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Evaluating the Impact of Managerial Decisions on Production Costs Using the Leveling of Effective Factors

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Abstract

the aim of this study was to assess the impact of internal and external decisions on the cost of industrial products. the research method is applied and quantitative. the statistical population of the study is experts and experts in academia and industry that 25 people were selected as the sample size by theoretical saturation method. a researcher - made questionnaire was used to collect data. validity was confirmed by experts and reliability was confirmed by cronbach 's alpha. the results of quantitative data were analyzed by interpretive approach. the results showed that a total of 31 factors in the five categories of sales and marketing factors, investment factors, production factors, legal factors and price elasticity factors have an important role in the cost of industrial products that were placed in levels 2, 1, 4, 4 and 3, respectively. therefore, when making decisions about determining the cost of the products in question, continuous attention should be paid to these internal and external factors.

Keywords: *internal and external organizational decisions, cost of industrial products, structural - interpretive approach.*

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1. Introduction

One of the important information in organizations, especially for manufacturing sectors, is the calculation of the cost of manufactured goods. Companies whose cost of manufactured products is lower compared to their competitors achieve greater profitability [1]. Therefore, the cost of producing goods is an important and significant issue in the field of management of manufacturing organizations [2]. Various characteristics can affect the calculation of the cost of manufactured goods, one of the most important of which is the decision-making variable [3]. According to Kahneman [4], decision-making is made in two areas, one includes intra-organizational decision-making and the second includes extra-organizational decision-making. Intra-organizational decision-making refers to all arrangements that can be made by senior managers, but extra-organizational decision-making is made by managers or institutions from outside the organization that are likely to affect the activities of an organization. In recent years, many manufacturing companies in the world have become companies that want to implement a cost leadership strategy in order to reduce organizational and customer costs [5]. Traditional cost systems have also failed to provide accurate, timely, and reliable information for managers to make decisions in the areas of pricing. Therefore, new methods have been proposed [6]. One of the most important challenges for industrial companies is to decide on the optimal product mix. In fact, due to resource limitations, the product mix must be chosen in a way that creates maximum benefits. Various methods have been proposed to solve this problem. Therefore, one of these methods is the theory of constraints, which provides useful information for decision-making. [7].

Not being clear about the definition of the cost price of services and products in companies with industrial products is one of the most important challenges. because there is no complete and comprehensive definition of the cost and the definitions mentioned can not respond to such things as unabsorbed costs, administrative and organizational costs and depreciation costs and so on. considering these costs is very important because of its effect on tariffs and pricing. in addition, advanced analytical tools can help businesses discover trends and cost patterns, identify cost - saving opportunities, and predict future manufacturing company costs based on historical data and algorithms. in this regard, the aim of this study is to level the factors affecting the impact of internal and external decisions on the cost of industrial production.

1.1. Theoretical Literature

1.1.1. Definition of Decision Making

Lee et al. [1] describe decision making as a complex process that involves a variety of intellectual abilities as well as having information about the decision we want to make. Liang [8] considers decision making to be the choice of one way between different ways. decision making is the study, identification and selection of options based on the values, priorities and justifications of the decision maker. decision - making consists of several stages, in which one must first determine the options and then choose the best option that is in harmony with the goals, lifestyle, values and desires of the people. decision making is the process of selecting the most preferred option with rule among other options. decision making is involved in all aspects of life including purchasing decisions, voting, career choices, etc. decisions are usually accompanied by uncertainty about the external world and personal conflicts, priorities and preferences, and the decision - making process often begins with the information - gathering stage and proceeds to the final stage of selection after a possible evaluation [9].

internal decisions in any organization are made by senior managers of the organization periodically, often monthly. these reports are prepared from the performance of the organization including the cost of products, material consumption, purchasing report and other important reports of industry and production process. internal decisions can be considered as one of the types of management reports, because these reports are presented to managers for detailed analysis of the financial and production performance of the organization [10]. after presenting the output, the manager will be responsible for analyzing the internal decisions, accountants will only prepare the report accurately; then the managers will be responsible for analyzing and making decisions about them. internal decisions are often made and used in manufacturing firms. The most commonly used types of in-house decisions are in manufacturing establishments, because managers want to know the details of the production process. therefore, they need reports such as cost report, material consumption report, goods report during construction, purchase, waste, etc. [11].

out - of - organization decisions are a type of reports that after the approval and review of the managers of the organization, they are exposed to others. these reports

examine the financial condition of the organization as a whole. reports such as financial statements, profit and loss, balance sheet, etc. are such reports that generally review financial accounts. These reports do not go into detail with smaller parts of the organization, such as production and materials, etc. [8]. the structure of external decisions is different from internal decisions. because the purpose of these decisions is outside the organization and must comply with national standards. since the purpose of external decisions is to show the economic situation of the company to other organizations, it is necessary to follow the same format. For example, the balance sheet, in the same format, is determined according to national laws and basic accounting standards. external decisions represent the economic policy of the organization. the periodic performance, success or failure of the organization and the ability to manage the organization can be inferred from the external report [12].

1.1.2. Internal and External Decisions

Internal Decisions: Intra-organizational decisions in each organization are prepared by senior managers of the organization on a periodic basis, often monthly. These reports on the organization's performance include the cost of products, material consumption, purchasing reports, and other important reports on the industry and production process. Intra-organizational decisions can be considered a type of management report, because these reports are presented to managers for detailed examination and analysis of the organization's financial and production performance [10]. After presenting the output, the analysis of intra-organizational decisions will be the responsibility of the manager, accountants only prepare detailed reports; then the analysis and decision-making about them is left to managers. Intra-organizational decisions are often prepared and used in manufacturing institutions. The most common use of intra-organizational decisions is in manufacturing institutions, because managers want to be aware of the details of the production process. Therefore, they need reports such as cost reports, material consumption reports, work-in-progress reports, purchases, waste reports, etc. [11]. Internal organizational decisions refer to reports that focus on the financial performance of the organization's internal departments. These reports include a lot of details of financial information during the organization's processes. Given that these reports are prepared based on the needs of internal managers, they include information that, in addition to showing financial performance, can affect the process of activities. An organizational manager wants to know how much of the costs are consumed in each department. And can he reduce or optimize costs? For this reason, the items that come in internal organizational decisions do not need to be mentioned in external organizational decisions [13]. The purpose of internal organizational decisions is to examine the ability, find strengths and weaknesses, research the institution's performance, evaluate and control activities. All these goals are made possible by analyzing correct internal organizational decisions. The characteristics of intra-organizational decisions are that they are clear and obvious, have no ambiguous points, are complete and comprehensive, and contain sufficient information [2].

External Decisions: External decisions are a type of report that is exposed to others after being approved and reviewed by the organization's managers. These reports examine the financial conditions of the organization in a comprehensive manner. Reports such as financial statements, profit and loss, balance sheets, etc. are reports that generally examine financial accounts. These reports do not go into detail with the details of smaller parts of the organization such as production and materials, etc. [8]. The structure of external decisions is different from internal decisions. Because the purpose of these decisions is outside the organization and must comply with national standards. Since the purpose of external decisions is to show the company's economic situation to other organizations, it is necessary to follow the same format. For example, the balance sheet is determined in the same format according to national laws and basic accounting standards. External decisions indicate the economic policy of the organization. The periodic performance, success or failure, and ability of the organization to manage the organization can be inferred from the external report [12]. External decisions are prepared periodically in all organizations and companies. Unlike internal decisions, which are optional, external decisions are made in any company that has an accounting unit. Even in external decisions, the first users are the organization itself because managers want to measure their economic success after a financial period. After manager's review and study, these decisions are exposed to external factors. Therefore, the evaluation of external decisions is first carried out by managers and then by external influencers such as the tax office, bank, shareholders, etc. [14]. Given that they have the same structure, external decisions often pursue similar goals. Unlike internal decisions that can be changed according to the needs of the

institution and have high flexibility, the goal of external decisions is to obtain the economic performance of the organization in financial periods. Managers become aware of their progress by reviewing these decisions and comparing them with previous periods. External users each use these decisions according to their own needs. To achieve the goal, decision-making is necessary. And the decision-maker must choose and apply one of the existing strategies. The quality and nature of this strategy, the nature of environmental factors outside the organization's control, and the power of competitors and the nature and intensity of their competition with the organization are among the factors on which the success or failure of the decision-maker in achieving the goal depends [15]. Koontz et al. [16] believes that decision-making constitutes the principle and basis of planning. Because it is obvious that a plan, program, policy, and guideline cannot exist unless someone, somewhere, has made a decision. The manager usually considers decision-making to be his main task, because in practice he observes that he must constantly think about what path to choose and what to do, who to assign and make responsible for what, and when, where, and how the work should be done.

1.1.3. The Role of Decision Making in the Cost of Products

one of the important factors for managers not to use financial information is that they do not have the necessary quality information. according to the research findings, if financial information has the necessary quality, management will use them in its decisions. of course, not all of the qualitative characteristics of accounting information are equally effective on the use of management accounting. a variety of accounting information in decision making helps managers that cost items are among this information. the organizational goals of managers are very diverse. some goals that have been repeatedly emphasized are: profitability, growth and financial self - sufficiency, minimizing the cost, etc. in the efforts to achieve the above goals, managers usually engage in four main activities including decision - making, planning, leadership of operational activities and controlling [11].

although each manager makes his or her own decisions in a relatively different way, most of them agree with the following steps in the decision - making process:

1. problem definition 2. solution identification 3. data collection 4. decision making. perhaps the most important step in the decision - making process is to define the problem because all subsequent activities of the process depend on this step and the incorrect definition of the problem is a waste of time and resources. once the problem is defined, the question arises as to how to solve it. there is usually more than one solution to solve problems, so the most appropriate solution is chosen. managers may need a variety of information to facilitate decision - making. some of this information may be qualitative, others quantitative, part internal and part external. some information may be based on past prices and events and others on managers ' expectations of future prices and events [9].

2. information, regardless of its nature, should be relevant. it is important to separate the information about the problem under investigation from irrelevant information [1].

in the decision - making process, a single variable is often not superior to other variables or factors, but several decision - making criteria interfere with each other and affect each other. unlike qualitative information, accounting information is quantitative and handleable and often provides effective assistance to decision - making managers. this is a growing need for accounting information to meet internal requirements as well as to provide financial reports to interest groups outside the business unit. among the accounting information, cost accounting information, which is collected daily, is considered. the effective and useful analysis of cost information will largely depend on understanding the ways in which the cost components are found, as well as on the perspective on the problem, and will vary depending on the long -, medium - and short - term perspective of the decision taken.

given that the cost is presented in detail in many internal reports, in this study, the decision - making process based on cost analysis is investigated. this study deals with how to decide on the choice of a solution from among possible solutions and the role of cost items in these decisions. in these decisions, a solution is selected from among the available solutions that is aimed at bringing the organization closer to its desired goals [10].

1.1.4. Empirical Literature

jalalpour et al. [17] conducted a study entitled modern methods in cost accounting. They believe that profit motivation is the most effective driver of business management. One of the most important ways to achieve this goal is to calculate the costs that are allocated for the production of goods or the provision of services. by calculating the cost and analyzing it, we can provide

strategic and encouraging responses to shareholders and stakeholders in addition to proper cost management.

medical conducted a study titled " " the investigation of industrial accounting methods, analysis of financial statements and calculation of the cost of sugar and sugar in manufacturing plants " ". for this purpose, according to the environmental conditions, the company should have an assessment of the current and desirable situation so that it can adopt and implement the most appropriate strategy. management accounting can be effective by introducing new costing systems and reducing costs, introducing new management techniques and solving problems and obstacles of companies in order to achieve their success.

Javadpour et al. [18] have written an article on the application of ABC and TOC models in pricing products. comparison of the results obtained through the paired t - test statistical model of the two dependent populations showed that the TOC model provides more relevant results in the short run and for specific orders. also, the results of this study indicate that TOC and ABC models are complementary in sales decisions.

lee [1] conducted a study entitled costing kaizen, a variety of novel costing methods in cost management accounting. in order to plan and control cost reduction, comprehensive and efficient tools are needed for evaluation. costing of kaizen results in improvement of machinery performance, reduction of waste, increase of training and motivation of employees to encourage them to identify and perform additional routine repairs. ~~~ therefore, it can improve the cost and quality of performance.

sand conducted a study on the structure of cost accounting systems and information quality characteristics. the results show that accounting information system is a component and element of the company that provides the basis of decision making to users by processing financial events, financial information and cost accounting information. in fact, the system designed in cost accounting for processing information or accounting information system should provide information that is relevant, reliable, timely and accurately presented and useful for the decision making in question.

oro et al. [19] conducted a case study of constraint theory in the order production environment. in the case study of the analysis, the conservation capacity of non - bottleneck resources was used as a key factor when subscribing an order - based system to a bottleneck. in addition, the results are consistent with one of the two key factors defined by the literature, namely conservation capacity and conservation inventory.

James Cox [20] conducted a study titled using the theory of continuous improvement constraints processes to address the problem of implementing a production scheduling system. This theory improves the manufacturing process and when implemented across production planning systems, the cost can be significantly reduced. in addition, quality and timeliness can be significantly increased.

Herbert Simon [21] is a researcher who has conducted many studies on the concept and mechanism of decision-making. In his opinion, management and decision-making are two words that have the same meaning and are synonymous. In addition to Simon, another group of experts have also defined management and decision-making as one and the same and have considered management to be nothing but decision-making and believe that the main focus of management is decision-making and that performing tasks such as planning, organizing, or controlling is actually nothing but making decisions about the way and how to perform these activities. According to Drucker, the emphasis of future management is on the decision-making process and understanding this process. In the opinion of this group of researchers, the principle of management is decision-making, because it is through and by decision-making that the manager performs all his tasks.

To achieve the goal, decision-making is necessary. And the decision-maker must choose and apply one of the existing strategies. The quality and nature of this strategy, the nature of environmental factors outside the organization's control, the power of competitors, and the nature and intensity of their competition with the organization are among the factors on which the success or failure of the decision maker in achieving the goal depends [15].

Koontz [16] believes that decision-making constitutes the essence of planning. Because it is obvious that a plan, program, policy, and guideline cannot exist unless someone, somewhere, has made a decision. The manager usually considers decision-making to be his main task, because he practically observes that he must constantly think about which path to choose and what to do, who to assign and be responsible for what, and when, where, and how the work should be done. Even organizations operate without consensus. Another manager of an automobile company had hired a consultant to research and find out who ultimately decides in his company to build a new model of car. The

consultant's answer was that probably no one in particular makes the decision.

One person designs a car model, another examines its engineering issues, and like a snowball, thousands of decisions and actions are added to this ball. Another person may design a bumper for him, and so on. The car is designed. Of course, the issue may be raised and recorded in a moment at a board meeting, but perhaps the decision was made at that moment when the company manager reached such a conclusion to build a new car six months ago during a visit to the production line. [22]

The decision-making process deals with issues such as determining the desired profit, obtaining and accessing raw materials, labor, and machinery, estimating production volumes, and establishing a communication system that enables reporting and controlling actual results compared to predetermined plans, and an industrial accounting information system that enables effective communication, continuous information transfer, accountability accounting, and management flexibility.

following the increasing progress of trade, science and technology in recent decades, numerous large and numerous companies and manufacturers have been created and their numbers are increasing every day. this has led to a variety of goods with different quality and prices entering the markets. in these markets, there is heavy competition. therefore, companies to maintain their competitive advantage in today 's dynamic and changing environment with iodine can adapt to changes and create the ability to predict and respond to them. therefore, simultaneous attention to factors affecting internal and external organizational decisions has an important role in pricing of industrial products that has not been considered in previous studies.

2. Methodology

this research is an applied and quantitative research in terms of data collection. at first, concepts related to cost and also the issue of internal and external decisions were explained by library studies, theses and publications, etc. then, by studying and reviewing the previous related researches, the dimensions and components affecting the model were measured using interviews of experts and experts. the statistical population of the study is experts and academic experts with a background on the cost of industrial products that 25 people were selected as the sample size by theoretical saturation method. a researcher - made questionnaire was used to collect data. validity was confirmed by experts and reliability was confirmed by cronbach 's alpha. the interpretive approach of quantitative data was analyzed.

3. Findings

3.1. Confirmatory Factor Analysis

confirmatory factor analysis (cfa) is a method that shows the extent to which the measurement items of a construct have been correctly selected. in fact, in this method, it is determined whether the questions that have been selected in a questionnaire to measure each factor is appropriate or not. Considering that the obtained values are more than 00.5 and the items are confirmed.

Table 1. Results of Confirmatory Factor Analysis

subcomponents / Factors	Sales and Marketing Agents	Factors of investment	Factors of production	Legal factors	price elasticity factors
Marketing	0.764				
Advertise	0.735				
Distribution and Sales	0.793				
Shipping and Shipping	0.744				
Manpower	0.784				
Overhead construction		0.755			
Investing		0.876			
Amount of profit		0.765			
Volume and number of sales		0.711			
Pricing		0.744			

subcomponents / Factors	Sales and Marketing Agents	Factors of investment	Factors of production	Legal factors	price elasticity factors
Depreciation costs		0.790			
Production capacity			0.773		
The energy consumed.			0.865		
Quantity Discounts			0.843		
Level of technology			0.712		
Inflation				0.764	
Taxes and duties				0.777	
Market competition				0.705	
exchange rate				0.815	
Bank interest rate				0.790	
Possible license fees				0.792	
Terms and conditions of association				0.798	
Import and Export				0.766	
Market demand					0.743
Price of energy carriers					0.744
Price of raw materials					0.833
The nature of the market					0.732
Competitor price					0.762
Market boom or recession					0.769
price elasticity					0.755
Successor goods					0.811

3.2. Normality of Data

the normality of the data distribution should be checked by calculating skewness and elongation to determine how far the data distribution is from the normal distribution. the study of table 2 shows that the data distribution of all subcomponents of the model is normal because the skewness and elongation are between -1 and -1.

Table 2. Testing the Normality of Data Distribution

Elongation*	Dispersion†	Dimensions
0.533	0.633	Sales and Marketing Agents
0.732	0.546	Factors of investment
0.289	0.656	Factors of production
0.308	0.376	Legal factors
0.478	0.409	price elasticity factors

3.3. Linear Analysis of Subcomponents

another presupposition required to perform data analysis is to investigate the absence of multiple linearity of variables. in order to investigate this condition, variance inflation rate (vif) and tolerance are used. If the inflation factor is above 5 and the tolerance is less than 0.1, it means that there is a co-linearity between the variables. As shown in Table 3, the dimensions of the model do not have a

* Kurtosis
† Skewness

variance inflation rate greater than 5 and a tolerance of less than 0.1, so there is no multiple linearity between the dimensions of the model.

Table 1. VIF Test to Check Multiple Non-Coherence

Tolerance	Rate of VIF	Model Dimensions
0.433	2.207	Sales and Marketing Agents
0.535	1.870	Factors of investment
0.454	2.874	Factors of production
0.266	1.791	Legal factors
0.209	1.901	price elasticity factors

3.4. investigation of divergent validity (diagnostic) for dimensions of research model

one of the methods for measuring this validity is fornell - locker test. table 4 shows the results obtained for the dimensions of the research model. the following table shows that the constructs are completely separated, i.e., the original diameter values for each hidden variable are greater than the correlation of that dimension with the other reflected hidden dimensions in the model.

Table 4. Fornell Locker Index for Evaluating Diagnostic or Divergent Validity Index

5	4	3	2	1	Dimensions	row
				1	Sales and Marketing Agents	**1**
			1	0.831	Factors of investment	**2**
		1	0.886	0.764	Factors of production	**3**
	1	0.449	0.789	0.490	Legal factors	**4**
1	0.406	0.891	0.691	0.499	price elasticity factors	**5**

3.5. Structural and Interpretative Modeling

Step 1. Formation of Own Matrix - Interactive Structure

At this stage, the relationship between factors in a two - to - two form, using structural interpretive modeling and the use of the conceptual relationship " " lead " " was analyzed. this matrix is a matrix of the dimensions of the factors mentioned in the row and column of the factors matrix. The matrix table consists of the symbols that are most frequent in the opinions of experts. The results are as follows:

Table 5. Structural Self - Interaction Matrix

5	4	3	2	1	Factors
O	**V**	**A**	**V**	**X**	Sales and Marketing Agents
A	**O**	**V**	**O**		Factors of investment
X	**O**	**V**			Factors of production
V	**A**				Legal factors
V					price elasticity factors

Step 2. Primary Access Matrix

To obtain the access matrix, the symbols above must be converted to zero and one. According to the following rules, the initial access matrix can be obtained.

- If the house (I, J) is given a symbol V in the structural self-interaction matrix, the

corresponding house in the access matrix gets one and the corresponding house gets zero.

- If the house (I, J) is given the symbol A in the structural self-interaction matrix, the corresponding house in the access matrix gets one and the corresponding house gets zero.
- If the house (I, J) is given the symbol X in the structural self-interaction matrix, the corresponding house in the access matrix gets one and the symmetric house gets zero.
- If the house (I, J) is given an O symbol in the structural self-interaction matrix, the corresponding house in the access matrix gets one and the symmetric house gets zero.
- If i = j, the corresponding house in the access matrix gets one.

Table 6. Primary Access Matrix

5	4	3	2	1	Factors I J
0	**1**	**1**	**1**	**1**	Sales and Marketing Agents
1	**1**	**0**	**1**	**0**	Factors of investment
1	**0**	**1**	**1**	**0**	Factors of production
1	**1**	**1**	**0**	**0**	Legal factors
1	**0**	**1**	**0**	**0**	price elasticity factors

Step 3. Final Access Matrix

After the initial access matrix has been obtained, it must be internally consistent, so that if (i, j) is important and (j, k) is relevant, then (i, k). they 're connected. In this matrix, the influence strength and dependence of each stimulus are also shown. The results are shown in Table 7, and the numbers that are marked *, show that in the first access matrix, they are zero and after adaptation, they become one.

Table 7. The Ultimate Access Matrix

The power of influence	5	4	3	2	1	Factors I J
5	**1***	**1**	**0**	**1**	**1**	Sales and Marketing Agents
4	**1**	**1**	**1***	**0**	**0**	Factors of investment
2	**1**	**0**	**0**	**0**	**0**	Factors of production
2	**0**	**0**	**0**	**1**	**0**	Legal factors
2	**0**	**0**	**1**	**0**	**1***	price elasticity factors
	3	**3**	**3**	**3**	**4**	Amount of dependence

Step 4. Levelling

To determine the relationships and leveling factors, the set of outputs and set of inputs for each stimulus were extracted from the received matrix. the set of outputs included the factors themselves that were affected by it. the set of inputs included the factors themselves and the set of factors that influenced it. then, the set of mutual relations (common) of each of the factors was determined. that is, the number of stimuli that were repeated in both input and output sets, the factors were leveled based on the obtained sets. Typically, factors that have the same output set and set of two-way or shared relationships form high-level hierarchical factors. for high - level stimuli, they will not be the source of any other stimulus. when a high level is defined, it is separated from other stimuli. the results are presented in table 8.

Table 8. Leveling of Factors

surface	Total Subscriber	Output set	The Verory Collection	Factors
2	2.3.5	.2.3.4.5.6	1.2.3.5.7.25.26.27.28	Sales and Marketing Agents
1	.2.4.5	.2.4.5.6	.2.4.5.7.20.21.22.23.24	Factors of investment
4	4	.4	.3.4.6.7.8.17.18.19	Factors of production
4	.4.5.7.8	.4.5.6.7.8	.4.5.7.8.29.30.31	Legal factors
3	.2.3.4.5	.1.2.3.4.5	.2.3.4.5.6.7	price elasticity factors

Step 5. Analysis of Penetration Strength and Degree of Dependence

In this step, the influence power - dependence matrix of factors was extracted which according to the influence power and dependence rate were divided in four regions. four areas are: independence, dependence, communication and influence. factors that had the least degree of dependence and influence power on other variables were placed in zone 1, which was called the goband independence zone. these elements are somewhat borderline from other factors and have few connections. factors that had high dependence and low influence on other factors were placed in zone 2, which is called dependency zone. factors that have a high degree of influence and a high degree of dependence, and in fact have a two - way relationship, are in the area of communication, which is called zone 3. Any change in these types of factors will result in a change in other factors. finally, the factors that had high penetration and low dependence were placed in the area of penetration, which is known as zone 4.

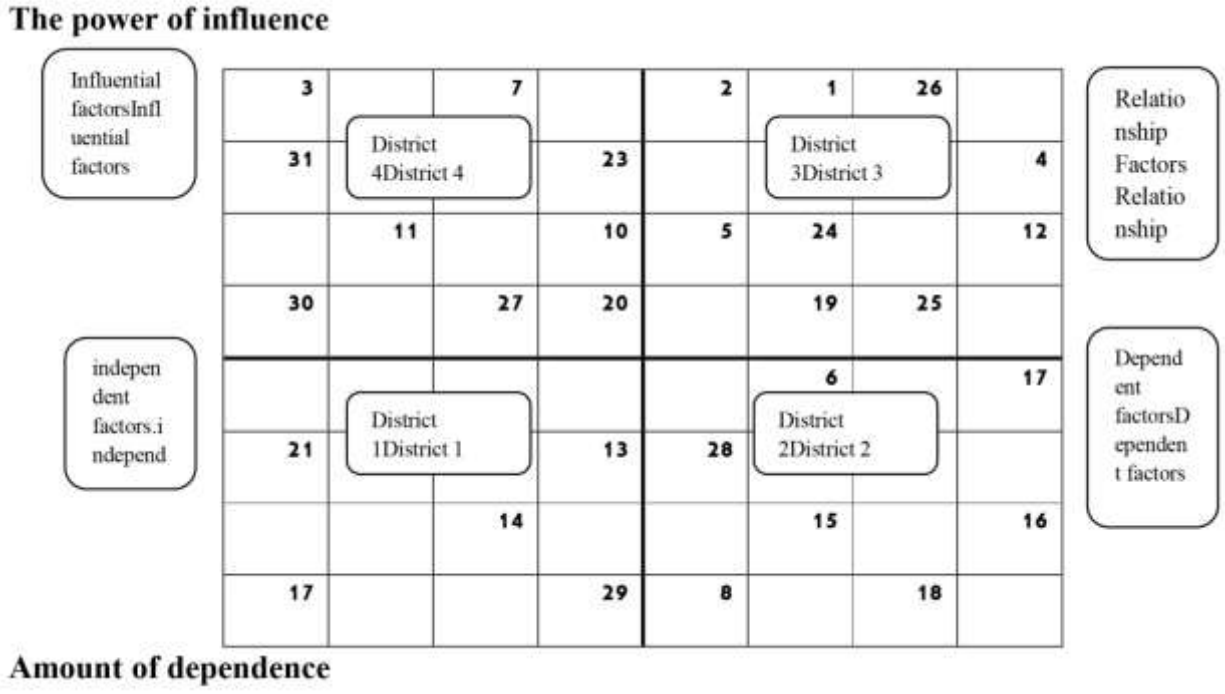

Figure 1. Penetration Strength Diagram - Degree of Dependence

In figure 1, the position of all factors in the penetration strength - degree dependence diagram is shown. Classification of factors based on their influence power and dependence rate shows that there is no stimulus in Zone 1 or Independence Zone, i.e. with low influence power and low dependence rate. in zone 2 monitoring and monitoring, the

factors that are located in zone 3 and any change in such factors will cause changes in other factors. in area 4, factors are located that these factors have little dependence on other factors.

4. Discussion and Conclusion

in this study, the effects of internal and external organizational decisions on the cost of industrial products were investigated. the findings showed that 31 factors including sales and marketing factors, investment factors, production factors, legal factors and price elasticity factors have an important role in the cost of industrial products that were placed in levels 2, 1, 4, 4 and 3, respectively. these findings are consistent with the results of pacheco et al. [23] and Otku [24] in the components of technology level, inflation, taxes and duties, Zineb [25] and akersei in the components of bank interest rate, cost of possible permits, duran and infoldans et al. and demeter [26] in the components of raw materials, market nature, price of competitors. in explaining these findings, it can be stated that by allocating more rewards to employees by increasing the percentage of profit allocation to the reward after the first year, which is a very small amount of reward, with the passing of the middle years and at the end of the simulation period due to the increase in the company 's profit and consequently, the reward of employees, their motivation reaches the highest level and consequently, the production capacity with the highest efficiency is exploited. also, with increasing the company 's production, the fixed costs of production are amortized and with increasing the production, exports are also increased and the proceeds of that increase the profits to a great extent. buying high - quality parts reduces the cost of repair and maintenance and increases profitability by reducing the cost and increasing the production capacity. ~~~ in general, the costs of buying these parts, which were paid at the beginning and part of it was provided from the accumulated profits, are added to the company 's profits. with the release of energy prices in the last few years, the share of energy costs in the production process has increased. on the other hand, due to the lack of a proper culture in energy consumption, a significant share of production costs is spent on energy costs. ~~~ therefore, investment for renovation and improvement of the industrial unit in order to reduce energy consumption is another way to reduce production costs, which is necessary for energy audit and reform of production lines by experts. machinery and modern technologies have a direct relationship with the amount of waste, production capacity and production speed. in this regard, the modernization of machinery and the use of modern technology have a significant role in reducing production costs. khaliqi stated that according to the machinery law, in 10 years of their absolutism, he said that since in most of the production units technology and technical knowledge is of great importance, changing the machinery and updating them will increase the quality of the product and production capacity, and by reducing waste with fewer raw materials, more products will be produced. therefore, the managers of industrial units, by observing the changes in technology and its impact on the production process, should remove their machinery from the cycle earlier than 10 years and update it. currently, modes of transportation in the country are by no means cheap. Many developed countries have invested heavily in the rail transport sector to move large volumes of goods at lower cost, greater security, and so on. currently, weakness in rail, air, sea and even road transportation in the country and high costs of transportation insurance have a strong impact on competitiveness. therefore, this section is a category that requires macro planning at the national level.

rent costs of property, water and electricity costs in retail units have caused more expensive products to reach the consumer. on the other hand, distributed and retail distribution of products will increase transportation costs for the industrial unit. therefore, creating large chain stores or creating sales branches for the industrial unit can bring the product up to 10 percent lower than the market price to the consumer. khaliqi emphasized that entering the field of direct distribution depends on the ability of the industrial unit, adding that this method is often effective in the food and clothing industries due to the diversity in the product produced and entering the field of direct distribution through sales branches, chain stores and ... can bring the product to the consumer at a lower price, but this method is highly dependent on the unit power. to reduce the cost of raw materials, a single version cannot be complicated for industries, but proximity to the source of raw materials can be one of the cost reduction factors, for example, industries that depend on mineral raw materials should be close to the site of mines. in this study, the results are presented for a set of companies, so doing research to separate each company in order to achieve more accurate results can be another requirement for future research. the results obtained from the companies under study are not generalizable to other societies and caution should be taken to generalize.

therefore, other companies can also use the results presented for the cost of their products through localization.

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Authors equally contributed to this article.

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Declaration of Interest

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Ethical Considerations

All procedures performed in this study were under the ethical standards.

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