



## Research Paper

# Identifying the dimensions and components of fundamental and strategic innovation with fuzzy Delphi technique

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**Abstract**

The purpose of this research is to identify the dimensions and components of important factors of fundamental and strategic innovation in petrochemical design and construction companies. The research method is qualitative and applicable. Two methods of documentary study and fuzzy Delphi have been used to collect data. The statistical population of the research includes 10 experts (university professors in the field of management) who were selected in a purposeful way and their opinions were extracted using the fuzzy Delphi method. In order to prioritize factors affecting fundamental and strategic innovation, the standard factor analysis model coefficients of the final model were used. The component of revolutionary technologies with a standard coefficient of 0.93 is in the first place, the component of innovation in the market with a standard coefficient of 0.86 is in the second place, the component of innovation in the development and planning of human resources is in the third place with a standard coefficient of 0.85, the component of emerging new industries with a standard coefficient of 0.83 in the fourth place, the component of innovation in organizational processes and organizational structure with a standard coefficient of 0.82 in the fifth place, the component of product innovation with a standard coefficient of 0.78 in the sixth place, and finally the operational capability component with the standard coefficient of 0.75 was ranked seventh.

**Keywords:**

fundamental innovation, strategic innovation, development and planning of human resources, operational capability.

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## Extended Abstract

### Introduction

Today, due to facing the tidal waves of global changes (social, technological, economic), it is no longer possible to compete with major global competitors in the traditional way in the economy through only one type of innovation, and if a company wants to face ruthless competition in a resilient world needs to quickly change the way it does business. For this, it requires a type of innovation that helps the institution or business to adapt to the changing business environment as quickly as possible by applying appropriate forms of innovation (Faghih et al, 2018). Strategic innovation with a holistic and systematic approach is what institutions and organizations can benefit from in order to maintain competition. In that case, strategic innovation is a combination of innovation and strategy (Haghshenas Keimasi, 2018).

Large organizations, including petrochemical design and manufacturing companies, are facing political obstacles, internal conflicts, oil prices, geopolitics, and economic tension, which is one of the needs of these large organizations. Unaligned motivations, organizational structures that focus on existing operations, or personal motivations can affect innovation decision-making (Mirza et al, 2022). Executive managers also invest too much on their popular projects or spend a lot of resources on ideas they have created themselves. Depending on the gradual or radical innovation, there may be differences regarding how to apply them and which one is more important. Current researches have not provided specific factors regarding the difference in criteria depending on the innovation (Kranz, 2021). When an idea is created, organizations choose which one to put more in the implementation phase. It is at this point that the considered critical factors are applied to the selection process. It should be noted that the innovation selection process is different for radical and gradual innovation ideas. We should note that the linearity of the process of gradual innovation does not exist for radical innovation. For managers, it is important to recognize this tension (Vergera et al, 2021).

In this research, the researcher intends to answer the basic question that what are the important factors of fundamental and strategic innovation in petrochemical design and construction companies and how are these factors ranked?

### Theoretical framework

Brink (2022) conducted a research entitled "Organizing to activate strategic innovation in the sense of horizontal leadership for the duality of stability and change". The statistical population is service companies in Paris. The research method was descriptive-analytical and purposeful sampling. The results of the research showed that while being creative and creating ideas seems very easy, being innovative and implementing these ideas and accomplishing them in a regular way is very difficult.

Baregheh et al. (2022) conducted a research entitled "The role of governance and strategic innovation in organizational learning". The statistical population includes industrial companies in England. The research method is Correlation and the sampling method is random simple. The research results showed that the level of industrial governance and organizational strategic innovation can play an effective role in improving people's learning and organizational performance.

### Methodology

This research is considered a developmental research according to its purpose, and since in this research we are also looking to solve a problem under the title of important factors of fundamental and strategic innovation, the research method is applicable. Also, based on the



research plan and in terms of data collection, the current research is a descriptive (non-experimental) research and three methods; document study, Delphi, and survey were used to collect information, so there is a kind of trinity in the method. The collection tool in this research is a semi-structured interview form. The statistical population of this research includes 10 academic experts (academic professors in the field of management) whose views were extracted and refined by means of targeted sampling and using the fuzzy Delphi method. In the fuzzy Delphi technique, experts usually present their theories in the form of verbal variables, then the average of the experts' opinion (numbers presented) and the amount of disagreement of each expert are calculated from the average, and then this information is sent to the experts to obtain new theories.

### Discussion and Results

In order to prioritize factors affecting fundamental and strategic innovation, the standard factor analysis model coefficients of the final model were used. The results showed that the important factors of fundamental and strategic innovation are 7 dimensions: "Innovation in the development and planning of human resources", "Innovation in organizational processes and organizational structure", "Innovation in the product", "Innovation in the market", "The birth of new industries", "operability", "revolutionary technologies" and 45 indicators. The component of revolutionary technologies with a standard coefficient of 0.93 is in the first place, the component of innovation in the market with a standard coefficient of 0.86 is in the second place, the component of innovation in the development and planning of human resources is in the third place with a standard coefficient of 0.85, the component of being born New industries with a standard coefficient of 0.83 in the fourth place, the component of innovation in organizational processes and organizational structure with a standard coefficient of 0.82 in the fifth place, the component of product innovation with a standard coefficient of 0.78 in the sixth place, and finally the operational capability component of the standard coefficient of 0.75 was ranked seventh.

### Conclusion

The current research was conducted with the purpose of identifying the dimensions and components of fundamental and strategic innovation with the fuzzy Delphi technique. The results of this research are consistent with the findings of researchers such as Baregheh et al. (2022), Hübel et al. (2022), Tayebi Abolhasani et al. (2020) and Taherpour Kalantari & Hosseini (2020); effective organizational communication can reduce intra-organizational communication barriers, and extensive extra-organizational communication keeps the organization in sync with the complex technological environment that is rapidly changing (Gharagozlu, 2018). By creating cooperation and respect in the organization, which provides a cooperative and reliable environment between employees and managers, as well as increasing the willingness to take risks and the willingness to innovate among employees in the organization, the organization can be synchronized with technological innovations. Omitting intra-organizational communication barriers, creating a cooperative environment in the organization, flexibility and readiness of employees to accept changes and pay attention to the ideas of new employees are more important in this dimension (Ghanbari, 2019). Management systems have an impact on technological innovation by supporting idea generation (through sending employees to exhibitions and conducting visits) and operationalizing ideas (through team building, establishing a proposal system and creating creativity and innovation mechanisms). Organizational structure shapes employees' activities to achieve common organizational goals (Dinesh, 2021). Based on the obtained results, it is suggested that the company should continuously try to develop



the knowledge of the employees in the direction of its goals. In this regard, the creation of groups in which interaction and exchange of opinions take place and tacit knowledge transferred from one person to another is emphasized. Managers should also consider material or spiritual rewards for the innovative activities of their employees. Finally, in order to create less concentration in the organization, it is better to delegate authority according to the responsibilities and duties of the members of the organization, and in order to create less complexity in the organization, organizational units should be placed in a network or horizontal manner.