Designing a business model based on competitiveness in the petrochemical industry

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Abstract

In today's era, businesses are increasingly faced with dynamic and changing environments, and many businesses are not only not creative, innovative, and entrepreneurial, but they are also unable to coordinate with the developments, advances and changes of this era, and often with Traditional inefficient methods continue their trend and on the other hand, in the international competitive environment, businesses are looking for competitive power to survive. In this research, we seek to investigate and identify the components of the business model based on competitiveness in the petrochemical industry and finally design and present the relevant model for the growth of this field in the petrochemical industry. Therefore, according to the research purpose, future research was conducted using the research synthesis method. Since reviewing and summarizing the findings of past studies is an important step in drawing a comprehensive picture of the implementation of international financial reporting standards, their synthesis will be considered. In the first step, with a comprehensive search of sources, the samples needed for the source will be obtained, and in a 3-step refinement, articles related to the qualitative research method were selected from them. Concepts were extracted from the articles and categories were extracted by rereading the concepts. Finally, 93 sub-codes were extracted that indicate the factors affecting the business model of the petrochemical industry based on competitiveness. In the next stage, using these codes and according to the proximity of their meanings and definitions, 31 axial codes (themes) were defined. In the last stage, the themes were compiled under the four main components of market conditions, customer category, cost and profit, and administrative and organizational structures.

Keywords: competitiveness, petrochemical industry, business model, research synthesis
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1 Introduction

In recent years, there has been a strong interest in the concept of business models in academic research. This interest is increasing not only from business schools but also in various scientific groups such as system management, strategy, technology management, international business and sustainable development [17]. Researchers consider business model studies as a valuable link that connects different theories. The business model can be considered a new

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concept in management because, until the end of the nineties, this concept was not used much in management texts. The main reason for this can be seen as the transition from traditional business activities to Internet-based business activities in those years [45].

The business model is a picture of the organization in a situation that can describe its current or future situation. But the formation of the new business idea, the development of the current business model and the leadership of new industries are the focus of research on business model innovation [11]. Today, companies must have a competitive advantage in the face of economic development and consider the field of free market competition. To have a competitive advantage, companies need continuous innovation activities [40]. Today, in the theories of economic growth and development, innovation in the production process is considered one of the most important factors that determine the development and long-term growth of countries' economies. Innovation provides the possibility of increasing profits and market share of companies and results in higher economic growth [21]. Competitive advantage is mainly in the value that the company can create for its customers. Based on this theory, studies related to innovation in business have been linked to the relationship between innovation in terms of products, markets, workforce, culture and their relationship with organizational performance [32].

According to Chikán [5], firm competitiveness (FC) is a structure in which the analysis of the firm is embedded in its macro-level contexts and is investigated by economics, business and management studies. "Corporate competitiveness is the ability of a firm to sustainably realize its dual purpose: to meet customer demand at a profit. This capability is achieved through the supply in the market of goods and services that customers value more than the goods offered by competitors. Achieving competitiveness requires constant adaptation of the company to changing social and economic norms and conditions [5]. With the expansion of technology, the shape and image of businesses have changed and the boom of the Internet has created new businesses [24]. In these businesses, all steps are done with complete speed and integrity, and factors such as communicating with customers, knowing the target market for sales, knowing the activities of competitors, attracting customers, etc. are done more easily [30]. This change and evolution have progressed in such a way that there is no need for a person to be present and communicate continuously with customers [18]. In today's era, all aspects of business such as operations and even management are done using modern technology tools. These developments have changed all sectors of the industry and transformed the way of providing service to customers [42].

The petrochemical industry is operating as one of the most important economic sectors of the country. In recent years, due to the various economic, political and government system problems of these companies and most importantly the spread of the COVID-19 virus, many issues and problems have been created for businesses as well as the petrochemical industry in order to reduce production and also reduce demand [17], and to get out of the existing problems, the traditional business model has faced a decrease in functional efficiency and changing business processes has become an important issue for this industry.

According to the stated issues, today the petrochemical industry has become competitive and companies need to gain a competitive advantage, and the way of interacting with customers has become more important in today's businesses. These connections can be formed in real or virtual space. Considering the environmental changes that have occurred and the dynamics of the market and more changes that are ahead of us, firms in the petrochemical industry should pay attention to equipping and updating their processes and technologies, identifying the needs and expectations of customers, and paying attention to the market conditions in advance. to succeed Firm competitiveness is mostly studied from the perspective of strategic management, and from the perspective of operations, it has rarely been the subject of analysis. Considering the stated issues and the lack of research conducted in the field of business models in the petrochemical industry, as well as the lack of research in the field of competitiveness in the business models of this industry and the existing research gaps in this field, the present study seeks to present a business model based on competitiveness in the petrochemical industry is to solve the existing gaps the main question of this research is what are the main components of the business model based on competitiveness in the petrochemical industry?

2 Methodology

In this research, we seek to investigate and identify the components of the business model based on competitiveness in the petrochemical industry and finally design and present the relevant model for the growth of this field in the petrochemical industry. Therefore, according to the purpose of the research, the upcoming research was conducted as a research synthesis [8, 9]. Since reviewing and summarizing the findings of past studies is an important step in drawing a comprehensive picture of the implementation of international financial reporting standards, their synthesis will be considered [35]. In the first step, with a comprehensive search of sources, the samples needed for the source

will be obtained, and in a 3-step refinement, articles related to the qualitative research method were selected from them [50]. Concepts were extracted from the articles and categories were extracted by rereading the concepts.

Meta-regression including BR

Step 1:Residuals are generated from

$$y_i = \alpha + \beta^{\mathfrak{C}} \mu_i + u_i + \sigma_i \varepsilon_i$$

where

y_i is the observed mean difference from study i

α and β are the intercept and slope of the regression, respectively

μ_i is the observed mean response of the control arm in study i

u_i is a random effect term, $u_i \sim N(0, \tau2)$

$\sigma_i \varepsilon_i$ is the random error term where σ_{i2} is the sample variance of y

Step 2: Regression Test

- Regression test on residuals following adjustment for BR with standard error as the predictor

- Regression test on residuals following adjustment for BR with sample size as the predictor

- Regression test on residuals following adjustment for BR with inverse sample size as the predictor

Step 3: Regression Test

- Regression test on residuals following adjustment for BR with standard error as the predictor

$$residual_i = \alpha + \beta(s.e.\ residual_i) + \varepsilon_i$$

  where $\varepsilon_i \sim N0, \quad s.e.\ residual_i 2\varphi$

- Regression test on residuals following adjustment for BR with sample size as the predictor

$$residual_i = \alpha + \beta\ sample.size_i + \varepsilon_i$$

  where $\varepsilon_i \sim N0, \quad s.e.\ residual_i 2\varphi$

- Regression test on residuals following adjustment for BR with inverse sample size as the predictor

$$residual_i = \alpha + \beta\ 1/sample.size_i + \varepsilon_i$$

  where $\varepsilon_i \sim N0, \quad s.e.\ residual_i 2\varphi$

3 Findings

The use of research synthesis, business model based on competitiveness was examined from the point of view of experts [13, 14, 15]. The extracted results show that the dimensions and components of the business model based on competitiveness in the petrochemical industry can be categorized into 9 categories: interdepartmental partnership, quality assurance, interactivity, increasing technical capabilities and innovation, brand promotion, portfolio policy , economic needs, organizational development, increasing sales and exports.

First step: Grounded theory

Grounded theory was used to extract codes [10, 34, 48, 49].

The second question of the research: How is the prioritization of these dimensions and components?

Second step: review the texts in a systematic way

In this stage of synthesis, the researcher systematically searches for articles published in various journals and selects relevant keywords. Various keywords used to search for articles in the research are presented in Table 3.

Table 1: dimensions and components of the business model based on competitiveness in the petrochemical industry from the experts' point of view

| Number	Class	Code
1	Interdepartmental partnership	Growth of participation
		Financial growth and stability
		Increasing the health of products and services
2	Quality guarantee	Reducing customer dissatisfaction
		Reducing organization disruptions
		Increasing personal and psychological adaptation
3	Interactivity	Increase employee confidence
		Maintaining the independence of the organization
4	Increasing technical capabilities and innovation	Development of technical capabilities and capabilities
		Increasing creativity and innovation
5	Brand promotion	Financial growth
		ready for change
		Developing employee skills
6	Collection policy	Strengthening the beliefs and values of the organization
		Reduce technical problems
		Improvement and correction of management
		Reducing structural problems
7	Economic needs	Increase and promote brand compatibility
		Reduce vulnerability
		Empowerment of employees
		Increasing social participation
8	Organizational development	Development of social relations
		Strengthening the skills of employees
		The growth of contingent participation
9	Increase sales and exports	Improving the technical situation
		Updating educational methods and increasing quality
		Training of organizational values
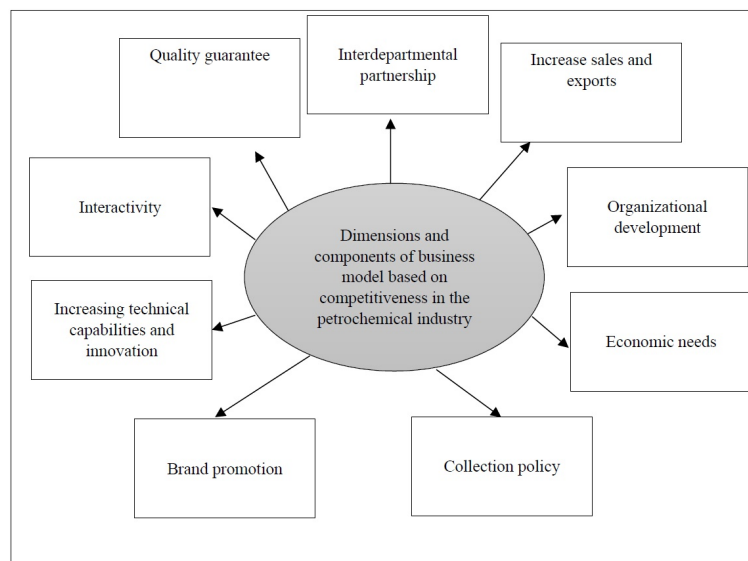
Figure 1: The necessity of addressing the business model based on competitiveness in the petrochemical industry

Table 2: Journals used in the research

Journal	
Journal name	Frequency
Emerald	98
Elsevier	54
Ebsco	79
Springer	21
Willy	14
Total	267

Table 3: Keywords of the research

Keywords
Business model
Petrochemical industry
Competitiveness

To answer the second question, a suitable model was obtained using the research narrative method. In this research, various articles from Emerald-Elsevier-Springer-Ebsco databases were reviewed between 2000 and 2023. Various keywords were also examined to search for research articles. As a result of searching and checking different databases, magazines and search engines and using the desired keywords, 267 articles were found.

The selected articles in this phase have been done according to the main question of the research, and the acceptance criteria are articles that have mentioned the dimensions of business models and their components in a partial or general way.

Third step: searching and choosing suitable articles

In this research, the texts have been examined in terms of the relevance of the title to the purpose of the research, availability, relevance of the abstract, relevance of the content and finally evaluation of the methodology. The tool used to check the methodological quality of the research is the "Critical Evaluation Skills Program". This tool contains ten questions that help determine the accuracy, validity and importance of qualitative research studies [7]). Based on the 50-point scale of the critical research evaluation skills program, the following scoring system is proposed and any article that is lower than a good score (below 30) is removed. This program is an index that helps the researcher determine the accuracy, validity and importance of qualitative research studies. Based on this index, the research objectives, the logic of the research method, the research design, sampling, data collection, reflectivity, ethical considerations, precision in the analysis, the expression of the findings, and the value of the research are examined [41].

Fourth step: extracting the results

In the current research, the information of the articles is extracted as follows: in the first column of the article row, the second column is the article code, the third column is the bibliographic information related to each article (including the last name of the author along with the year of publication of the article), in the fourth column the codes extracted, the fifth to the seventh columns of methodological information, the eighth column of the score received based on the CASP evaluation list, and the ninth column of the quality rating of the articles. The results are presented in Table 4. It is common to assign a code to each artifact to increase the speed and accuracy of retrieval. For this purpose, MEM code was used for review articles, MAP code was used for research articles, K code was used for books, and FAK code was used for book chapters.

Table 4: Data classification

Data		
Code	Frequency	References
Value provided	18	[1, 3, 12, 20, 22, 28, 31, 33, 37, 38, 43, 46, 47, 51, 55]
Accessibility	7	[2, 26, 52]
Product differentiation	14	[19, 36]
Designing	3	[4, 6, 44]
Brand	5	[25, 52]
Price	9	[16, 56]
Risk reduction	12	[23, 47, 58]
Products and Services	8	[4, 19, 25, 29, 36, 39, 53, 57]
Customer desire	7	[39, 54]

Fifth step: experiment and analysis and integration of qualitative findings

In the current research, we first consider all the factors extracted from the studies as codes according to Table 5, then considering the concept of each of these codes, we categorize them in a similar concept. In this way, we form the concepts (themes) of the research. In Table 5, the factors are briefly shown.

Based on the findings of the above table, 93 sub-codes were extracted by analyzing and examining the factors

Table 5: Classification and coding of related categories

Market conditions	New Income Flow
	Various Products
	More Efficient Supply Chain
	The Possibility of Easier Competition
	Potential Access To All Customers
Customer category	Customer Satisfaction
	Detailed Information
	Easier And Faster Access
	Easier Classification Of Customers
	Get Customer Feedback More Easily
Cost and profit	Reduce Management Costs
	Supply Chain Cost Reduction
	More Profitable Products
	Reduction Of Intermediation
	Sales Increase
Administrative and organizational structure	Easier Drawing Tasks
	Easier Implementation Of Innovations
	Fewer Administrative and Organizational Structures
	Easier Communication
	Reduction Of Human Population

affecting the business model based on competitiveness in the petrochemical industry. In the next stage, 31 axial codes (themes) were defined by using these codes and according to the proximity of their meanings and definitions, and in the last stage, the themes were compiled under the four main components of market conditions, customer category, cost and profit, and administrative structure and were placed in an organization.
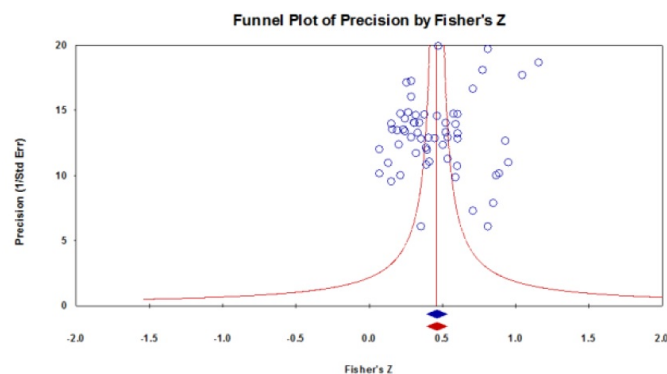

Figure 2: Funnel diagram about evaluation of publication bias or publication error

4 Discussion and conclusion

In this research and by reviewing the process literature, the components related to business processes were reached in such a way that each of these components was included in the definitions of business models, these components were activity, information sources, non-material sources. Information, input/output, purpose, time, technology, laws and stakeholders involved in business processes, during the research, these components have been used as business process components in the formation of business models.

Based on the findings presented in the form of the above framework, it can be said that companies in the field of business model based on competitiveness will be successful if they have a comprehensive view of the components of their work processes, which means that in order to integrate the activities of the processes take steps by standardizing activities and forming performance criteria related to each activity. It should focus on issues such as the timeliness of process information, clarity or in other words common understanding of process information, the level of attention to details of work information, the accuracy and availability of information, the integrity of databases, attention to process knowledge, the level of sharing Placement and integration of physical resources or inventory management, physical flow management and budget management are focused on the processes.

In this research, the presented indicators were actually with the purpose of business model based on competitiveness in the petrochemical industry, so when it shows its value more when it is possible to practically use these indicators in the direction of business based on competitiveness in the petrochemical industry used in the organizations and based on the evaluations provided, the organizations realized their weaknesses and strengths in this field and took action to correct their weaknesses and improve their strengths. Therefore, based on the case study that was conducted in Rahbar Informatics Services Company, a company that works in the field of information technology, to evaluate the integrity of each of the components in different organizational units and in the whole organization, to evaluate the integrity of each of the units And the evaluation of the integrity of the whole organization was done, which is followed by the results of the cases along with suggestions to improve this company.

In the field of business model based on competitiveness in the petrochemical industry and among the reviewed sources, there was no example that looked at this issue with a macro view, and the presentation of the above framework expresses a new perspective on this issue. However, among the few cases that have dealt with this field, we can point to the results of a research called "Moving towards a business model based on competitiveness in the petrochemical industry", in this article, it shows the aspect of information resources in integrated Business processes have mentioned and according to the specified indicators, it shows that if information sources are integrated in the levels of availability, transparency, timeliness and the level of attention to detail, business processes have reached a high level of integration. The above research has introduced the determination of a tool to measure process integrity as a suggestion to other researchers [27]. The presented framework of the current research has considered more comprehensive and complete indicators compared to this research.

Limitations

According to the research done, the limitations of the current research are as follows:

A small number of experts and consultants related to the subject who have sufficient experience and information in the field under discussion.

During the search, only Farsi and English articles were considered and other languages were not reviewed.

The search was done online only.

5 Suggestions

Considering that not many studies have been conducted in the field of business models based on competitiveness in the petrochemical industry to evaluate it, and comprehensive models and frameworks have not been presented so far, and in fact, there is no clear understanding of this concept, so the direction to reach To have a clear understanding of the business model based on competitiveness in the petrochemical industry and its evaluation as well as the use of its benefits, there is a need to conduct more and wider studies in this field. In this regard, the following research topics can be suggested:

- Presenting a business model based on competitiveness in the petrochemical industry, taking into account the opinions of more experts, as well as in the larger society and in various other industries.

- Comparing business model based on competitiveness in one organization with another organization or in one industry with another industry

- Conducting research with meta-analysis (quantitative) and comparing it with meta-synthesis (qualitative)

- Identifying obstacles facing organizations in integrating business processes

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