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Designing an intelligent competitive online network model in order to improve business efficiency by using online capabilities in small and medium-sized companies using structural equations

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Abstract

The statistical population in this research is about 500 managers and employees of companies active in the field of production and distribution of petrochemical products. The sample size was determined through Morgan's Table 217. In this research, we use the Kolmogorov-Smirnov test to ensure the type of distribution of research variables in terms of normality or abnormality. This test is used to check the claim made about the distribution of research variables. When the variable distribution is normal, parametric tests should be used; otherwise, we use non-parametric tests. In the analytical statistics of this research, the univariate linear regression test (t-test) was used to determine the effect of each of the identified factors on loyalty and offline advertising. The measurement tool of this research is a questionnaire that was examined in terms of validity and reliability. After collecting the questionnaires, the data were analyzed using the structural equation modelling method with the partial least squares approach with the help of SPSS21 and Smart PLS2 statistical software. In this way, the use of advanced and up-to-date systems, timely services, providing innovation to identify the needs of customers, discovering creative opportunities in the important market and obtaining new information from customers and suppliers in the market and evaluation are suggested.

Keywords: competitive intelligence network, business performance, competitive advantage
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1 Introduction

A competitive intelligent network is a commercial tool that helps the strategic management process in organizations and increases business performance through increasing knowledge, internal communication and the quality of strategic plans. In this era, it is necessary to create a competitive environment and empower manufacturing companies to participate in a competitive environment. In this situation, companies and enterprises can achieve high competitive power that benefits from intellectual capital and intelligence, especially competitive intelligence. The specialized association of competitive intelligence states that competitive intelligence is a systematic process for collecting, analyzing

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and managing external information that affects the company's plans, decisions and performance [1]. Companies with high competitive intelligence extract and analyze the information of competing companies and use the results for strategic decisions. Today, the desire for competitive intelligence and its actions is growing day by day, considering the competitive conditions of the market and rapid environmental changes, and the strategic entrepreneurship paradigm is one of the main solutions for improving the performance and growth of organizations [2].

Strategic intelligence was first used in military operations in the 4th century BC, when it was employed by [4], one of the world's foremost military strategists, "so that a wise commander of military mastery may do what beyond the skill of ordinary leaders of the past. This form of intelligence has a long history but lacks consistent meaning and agreement. This situation indicates that according to the duration and scope of historical experience, there is much more work in the field of discovering the limits and possibilities of this form of intelligence. See [3] the Central Intelligence Agency (CIA), as the first organization to use this style of intelligence in the implementation of arms control agreements and in providing strategic intelligence to political decision-makers and policymakers. When organizations realized the importance of this type of intelligence and provided many metrics about the evolution of this intelligence, several institutions in Europe and North America began to create strategic intelligence units within organizations to provide insight to policymakers and academic programs. Present about smart style. Intelligence [5]. Many businesses are also developing strategic intelligence, which is created by a group of experts who provide basic recommendations that serve as the basis for top management decisions on issues such as mergers with other organizations and new product development [15]. The decision-making process will be more difficult in situations where the markets pay attention to different ways of development [12]. There are new products and other exciting and emerging products as well as an increase in the number of sellers or suppliers and other factors that influence the decision about products. This is a complex description of time marketing decisions because they are more complex than any other decision made by the government [8]. The investigation between competitive intelligence and organizational performance of the country's industries will show that the dimensions of competitive intelligence and organizational performance in this industry have a deep relationship. Executive managers with a better understanding of competitors and the challenging environment of competition can rely on special tools and techniques of information related to capabilities to examine the strengths, weaknesses and intentions of competitors to choose the appropriate strategy and always be one step ahead of competitors. Thus, considering the importance of a competitive intelligence network, this research tries to identify the role of these factors on organizational performance.

2 Theoretical foundations and research background

One of the prominent and dominant features of the current era is the increasing changes in human knowledge and various social, economic, industrial, political and technological fields. In a situation where human knowledge is experiencing growing changes in all fields, understanding market changes, competition, technology, innovation, and predicting future trends seems necessary for competition, and competitive intelligence focuses on these fields. Globalization has led to many challenges and opportunities for organizations. Based on this, the existence of a competitive intelligence program for organizations means a successful presence in the field of global trade. In other words, competitive intelligence plays an important role in managing organizations in a competitive environment to optimally use the opportunities created in global markets. Competitive intelligence plays an important role in the strategic management of companies, which is due to its sustainable competitive advantage. The online competitive intelligence network tries to analyze the information of the competing companies so that the company can determine its competitive strategies. In today's business environment, where the life cycle of products and services is getting shorter and future benefits are uncertain, entrepreneurial institutions need to take risks, innovate and dominate the market. Entrepreneurship and strategic management are concepts that have attracted the attention of many researchers and managers in the theoretical foundations and the field of management practice. Competitive market conditions and rapid environmental changes require organizations to develop entrepreneurship to identify and take advantage of opportunities that other organizations are unaware of or indifferent to.

The dimensions of the online competitive intelligent network are composed of two words: competition and intelligence. Competition refers to confrontation between at least two people, groups, teams, organizations and businesses. Intelligence here also means insight and insight in predicting future changes [21]. Historically, the concept of competitive intelligence has a rich heritage that dates back to about 5 thousand years ago in Chinese history. Since 1991, concepts related to intelligence opened their place in scientific meetings. Of course, in the past, the methods and tools for intelligence were not systematic and the people who used them were not an index group and did not have a special tradition or method. After the overall effect, a series of five Pinkerton articles was formed in the field of marketing intelligence. These documents represent the intelligence revolution. The second stage of the competitive intelligence

revolution is determined by referring to Porter's book. Organizations and companies have been using competitive intelligence for many years. Without even being aware of the existence of such intelligence. In many cases, competitive intelligence is used in the form of strategic planning, marketing, financial planning, policy-making and re-engineering to maintain and preserve the organization [11]. The Association of Competitive Intelligence experts consider intelligence as an ethical and systematic program for collecting, analyzing and managing external information that affects the plans, decisions and performance of the organization [13]. In the new era, the developments in information technology and its applications have contributed to the dimensions of the online competitive intelligent network, so that with the explosion of information available through blogs, emails and other electronic communications in virtual spaces, the dimensions of the online competitive intelligent network have become more meaningful [17].

There is no single definition of online competitive smart network dimensions in the literature on this topic because the definitions are different based on the authors and their attitudes towards this topic. Ben Gilad, one of the theorists of competitive intelligence, writes; Competitive intelligence is the total knowledge that a company has of the environment in which it competes, and it is the result of the analysis of countless particles of information that bombards the company daily. It is in the light of this knowledge that a complete picture of the current state of the future of the competition scene is placed in front of managers so that they can make better decisions [19].

The dimensions of the online competitive intelligent network are not just a task or function in the company; Rather, it is a comprehensive process [7, 16]. Competitive intelligence involves three special and important tasks, first) data collection and storage, second) data analysis and interpretation, third) dissemination of intelligence. In other words, explaining the reason for the emergence of the concept of competitive intelligence is the explosion of information through the acquisition of information and their rapid and extensive reproduction in commercial databases. In a general model presented by Bose in 2016, the above dimensions are expanded and described in five stages of the competitive intelligence process. In fact, the competitive intelligence process is the activity of collecting, analyzing, and applying information about products, competitors, suppliers, partners, and customers for the short and long-term planning needs of an organization. The process and cycle of competitive intelligence is such that in smart organizations, first by using planning, the overall framework of the competitive intelligence process is defined in three general stages, first (data collection and storage), second (data analysis and interpretation) and third (intelligence dissemination). becomes After collecting and analyzing the data, it is time for the third stage of the general framework, that is, the dissemination of information to the stakeholders (competitors, suppliers, partners and customers). As the final stage, through the main output of the process, which includes the ability to make forward-looking decisions and leads to strategic decision-making and market leadership, the final stage, which is process evaluation, is performed [6]. In their article, Mugo et al. [18] have presented the cycle of online competitive smart network dimensions, the elements of which are: 1. Expressing needs, 2. Gathering information, 3. Analyzing and processing information, and 4. Dissemination. Information. They have described a five-step process for online competitive smart network dimensions, which are: 1. identifying needs, 2. gathering information, 3. organizing and storing information, 4. analyzing information, and 5. disseminating information. On the other hand, regarding marketing capabilities, it can be said that credibility is widely defined as the believability of the goals and intentions of an independent entity at a specific time. Basically, marketing capabilities are a summary of long-term interaction of customers with product suppliers in terms of brand service stability, which in turn describes a more general, long-term and summary concept of satisfaction.

In 2021, Allen proposed the concept of marketing capabilities as the belief in product positioning information by customers based on their perception of whether the brand has the ability and willingness to consistently deliver what it promises. Swedney also considers marketing capabilities to represent the long-term relationship between a consumer and a brand [10]. As a result, Pinkerton introduced two main components for marketing capabilities in 2018. These two components are trust and expertise. Trust refers to the willingness of companies to deliver what they promised, and expertise refers to the ability of companies to actually deliver what they promised [19]. Due to the fact that brand trust and expertise is formed under the influence of marketing strategies and organization's functions, in this way, the credibility of a brand indicates the stability of marketing mix strategies.

These researchers concluded in their research that consistency in quality and transparency are effective on marketing capabilities. Quality stability, which indicates the balance of the organization's marketing functions with mixed marketing strategies over time, reduces the level of product variability. Transparency also means the absence of ambiguity in a brand. In this way, the formation of marketing capabilities is facilitated with the help of stability of quality and transparency of the brand and carrying out promotional marketing activities such as advertising or trying to improve the position of the product. Direction's research in 2021 indicated the impact of marketing capabilities on customers' willingness to buy through perceived quality and perceived risk. Perceived quality refers to the consumer's judgment regarding the superiority and excellence of a product, and perceived risk also refers to the uncertainty of the consumer in a situation where he is unable to predict the consequences of his purchase decision [14].

3 Research method

The research method in this research is of an applied type, and in terms of the goal, it is of an analytical type, and in terms of the process, it is a mixed (qualitative-quantitative) research. The method of collecting the required data in the research group is a combination of exploratory research, which was carried out in the following two consecutive stages.

3.1 Research method in the qualitative part

In order to improve the qualitative part of the research, two library methods and semi-structured in-depth interview with snowball sampling method were used and the interviews continued until theoretical saturation was realized. Interviews were conducted with 15 experts and experts who have academic knowledge or activity experience in the field of digital banking and business ecosystems related to it. Validity and reliability in this phase based on the criteria of credibility or believability, review by members (interviewees), triangulation of data sources, analysis of negative cases and transferability have been done. The above criteria are considered as reliability to replace the validity and reliability of qualitative research. The analysis of the interview texts was done in open, central and selective coding stages. The theme analysis is based on the theoretical foundations of the process of going back and forth in which the movement back and forth between the stages of the method in this research was carried out as follows over time: Stage 1. Getting to know the data, Stage 2. Creating small Topics, step 3. Finding themes, step 4. Revising themes, step 5. Defining and naming themes, step 6. Preparing a report. The results of the demographic survey of the experts are as follows:

Table 1: Initial access matrix

Percentage	Levels	Variable Frequency	Variable	Percentage	Levels	Variable Frequency	Variable
20.0	3	Masters	education	33.3	5	Female	gender
80.0	12	Masters and Ph.D.		66.7	10	Man	
100.0	15	total		100	15	total	
47.0	7	32-42	Age	47.0	7	11-15	Years of service
20.0	3	43-54		33.0	5	16-20	
33.0	5	54 <		20.0	3	> 21	
100.0	15	total		100	15	total	

3.2 The research method in the quantitative part

The research is descriptive in terms of practical purpose and in terms of collecting survey data, and among the types of survey research, the statistical population of the research includes all the active employees of the companies active in the petrochemical basin in the number of 420 people. For sampling, available sampling method and Cochran's formula were used, the sample size was calculated to be 200 people.

$$n = \frac{\frac{z^2 pq}{d^2}}{1 + \frac{1}{N}\left(\frac{z^2 pq}{d^2} - 1\right)} \tag{3.1}$$

First, based on the findings of the theoretical foundations and the background of the research, he designed a questionnaire, and then to obtain the reliability of the questionnaire, an initial random sample of 30 people was selected and using Cronbach's alpha test (Table 1), the reliability of the questionnaire was established by the researcher. has been measured. Cronbach's alpha was generally calculated using the following equation.

$$\alpha = \frac{k}{k-1}\left(1 - \frac{\sum_{i=1}^{k} S_i^2}{\sigma^2}\right) \tag{3.2}$$

In these relationships, k is the number of questions, the variance of the i-th question, the variance of the total number of questions, the average variance between the questions, and the average variance of the questions.

After confirming the reliability and validity of the questionnaire, it has been distributed among the entire sample population. Considering the maximum variance (success and failure equal to 0.05) and the limit error of 0.05, the number of 200 people has been estimated as a statistical sample. In order to measure the validity of the researcher's questionnaire, the opinions of academic experts have been used. Their shared opinion on the items was based on the validity of the target measure.

3.3 Quality control

In order for the researcher to be able to use the qualitative findings in the analysis, he must code them.

Inter-coder reliability is a widely used term that refers to the degree of agreement that independent coders obtain when evaluating the features of a message or text. The specific term for consistency in content analysis is "agreement between coders". Determining validity and reliability is a critical step in the qualitative data analysis process.

The Kappa method is one of the statistical decision-making tools that examines the amount of agreement and coordination between two individuals, phenomena, or sources of decision-making, each of which is measured separately.

Kappa coefficient is a numerical measure between -1 and +1, the closer to +1 indicates the presence of proportional and direct agreement, the closer to -1 indicates the presence of inverse agreement, and the opposite and values closer to zero indicate the opposite of agreement.

$$k = \frac{p_o - p_e}{1 - p_e} \tag{3.3}$$

In this regard, p_o is equal to the ratio of the units about which there is an agreement, p_e is also the ratio of units that are likely to be a random agreement.

3.4 Interpretive structural method

The interpretive structural modelling method is an interactive learning process. In this technique, a set of different elements is structured in the form of a comprehensive systematic model. Such a model that is formed, draws the structure of a complex issue or a problem in the form of a carefully designed pattern in the form of a diagram. This method is an interpretive model in which a group of experts decide whether and how the elements are related, and it is a structural model in that it extracts complex components based on the relationship of the structure and specific relationships through the modelling method. and explains the overall structure as a diagram model. This method is a tool to create order in the complexity of relationships between variables and is a suitable option for dealing with complex issues, especially when using systematic and logical thinking.

The various steps involved in the ISM technique are shown in the figure above. These steps ultimately lead to the creation of an ISM model, which is explained in the following steps:

Step 1) Identification of variables related to the problem: The ISM method begins with the identification of variables that are related to the problem or topic under discussion. These variables are obtained through the study of the subject literature, past studies, through receiving the opinions of experts or through questionnaires.

Step 2) Formation of the structural matrix of internal relations of variables (SSIM): This matrix (structural self-interaction matrix) is a matrix with the dimensions of the variables, in which the variables are mentioned in the first row and column respectively.

Step 3) Create the achievement matrix (RM) or the received matrix: by converting the symbols of the SSIM matrix to the numbers zero and one, the achievement matrix can be reached. By following these rules, the initial acquisition matrix is prepared.

Step 4) Adapt the achievement matrix: After the initial achievement matrix is obtained, its internal consistency should be established. For example, if variable 1 leads to variable 2 and variable 2 leads to variable 3, then variable 1 should also lead to variable 3, and if this state was not established in the initial achievement matrix, the matrix should be modified and the relationships that were missed be replaced.

If we have n criteria as described in $c_1, c_2, ..., c_n$ and their pairwise comparison matrix is as follows:

$$A = [a_{ij}], \quad I, j = 1, 2, ..., n$$

where a_{ij} shows the preference of element c_i over c_j, if we have in this matrix:

$$a_{ik} \times a_{kj} = a_{ij}, \quad I, j, k = 1, 2, 3, ..., n$$

Then we say that the matrix A is consistent.

3.5 Inconsistent matrix

In this part, we want to know that if the matrix of pairwise comparison is inconsistent, what is the amount of inconsistency of the matrix and how do we measure it. Before stating the inconsistency measurement criterion, some important issues about each pairwise comparison matrix are mentioned:

Theorem 3.1. If $\lambda_1, \lambda_2, ..., \lambda_n$ are eigenvalues of the pairwise comparison matrix A, the sum of its values is equal to n:

$$\sum \lambda_i = n$$

Theorem 3.2. the largest of this special value ($\lambda_{\max}$) is always greater than or equal to n, in this case some λ's will be negative.

$$\lambda_{\max} \geq n$$

Theorem 3.3. If the elements of the matrix deviate a little from the compatible state, its eigenvalues will also deviate a little from their compatible state.

$$A \times w = \lambda.w$$

where λ and w are the eigenvalue and eigenvector of matrix A, respectively. In the case that matrix A is consistent, one eigenvalue is equal to n (greater than eigenvalue) and the rest are equal to zero. Therefore, in this case it can be written:

$$A \times w = n \times w$$

In the case that the pairwise comparison matrix A is inconsistent, according to Theorem 3.3, $\lambda_{\max}$ is slightly different from n, which can be written:

$$\lambda_{\max} \times w = A \times W.$$

The reason for using $\lambda_{\max}$ according to theorem 3.3 is that it will have the smallest distance from n. Since $\lambda_{\max}$ is always greater than or equal to n, and if the matrix deviates from the compatibility mode, $\lambda_{\max}$ will deviate from n, so the difference between $\lambda_{\max}$ and n ($n - \lambda_{\max}$) depends on the value of n, and to solve this dependence, the scale can be defined as follows, which we call the inconsistency index (I.I.).

$$I.I. = \lambda_{\max} - n/n - 1.$$

For each matrix, the result of dividing the inconsistency index (I.I.) by the inconsistency index of the random matrix (II R.) is then a suitable criterion for judging the inconsistency, which we call the inconsistency rate (I.R.). If this number is smaller than 0.1, the compatibility of the system is acceptable, otherwise you should reconsider your judgments.

Calculate the inconsistency rate:

Step 1. Calculation of the weighted sum vector: Multiply the matrix of pairwise comparisons by the "relative weight" column vector. Call the new vector that you get in this way, the weighted sum vector (Weighted sum Vector=WSV).

Step 2. Calculation of compatibility vector: Divide the elements of the weighted sum vector by the relative priority vector. The resulting vector is called compatibility vector (Consistency Index = CI).

Step 3. Obtaining $\lambda_{\max}$ gives the average of the elements of the compatibility vector $\lambda_{\max}$.

Step 4. The formula for calculating the compatibility index: The compatibility index is defined as follows:

$$CI = \frac{\lambda_{\max} - n}{n - 1} \tag{3.4}$$

n is the number of options in the problem

Step 5. Compatibility ratio calculation formula: The compatibility ratio (Random Index = RI) is obtained by dividing the compatibility index by the random index

$$CR = \frac{CI}{RI} \tag{3.5}$$

A compatibility ratio of 0.1 or less indicates compatibility in comparisons.

Step 6. Determining the level and priority of variables: In this step, using the final achievement matrix, the set of output and input for each variable is obtained. To determine the level and priority of the variables, the achievement set (output) and the prerequisite set (input) are determined for each variable.

Step 7. Drawing the model: after determining the relationships and level of the variables, they can be drawn in the form of a model. For this purpose, first, the variables are adjusted according to their level from top to bottom. At this stage, according to the levels obtained from the variables and the final matrix, an initial model is drawn and the final model is obtained by removing transferability in the initial model. The relationship between the variables and the direction of the arrow is determined from the final matrix.

Step 8. Analysis of penetration power and degree of dependence (MICMAC): MICMAC or the mutual influence of matrix multiplication applied for classification; The purpose of this analysis is to identify and analyze the power of penetration and the dependence of the variables. At this stage, by summing the entries of ((1)) in each row, the power of penetration and also the sum of the entries of ((1)) in each column, the amount of the dependence of the variables is obtained.

4 Results

In this section, we first check the normality of the data using the Kolmogorov-Smirnov test. Then we will examine the status of the research variables. In the end, we will verify or reject the proposed hypotheses using structural equation modelling.

- Normality test (measurement of the normality of the distribution of variables)

  Kolmogorov-Smirnov (K-S) test was used to show the normality or non-normality of distributions (variables). In this test, if the calculated sig is greater than 0.05, the distribution is normal and parametric tests can be used to analyze the data; Otherwise, non-parametric tests are used. In the following, the variables of this research were measured using the K-S test and their normality or abnormality was determined as follows:

Table 2: Kolmogorov Smirnov test (K-S)

Test result	**A significant amount**	**Kolmogorov-Smirnov**	**Components**
normal	0.19	1.07	Competitive intelligence network
normal	0.21	1.059	Competitive Advantage
normal	0.123	1.180	Marketing capabilities
normal	0.18	1.09	Business performance

The results of table 2 show that the variables of competitive intelligence network, competitive advantage, strategic marketing capabilities and business performance have a normal distribution. According to the results obtained in this part, we will use the t-test of an independent sample to determine the status of the research variables.

- Average test of a population (T test)

  The independent one-sample T-test is used to compare the mean of a variable with a hypothetical or expected number. In fact, by using this test, we will investigate whether the condition of the research variables is appropriate or not. The hypotheses presented in this section are designed as follows:

Table 3: Sample t-test results

Average value equal to 3						
95% confidence interval for the difference		difference in averages	Number	Degrees of freedom	the amount of significant	**Components**
lower limit	upper line					
1.2025	1.0199	1.11063	0.000	216	26.908	Competitive intelligence network
1.2366	1.0583	1.14747	0.000	216	25.365	Competitive Advantage
1.0831	0.9046	0.99386	0.000	216	21.943	Marketing capabilities
1.2027	1.0190	1.11060	0.000	216	23.904	Business performance

According to the tables 3, the value of sig, which means the significant number for the variables, is less than 0.05, and therefore, at the error level of 5%, the null hypothesis is rejected and the hypothesis one, which includes the

claim of the researcher, is confirmed. As a result, the average value of this variable has a significant difference with the number 3.

Also, since the values of the upper limit and the lower limit (both of which are positive) and considering that the value of $t > 1.96$, we conclude that the average of these variables is greater than 3 and this means that the variables are from the situation They are favourable.

- Structural equation modelling

A measurement model is a part of the overall model that includes a variable along with questions related to that variable. To check the fit of measurement models, three criteria of reliability, convergent validity and divergent validity are used. Reliability itself is done in three ways by examining factor loading coefficients, Cronbach's alpha coefficients, and composite reliability.

Factor loadings of all questions and t coefficients are given in Table 3. According to Holland, the criterion value for the appropriateness of factor loading coefficients is 0.4. In the present study, as it is clear from table 4, factor loadings above 0.4 and t coefficients above 1.96 were obtained for all questions. which shows the appropriateness of the questions related to each dimension, in other words, each of the questions can well build its own structure.

Cronbach's alpha coefficient is a classic criterion for measuring reliability and a criterion for evaluating internal consistency. Internal consistency indicates the degree of correlation between a construct and its related indicators. A value of Cronbach's alpha higher than 0.7 indicates acceptable reliability. However, in the case of variables with a small number of questions, the value of 0.6 is the upper limit of Cronbach's alpha coefficient.

Since Cronbach's alpha criterion is a traditional criterion for determining the reliability of structures, the PLS method has introduced a more modern criterion than alpha, called composite reliability. As a result, both of these criteria are used to better measure reliability in the PLS method. If the composite reliability value for each construct is above 0.7, it indicates the appropriate internal stability for the measurement model.

Convergent validity is the second criterion used to fit measurement models in the PLS method. The AVE criterion shows the degree of correlation of a structure with its indicators, the higher the correlation, the better the fit. Fornell and Larker [9] introduced the AVE criterion (average variance extracted) to measure convergent validity and stated that in the case of AVE, the critical value is 0.5. This means that the value of AVE above 0.5 shows acceptable convergence validity

In the current research, as seen in Tables 4 and 5, the results of Cronbach's alpha coefficient, composite reliability and convergent validity are given, which according to the limits mentioned for all 3 criteria in the tables, We conclude that Cronbach's alpha and composite reliability coefficients for all variables in the research are greater than 0.7 and AVE values are greater than 0.5.

Table 4: The results of Cronbach's alpha coefficient, composite reliability and convergent validity

Composite reliability coefficient ($Alpha > 0.7$)	**Cronbach's alpha coefficients** ($Alpha > 0.7$)	$AVE > 0.05$	**Title in the model**
0.93	0.82	0.52	Competitive intelligence network
0.91	0.90	0.78	Competitive Advantage
0.86	0.80	0.69	Marketing capabilities
0.86	0.81	0.52	Business performance

Table 5: The results of Cronbach's alpha coefficient, composite reliability and convergent validity related to independent and dependent variables

Composite reliability coefficient ($Alpha > 0.7$)	**Cronbach's alpha coefficients** ($Alpha > 0.7$)	$AVE > 0.05$	**Title in the model**
0.95	0.94	0.65	Competitive smart grid
0.95	0.95	0.58	Business performance

Divergent validity is the third criterion for examining the fit of measurement models, which examines the comparison of the correlation between the questions of a construct with that construct versus the correlation of those questions with other constructs. Table 6 shows the different validity of the research model. As it is clear in the table taken from the method of Fornell and Larker [9], the root value of the AVE of the variables in the present study, which are located in the houses in the main diameter of the matrix, is from the correlation value between them, which is in the lower and left houses of the main diameter of the order. are given, it is more. Therefore, it can be stated that in the above model, the constructs (latent variables) in the model interact more with their questions than with other constructs. In other words, the validity of model divergence is at a reasonable level.

Table 6: Divergent validity results

Structures	Competitive smart grid	Competitive Advantage	Marketing capabilities	Business performance
Competitive smart grid	0.83			
Competitive Advantage	0.69	0.72		
Marketing capabilities	0.57	0.71	0.75	
Business performance	0.57	0.71	0.71	0.80

Another test to evaluate the measurement model is its quality check test. The quality of the measurement model is calculated by the index of commonality with cross-validity (Cv Com). This index actually measures the path model's ability to predict observable variables through their corresponding latent variable values. If this index shows a positive number, the measurement model has the necessary quality. To check the entire measurement model, the average of this index is taken and if it is positive, the entire measurement model is of good quality. The results of this test are given in table 7 and as you can see, this index is positive for all the variables in the research and the total average of this index is 0.63, which shows the good quality of the measurement models.

Table 7: The results of the measurement model quality test

Cv Com	Title in the model
0.78	Competitive smart grid
0.69	Competitive Advantage
0.52	Marketing capabilities
0.57	Business performance

According to the values obtained and presented in the above tables, all the criteria we have used to check the measurement model show the appropriateness of the measurement part of the model.

- Checking the structural model

  Unlike measurement models, the structural model has nothing to do with the questions (manifest variables) and only the hidden variables are examined along with the relationships between them. In the review of the structural model, the significance coefficients of z (t-values), the criterion and the criterion of the structural model are examined. The results of these criteria are listed in the form of tables in the analysis.

  The first criterion of examining the fit of the structural model is the significant coefficients z. If the value obtained above the minimum statistic is considered at the reliable level, that relationship or hypothesis is confirmed. At the significance level of 90%, 95%, and 99%, this value is compared with the minimum t statistic of 1.64, 1.96, and 2.58, respectively.

  The second criterion for examining the structural model is the coefficients related to the endogenous (dependent) hidden variables of the model. and it indicates the effect of an exogenous variable on an endogenous variable, and three values of 0.19, 0.33 and 0.67 are considered as the criterion values for weak, medium and strong values. The more related to the endogenous structures of a model, the better the fit of the model.

  The third criterion for examining the structural model; This means that if the relationships between the structures are properly defined in a model, the structures will be able to have a sufficient impact on each other's indicators, and in this way, the hypotheses will be properly examined. In the case of all endogenous structures, three values of 0.02, 0.15 and 0.35 have been determined as low, medium and strong predictive power.

  According to the results of table 8, the t values for all questions are greater than 1.96 and are significant at the 95% confidence level. The values of t for most paths are from 1.96 and even 2.58, which shows the correctness of the structural relationships between the variables of the model. The results of this measure are given in Figure 1 and Table 10.

  According to table 8, the value for the main endogenous variables is more than 0.67, which is acceptable and desirable.

  According to table 9, since the amount of endogenous structures of the model is more than 0.33, it shows the strong predictive power of the model regarding this structure and once again confirms the fit of the structural model of the research.

  Therefore, all the criteria we used to measure the structural model show the optimal fit of the structural model.

- Checking the overall model

Table 8: Coefficients of research variables

Description	R^2	Title in the model
Three values of 0.19, 0.33 and 0.67 as the criterion value for weak, medium and strong values, respectively.	0.884	Competitive smart grid
	0.719	Competitive Advantage
	0.796	Marketing capabilities
	0.712	Business performance

Table 9: Coefficients of research variables

Description	Q^2	Anticipatory structures
Three values of 0.02, 0.15 and 0.35 are low, medium and strong prediction power, respectively.	0.433	Competitive smart grid
	0.365	Competitive Advantage
	0.412	Marketing capabilities
	0.300	Business performance

The general model includes both parts of the measurement model and the structural model, and with the confirmation of its fit, the examination of the fit in a model is complete. There is only one criterion called GOF to examine the fit of the overall model. The GOF criterion was invented by Tenenhaus et al. [20] and is calculated according to the following formula. Three values of 0.01, 0.25 and 0.36 have been introduced as weak, medium and strong values for GOF.

In the calculation $\overline{Communalities}$ is only related to the first order structures and the second and third order structures do not play a role in the calculation of the average shared values. But in calculating the value of all the structures, including the first and second order, it is taken into account.

The mean value of shared values is 0.63 and the mean value is 0.76. According to the following formula, the standard value of GOF equal to 0.69 was obtained, which shows the strong fit of the overall research model according to the above classification.

Table 10: The results of the general fit of the model with the GOF criterion

Description	GOF
Three values of 0.01, 0.25 and 0.36 are weak, medium and strong fit, respectively.	$GOF = \sqrt{\overline{Communalities} \times \overline{R^2}} = \sqrt{0.63 \times 0.76} = 0.69$

In order to investigate the sub-hypotheses of the research by using the variables examined in the main model of the research, we have done modeling using smart pls software, which is shown in figure 1 of the model related to the sub-hypotheses of the research. In this model, Cronbach's alpha coefficient, AVE and composite reliability coefficient are all higher than the standard value. Also, the value of the GOF criterion for the model related to the sub-hypotheses of the research in Figure 1 was equal to 0.66, which shows the high fit of the model.

5 Conclusion

One-sample T-test was used to check the status of the competitive intelligence network. A significance level of 0.000 indicates that this variable has a favorable situation. The result of this test is shown in table 3. In this section, in order to confirm or reject this hypothesis, we use the coefficients obtained after running the model, which were obtained after running the model with the method of structural equation modeling with the partial least squares approach using Smart pls2 statistical software and shown in table 10. The results of Table 10 and Figure 1 show that the coefficient of significance between the two variables of competitive intelligence network and business performance is calculated equal to 4.601, which is more than 2.58. The higher value of the t statistic than the limit of 2.58 shows that according to the collected data and with a probability of 99, we conclude that the hypothesis proposed in this section regarding the influence of the competitive intelligence network on business performance is confirmed. Also, the beta coefficient (effect coefficient) between these two variables in this model is equal to 0.231, which shows the good effect of the competitive intelligence network on business performance.

To check the state of competitive advantage, the sample t-test has been used. A significance level of 0.000 indicates that this variable has a favorable situation. The result of this test is shown in table 3. In this section, in order to confirm or reject this hypothesis, we use the coefficients obtained after running the model, which were obtained after running the model with the method of structural equation modeling with the partial least squares approach using Smart pls2 statistical software and shown in table 10. The results of Table 10 and Figure 1 show that the coefficient of significance between the two variables of competitive advantage and business performance is calculated equal to 1.556,

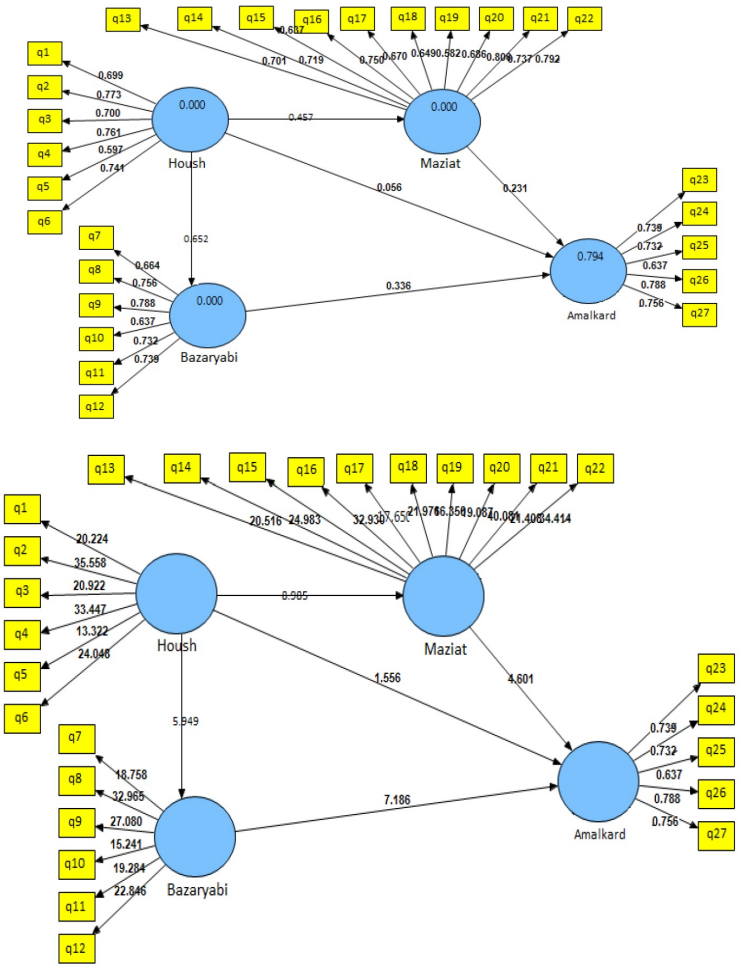

Figure 1: Standardized factor loading coefficients and t-values coefficients of the research structural model (sub-hypotheses)

which is less than 1.96. The fact that the value of the t statistic is less than the limit of 1.96 shows that according to the collected data and with a probability of 99, we conclude that the hypothesis proposed in this section that the competitive intelligence network influences business performance with the mediating role of marketing capabilities is rejected. Also, the beta coefficient (effect coefficient) between these two variables in this model is equal to 0.056.

To check the status of marketing capabilities, a sample T-Tech test has been used. A significance level of 0.000 indicates that this variable has a favorable situation. The result of this test is shown in table 3. In this section, in order to confirm or reject this hypothesis, we use the coefficients obtained after running the model, which were obtained after running the model with the method of structural equation modeling with the partial least squares approach using Smart pls2 statistical software and shown in table 10. The results of table 10 and figure 1 show that the coefficient of significance between the two variables of marketing capabilities and business performance is calculated equal to 7.186, which is more than 2.58. The fact that the value of the t statistic is greater than the limit of 2.58 shows that according to the collected data and with a probability of 99, we conclude that the hypothesis proposed in this section that the competitive intelligence network influences business performance with the mediating role of marketing capabilities is confirmed. Also, the value of the beta coefficient (effect coefficient) between these two variables in this model is equal to 0.336, which shows the good effect of the competitive intelligence network variable on business performance with the mediating role of marketing capabilities. The competitive intelligence network has an effect on performance with a significant number of 7.363 and an impact factor of 0.209. Calof and Wright [7] confirmed the relationship between the competitive intelligence network and organizational learning using the Pearson test with an impact factor of 0.559. Foss and Lyngsie [10] have also investigated the effect of competitive intelligence network on organizational innovation in a research. In this research, researchers have used structural equation modeling, which has been confirmed with a significant number of 2.827 and an influence coefficient of 0.306.

Based on the findings of the present research and comparing these results with similar researches, as a general conclusion, it can be said that the role of online competitive smart network has a very high impact on business performance with the mediating role of marketing capabilities and competitive advantage of active production and distribution companies in Tehran's petrochemical industry. The obtained correlation coefficient shows that the intensity of this effect is also very high. After that, the network of competitive intelligence, competitive advantage and marketing capabilities respectively have the greatest effect on the business performance of the companies active in the production and distribution of petrochemical industries.

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