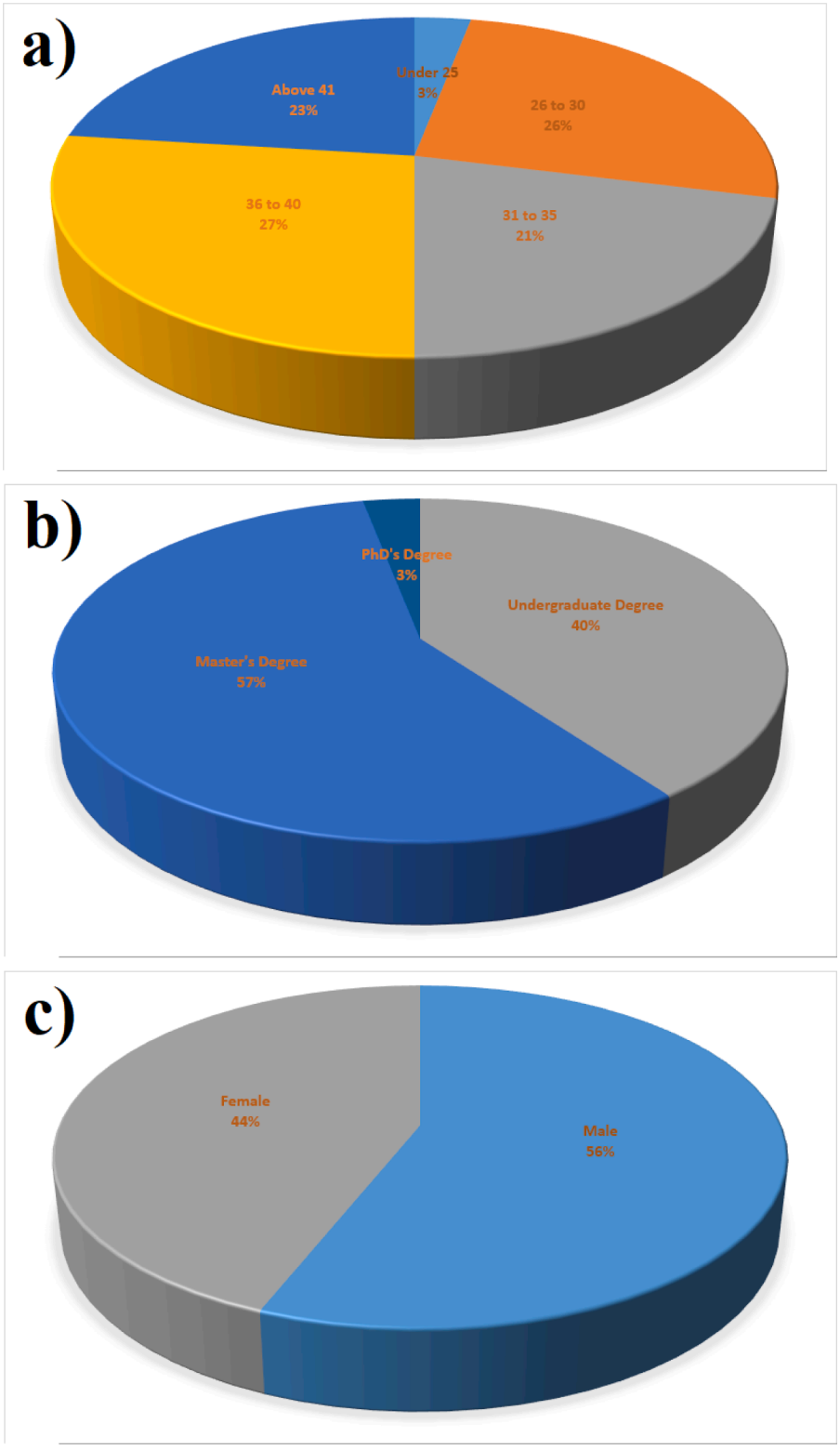

Fig. 2. Frequency distribution of respondents.

research samples have Master's Degree. Also, Fig. 2c shows that based on gender, most of research samples are Male.

According to the Table 3, The average of all variables is higher than the average value of 3.

3.2. Structural equations

3.2.1. *PLS* algorithm

In general, there are two approaches to estimating the parameters of a structural equation model, which include the covariance-based approach and the variance-based approach or PLS. Unlike the covariance-based approach, in which the model parameters are first estimated and then the item values are estimated by returning them to the set of all markers, as the estimated values for each hidden variable in a data set, in the PLS approach the case values are calculated first. For this purpose, latent variables are estimated as exact linear combinations of their experimental markers. The weights used to quantify the items are calculated to include the maximum useful variance for predicting the dependent variables from the independent variables. After calculating the weights in the PLS approach, it is possible to determine the values of each hidden variable. This is done by calculating the weight average of the markers of a structure. After calculating the values of the hidden variables, the structural path weights are calculated through Ordinary Least Squares (OLS) regression.

This algorithm is repeated until the convergence is achieved and the desired result is obtained. When the goal is application and prediction, the PLS approach is appropriate. Based on this approach, it is assumed that all the measured variance is used for explanation. Since in this approach the latent variables are estimated as an exact linear combination of the observed measurements, the problem of non-determination is avoided and a precise definition of the component scores is provided. Using the iterative estimation method, PLS provides a general model that includes all other methods of fundamental correlation, multiple regression, multivariate analysis of variance, and principal components.

3.2.2. Model complexity feature

In new areas of applied research, especially when measuring instruments are under construction, the distributive properties of the observed variables are unknown. Also in the model discovery phase, the complexity of the final model, the number of reliable markers and the size of the factor loads are unclear. It is obvious that with better measurements and stronger theoretical foundations of better model structures, appropriate decisions can be made to select estimators. These emphasize the complementary feature of PLS in relation to the modeling of covariance-based structural equations in theory testing, especially when the model has progressed from simple to complex. In other words, PLS is suitable for explaining more complex models because the PLS algorithm allows for a significant increase in model complexity.

The Partial Least Squares (PLS) method consists of two main steps: - Check the fit of measurement models, structural model and general model, - Testing the relationships between structures.

3.3. Model fit

3.3.1. RMSEA index

The root mean square error of approximation (RMSEA) index, used in most confirmatory factor analyzes and structural equation models. If the value of this index is less than 0.05, the fit of the model is good, and if it is between 0.05 and 0.08, the fit of the model is average.

3.3.2. RMR index

Root Mean Square Residual index, an index for residual variance is used to fit each parameter to the sample data or to measure the mean of the residuals and can only be changed in relation to variances and covariances. The closer this criterion is to zero, the higher the goodness of the model fit.

3.3.3. AGFI and GFI indexes

AGFI and GFI indexes, do not depend on the sample size. The value of Goodness of Fit (GFI) must be equal to or greater than 0.9. Adjusted Goodness of Fit Index or AGFI is another fitness index. This index is equivalent to using the mean of the squares instead of the sum of the squares in the face and denominator of GFI. The range of GFI and AGFI changes is between zero and one. The acceptable value of these two indicators must be equal to or greater than 0.9.

Table 4 shows the suitability indicators of the variable measurement model. Based on the table, it becomes clear that the variable measurement model is a good model because the chi-square value is normally in the desired range between one and five. RMSEA value is under 0.1, RMR value is under 0.05, and other indexes values are above 0.9, which are all desirable amounts.

Table 3
Descriptive statistics of research variables (Varshovi et al., 2018).

Research Variables	Samples	Average	Standard deviation
Business Intelligence	186	3.50	0.844
Marketing	186	3.42	0.756
Organizational Learning	186	3.66	0.819

3.4. Structural model

In the structural section, the values related to independent and dependent structures are presented. The output of the measurement model is shown in Fig. 3, and the structural model is displayed in Fig. 4.

Tables 5–7 are Software output – Outer Loadings related to Figs. 3 and 4.

3.5. Research hypotheses results

3.5.1. First hypotheses - business intelligence has a significant effect on marketing

Based on the results of the Figs. 3 and 4, as well as the Table 8, it was found that the value of statistics in the path of business intelligence to marketing less than 1.64 is the minimum default value for significance. Thus, business intelligence does not have a significant effect on marketing.

3.5.2. Second hypotheses - business intelligence has a significant effect on marketing through organizational learning

Based on the results of the Figs. 3 and 4, as well as the Table 9, it was found that the value of statistics in the path of business intelligence and marketing with the mediating role of organizational learning is greater than 1.96. It can be said that at the 95% confidence level and the 0.05 error level, business intelligence means marketing through organizational learning. Therefore, business intelligence has a positive and significant effect on marketing through organizational learning.

3.5.3. Third hypotheses - business intelligence has a significant effect on financial performance

Based on the results of the Figs. 3 and 4, as well as the Table 10, it was found that the value of statistics in the path of business intelligence and financial performance is greater than 2.57. It can be said that at the confidence level of 99.99% and the error level of 0.01, business intelligence has a significant effect on financial performance.

3.5.4. Fourth hypotheses - business intelligence has a significant effect on customer behavior performance

Based on the results of the Figs. 3 and 4, as well as the Table 11, it was found that the value of statistics in the path of business intelligence and customer behavior performance is greater than 2.57. It can be said that at the level of 99.99% confidence and the error level of 0.01, business intelligence has a significant effect on the performance of customer behavior.

3.5.5. Fifth hypotheses - business intelligence teams have a significant effect on financial performance

Based on the results of the Figs. 3 and 4, as well as the Table 12, it was found that the value of statistics in the path of business intelligence teams and financial performance is greater than 2.57. It can be said that at the 99.99% confidence level and the 0.01 error level, business intelligence teams have a significant impact on financial performance.

3.5.6. Sixth hypotheses - business intelligence teams have a significant effect on customer behavior performance

Based on the results of the Figs. 3 and 4, as well as the Table 13, it was found that the value of statistics in the path of business intelligence teams and customer behavior performance is greater than 2.57. It can be said that at 99.99% confidence level and 0.01 error level, business intelligence teams have a significant effect on customer behavior performance.

4. Conclusion

The purpose of this research is to achieve practical results in line with the subject under study in its specific time and place. In this research, first the issue and the importance of the issue about the impact of business intelligence on marketing with emphasis on organizational learning was addressed. Then, according to the objectives of the research, hypotheses were proposed and based on the results, their accuracy or inaccuracy was examined.

Results are:

- Business Intelligence does not have a significant effect on Marketing (the value of statistics was less than 1.64).
- Business Intelligence has a positive and significant effect on Marketing through Organizational Learning (the value of statistics was greater than 1.96).
- Business Intelligence has a significant effect on Financial Performance (the value of statistics was greater than 2.57).
- Business Intelligence has a significant effect on the Customer Behavior Performance (the value of statistics was greater than 2.57).
- Business Intelligence Teams have a significant impact on Financial Performance (the value of statistics was greater than 2.57).

Table 4
Model fit indicators (Varshovi et al., 2018).

Fit index					
RMR	GFI	NNFI	NFI	RMSEA	NC
0.032	0.90	0.90	0.90	0.059	2.22

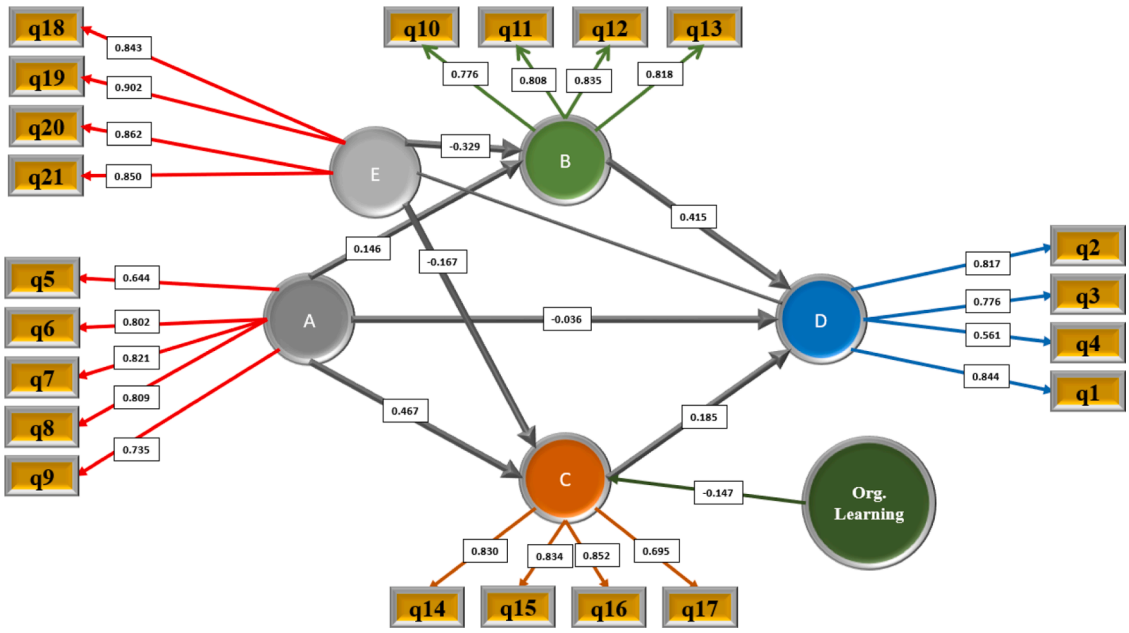

Fig. 3. The final output of the measurement model in the software.

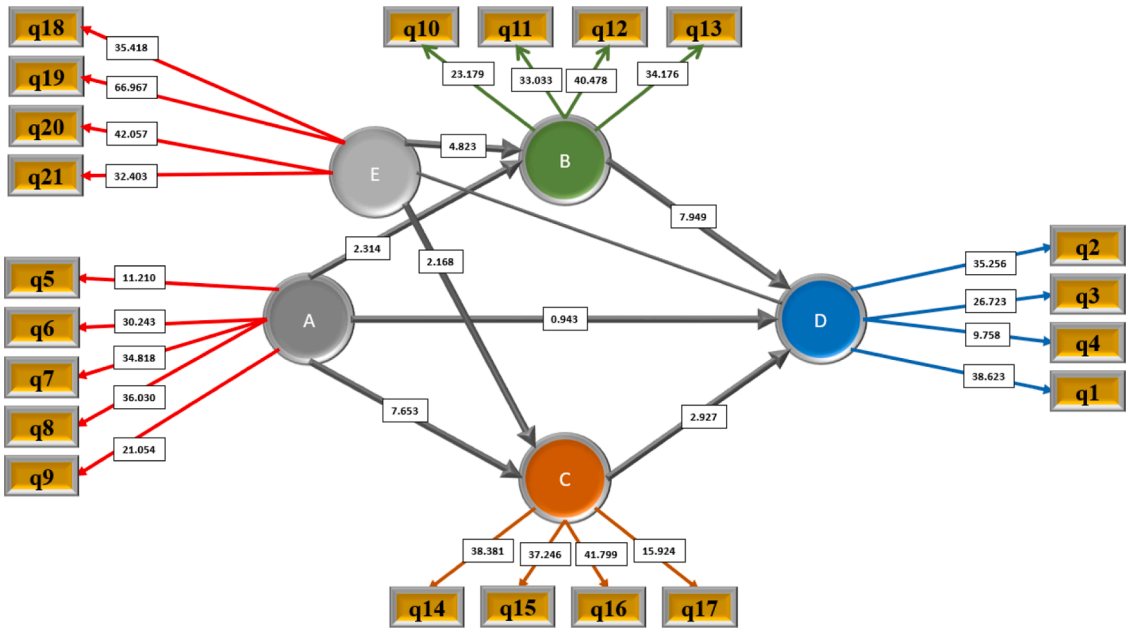

Fig. 4. Structural model output in software.

Table 5
Software output – outer loadings.

	R-Squared	Adjusted R-Squared
Business Intelligence	0.720	0.718
Marketing	0.674	0.671
Organizational Learning	0.641	0.631

Table 6
Software output – outer loadings.

	Cronbach's Alpha	Rho_A	Composite Reliability	Average Variance Extracted (AVE)
Business Intelligence	0.922	0.926	0.939	0.720
Marketing	0.892	0.894	0.921	0.699
Organizational Learning	0.889	0.892	0.912	0.567

Table 7
Software output – Outer Loadings.

	Saturated Model	Estimated Model
SRMR	0.069	0.076
d_ULS	1.526	1.893
d_G1	1.291	1.353
d_G2	1.094	1.154

Table 8
Path coefficient of business intelligence and marketing structures (Varshovi et al., 2018).

Path	(β) Path coefficient	(t) Statistics	Path Meaningfulness/not meaningful
Business Intelligence > Marketing	^{NS}-0.036	0.943	NM

*$p < 0.1$; **$p < 0.05$, ***$p < 0.01$; ns: Not Significant.

Table 9
Path coefficient of business intelligence, marketing, and organizational learning structures (Varshovi et al., 2018).

Path	(β) Path coefficient	(t) Statistics	Path Meaningfulness/not meaningful
Business Intelligence > Marketing > Organizational Learning	0.146**	2.314	Meaningful

*$p < 0.1$; **$p < 0.05$, ***$p < 0.01$; ns: Not Significant.

Table 10
Path coefficient of business intelligence and financial performance structures (Varshovi et al., 2018).

Path	(β) Path coefficient	(t) Statistics	Path Meaningfulness/not meaningful
Business Intelligence > Financial Performance	0.467***	7.653	Meaningful

*$p < 0.1$; **$p < 0.05$, ***$p < 0.01$; ns: Not Significant.

Table 11
Path coefficient of business intelligence and customer behavior performance structures (Varshovi et al., 2018).

Path	(β) Path coefficient	(t) Statistics	Path Meaningfulness/not meaningful
Business Intelligence > Customer Behavior Performance	0.415***	7.949	Meaningful

*$p < 0.1$; **$p < 0.05$, ***$p < 0.01$; ns: Not Significant.

Table 12
Path coefficient of business intelligence teams and financial performance structures (Varshovi et al., 2018).

Path	(β) Path coefficient	(t) Statistics	Path Meaningfulness/not meaningful
Business Intelligence Teams > Financial Performance	0.185***	2.927	Meaningful

*$p < 0.1$; **$p < 0.05$, ***$p < 0.01$; ns: Not Significant.

- Business Intelligence Teams have a significant effect on Customer Behavior Performance (the value of statistics was greater than 2.57).

A suitable business intelligence system in the field of distribution should be able to provide information to the distributor in order to

Table 13
Path coefficient of business intelligence teams and customer behavior performance structures (Varshovi et al., 2018).

Path	(β) Path coefficient	(t) Statistics	Path Meaningfulness/not meaningful
Business Intelligence Teams > Customer Behavior Performance	0.256***	4.925	Meaningful

*$p < 0.1$; **$p < 0.05$, ***$p < 0.01$; ns: Not Significant.

synchronize supply and demand, forecast production needs and predict customer needs based on purchase records. From the data, it should be possible to arrive at an appropriate behavioral pattern in which business intelligence systems play a key role.

Declaration of Competing Interest

There is no conflict of interests.

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