

An investigation into the technology-based strategy under development of international business at Ezam holding company

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Abstract: In current dynamic economy, information technology is considered as a vital tool to access competitive advantage and innovation within companies. The extent to which invested in this area has been largely increased in recent decades. Holding company is defined as a Parent Company that includes several affiliated companies, and has control over these companies to achieve a high value creation. Subsidiary companies of holding company are recognized as Subsidiaries. Strategic technology-based planning must be in line with comprehensive planning within holding companies. Indeed, IT department and other organizational units must strive to achieve common aims so as to get the desired outcomes. What considered as alignment between technology-based strategy and business refers to proper use of information technology to achieve aims and strategies of holding companies to enter to competition in international arena. In this study, a series of systematic questions to examine as alignment between technology-based strategy and business are addressed: what technologies support product and market strategy, what technologies are effective to create competitive advantage in markets, helping for adding or reducing costs, what technologies support new plans within market?, and etc. give a response to such questions requires more activity and more comprehensive understanding, and cannot be simply replied.

Key words: Technology-based Strategy; International Business; Ezam Holding Company

1. Introduction

In current dynamic economy, information technology is considered as a vital tool to access competitive advantage and innovation within companies. The extent to which invested in this area has been largely increased in recent decades. Yet, as a majority of investments on technology are not aligned with strategy and business benefits, this has resulted in reducing effectiveness and efficiency. Indeed, in recent years, information technology has been developed where less attention has been drawn on its enabling role in business area (Tseng, 2008). Such a concern on alignment between information technology and business has been listed in senior managers' concerns. Lack of alignment, in addition to fading out strategic role of information technology within organization, will be followed by many losses including decrease of efficiency in information systems, lack of integration of information, lack of support from business processes, lack of support from organizational decisions and etc. (Lankhorst, 2005). Such costs as well as economic pressures resulted from Lack of alignment necessitate support from information technology and use of an approach to integrate business with technology. Strategic alignment results in an access to sustainable competitive advantage, improved business performance, better understanding of information technology investments as well as improved

strategic planning in information systems; such a strategy is proposed in success of holding companies (Chen, 2010). Holding companies have a long record in business arena which plays a major role in economy of countries, yet knowledge on how to manage them is just little. Today, there are a large number of holding companies in Iran, where statistics indicate that creation of executive agencies and privatization of government bodies goes beyond in Iran. Yet, act for privatization to minimize governmental companies that have decided upon development is just a difficulty. A major act to minimize government is mentioned as creation of holding companies and assigning them to private part. Privatization by providing competition arena and creating a governing system on market obliges private institutions to have more efficient performance rather than public sectors (Allan et al., 2013). Holding company is defined as a Parent Company that includes several affiliated companies, and has control over these companies to achieve a high value creation. Subsidiary companies of holding company are recognized as Subsidiaries. In viewpoint of Richard Lynch, holding companies are those companies which own different businesses, and an investment company owns Shares of different businesses in majority. In some businesses, holding company might have control over its affiliated businesses by having the share lower than 50% (Lynch, 2006). How to control holding companies that are a group of companies is not the same as controlling a typical company, where planning and

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strategic control within holding companies that affect decision makings, monitoring and control over hierarchy and authority are totally different from the ones which go on in typical companies. Holding companies usually by means of different tools and methods control and conduct affiliated companies, where this relies on type of business in subsidiary companies and their relationship with each other.

2. Classification of technology strategy

There are a variety of classifications at technology area, yet less works have been proposed at the area of technology strategies. In the early works, the classification for technology strategies has been mainly proposed based on time.

Freeman divides technology-based strategies to six groups:

-offensive: it is prepared for acquiring leadership (Pioneering) in technology and market to supply new processes and products.

-Defensive: Being prepared to deliver a product to market, right behind the pioneer.

-Imitative: Imitative means a company mimics an innovative company's products, in case defensive strategy aimed to produce products that are optimized products of pioneers.

-Dependent: based on dependent strategy, a company acknowledges acting as subsidiary or a subset of a stronger company.

Traditional: it is based on the strategy used in the companies that act in the industries in which market does not ask for change, and there is no obligation for competition.

-Opportunistic: this acts based on business strategy with suitable situation.

Markides has introduced four types of information technology strategies: pioneering, rapid follow, minimization of costs, and expertise.

Sharif has identified four types of technology strategy, and examined the features of each type and its relation with business strategies. These four types of technology strategy include: IT leadership strategy, IT Pursuit strategy, IT Utilization strategy, continuing strategy of technology.

Basant has considered four classifications for strategy in the context of technology, including: Research and development, Purchase of foreign technology, the combination of these two strategies, Remain passive in the process in terms of technology.

3. An overview on literature review

In the vast literature on international cooperation, the models as follows have been mentioned: Porter model, Hax and Majluf model, Ford and Scraen model, Burgelman and Maidique model and Chiesa model;

3.1. Porter model

Michael Porter in 1980 introduced the concept of the value chain, completed it in later years. He divides the activities in an economic entity in his value chain to two main and support categories:

Technology strategy in view of porter addresses technology selection, Scheduling introduction of new technology and sale, or maintaining current technology, where the process of technology strategy formulation in Porter's model has been developed from the stages as follows:

- Identify all the major and prominent technologies in a value chain.

-Identify technologies to other industries or technologies in the stages of development with the potential to be used in value chain.

- Determine the likely direction of change of key technologies.

-Determine which technologies and potential technology-based changes are of importance for competitive advantage and industry structure.

-Evaluate capabilities of a company in important technologies and cost for improving operations.

-select a technology strategy that all important technologies cause improving competitive advantage.

-enhance technology strategies in company (porter, 1985) (Same source).

3.2. Hax and Majluf model

This model has been proposed in 1984 based on Analysis of Strategic Technology Unit (STU). Strategic Technology Unit (STU) means skills and systems in which products and processes are applied.

In this model, Strategic Technology Unit (STU) must be determined based on corporate strategy and business strategy. Technology strategy formulation is proposed using combined Strategic Technology Unit (STU).

Technology strategy in this model associates to technology selection, Scheduling introduction of new technology, the methods to access selection technology for projects to achieve technology, evaluation, resources allocation, organizational infrastructure control (Hax and Majluf, 1996).

3.3. Ford and Scraen Model

This model has been proposed in 1996, where technology strategy speaks out about creation, retention and exploitation of technology, in which technology elements include how to access technology, technology management, and how to exploit from technology. Exploitation can be in domestic or foreign areas.

The stages of technology strategy formulation in this model include Technology Audit, identification of technologies that success of entity relies on them, division of technologies to main, tangible and external technologies, evaluation of technologies existing in entity, assure the highest return on capital of all the investments on technology.

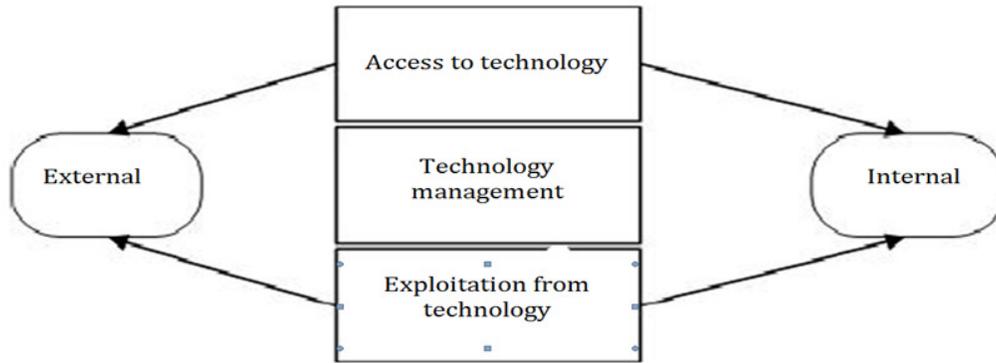


Fig. 1: Technology strategy elements in view of Ford

3.4. Burgelman and Maidique model

In this regard, experience from technology-based strategy implementation affects technologic competencies and also future technology-based strategy.

In this model, technology strategy is derived from Firm's technological competencies. Indeed, this model addresses periodic process of operating technology-based strategy formulation, in which revision of formulated strategies is fundamental in strategy formulation. In viewpoint of Burgelman and Maidique, technology-based strategy encompasses four facets that the first facet is regarded as competitive facet. Competitive facet addresses Technology selection, scheduling introduction,

obtaining or granting license and etc. this facet encompasses those behaviors together with technology that affect competitive position of entity. The second facet is the facet of value chain to get to know adopted decisions affect which part of value chain. The third aspect is the aspect of resource commitment.

The more resources committed to implementing formulated technology, technology-based strategy will be better understood. Finally, fourth aspect will be management aspect. This aspect draws attention to appropriateness of technologies with organization. Appropriateness of technology with organizational structure, manpower and etc. are taken into account (Burgelman et al., 2001).

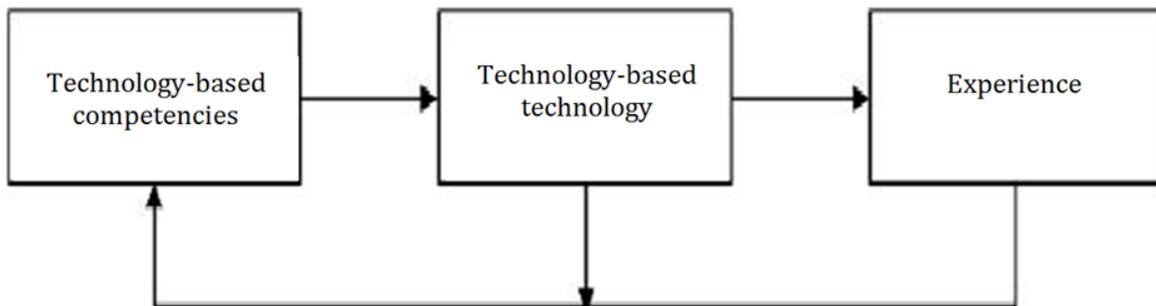


Fig. 2: Technology strategy model in view of Burgelman and Maidique

3.5. Chiesa model

This model has been proposed in 2001. In viewpoint of Chiesa, forecasting external environments as well as internal environment named context foresight affects all elements of technology-based strategy. Indeed, based on forecasting the future, it can address selection, scheduling and the way to access technology. Technology selection is resulted of five important factors: the first is to which extent a technology associates to entity's activities and aims. The second is which risks will be resulted from investment in access to technology. The third is to which extent technology will sustain,

if achieved, and to which extent competitors will have an access on it. The fourth is to which extent the affiliated technologies to the given technology are provided, and to which extent it can utilize the future opportunities by an attempt to achieve a technology. In this model, Scheduling is divided into two types: technology development scheduling and technology introduction scheduling. To formulate technology strategy in this model, firstly Product Matrix Technology is depicted. At this stage, technologies and products are embedded in the matrix. Investment in technologies embedded in each matrix cell brings about changes in the Firm competencies. This model suggests that firstly the

firm must deepen competencies with have recourse on developing new applications of existing technologies. Thereafter, it must make an effort to develop competencies by have an investment in new applications of existing technologies. At the next stage, it must decide upon attracting technologies exposed to converting to firm competencies, and achieving refreshment of competencies. Technologies which destruct competencies must be recognized as soon as possible in order to use them in creating future competencies (Chiesa, 2001).

4. Research method

Methods combined of different themes and interpretations have been defined in literature reviews. Yet, a common point in all of them lies on a fact that mix method is a research method in which two quantitative and qualitative methods are both used. In other words, mix research methods is a research method in which a researcher combines elements of quantitative and qualitative methods to reveal barriers existing in research and understand phenomena (Burke Johnson, 2007). This study has focused on mix method as a data collection method and analysis of quantitative and qualitative data in the research (Tashakkori and Teddlie, 1998). The main point is that applying quantitative and qualitative approaches together, and comparing both these methods, will result in a better understanding of research issues. Since both quantitative and qualitative research methods are used in designing and performing patterns with mix method, the main features of mix research methods are influenced of how to use quantitative and qualitative methods (Creswell, 2003). According what discussed above, heuristic research method has been used in this study.

5. Analysis of qualitative data

Data analysis was carried out at two stages. Content analysis method and coding process were used in analysis of data that were collected by means of qualitative method and interview. A variety of definitions are proposed for content analysis that difference in definitions turns back to the history of this technique and its evolutionary process. Krippendorff (2004) [86] has introduced content analysis as a research technique that is used for repetitive inference of data on text, that he knows this analysis likewise other research techniques suitable for providing recognition, new thought, image of reality (krippendorff, 2004) (same source). Content analysis is carried out in two quantitative and qualitative types. According to krippendorff (2004) (same source), questions as follows must be taken into account in each content analysis:

- which data must be analyzed?
- how data are defined?
- from which population, data are taken?
- what is the relationship between text and analysis data?

- What are analysis limitations?
- what are the results of analysis?

According to questions above, the stages of qualitative and quantitative analysis are different. In this study, qualitative content analysis method was used for content analysis of interviews. In this content analysis, the stages as follows are carried out:

Analysis unit: according to krippendorff (2004) (same source), the researcher must determine analysis units including word, sentence, paragraph, article, news and etc.

Data reduction: this means removing the same texts and repetitive cases.

Categorization: the researcher must address developing categorization using inductive and deductive methods, as Categorization is the leading core in qualitative content analysis.

According to krippendorff (2004) (same source), categories must be comprehensive, i.e. no data should be removed and not embedded in a specific category and no data must be embedded between two categories or more than a category.

Categories include a series of sub-categories with different stages.

Modify categorization system based on data: after Categories determined based on research data, the researcher must modify categorization system and remove some categories and add some others, if necessary.

-represent a report of qualitative data: in the end, a report must be prepared and proposed based on data. In this sense, it is essential to define content of categories. If necessary, it can use frequency of categories and other qualitative studies (Ryder, 2007).

6. Prepare questionnaire

Questionnaire has been an instrument for Data collection at quantitative stage, that analysis of market was addressed using variables from research model.

-Analysis of product market

This Questionnaire has been based on Likert spectrum, including five items, totally agree to totally disagree. Then, it can address measuring strengths, weaknesses, opportunities and threats in Ezam Company.

To determine reliability of questionnaire, alpha Chronbach method has been used. In this method, components of questionnaire are applied to measure reliability coefficient of test. The equation below can be used to calculate reliability of test.

$$\alpha = \frac{K}{K-1} \left(1 - \frac{\sum_{i=1}^K S_i^2}{S^2} \right)$$

According to this formula, k , S_i^2 , S^2 is the number of questions, variance of each question, and variance of all the questions, respectively. After questionnaires distributed, 200 questionnaires were collected from sample and descriptive and inferential statistical methods were used in analysis.

To test the relationship between variables, the methods of structural equation modeling and regression analysis have been used, and LISREL and SPSS software were used.

7. Organizing technology balance sheet

As a result, technology balance sheet was organized referred to interview with experts and results from questionnaire, and then technology life cycle at Ezam Company was calculated using s-curve.

8. Calculate s-curve

Despite large body of research on identification of technology life cycle, the new concept of co-word is used in this study. According to this concept, this presupposition is proposed “if two key terms are applied concurrently, these two key terms will point out to a same thing”, where applying these two key terms concurrently indicate correlation between two terms (Ding and Foo, 2001).

In other words, if an area of technology includes a series of technologies, products, tools, standards and methods with a high correlation with each other, then a technology area based on this method can be recognized, because the relationship between two terms can be calculated (Schneider and Borlund, 2004).

To quantify the relationship between two terms, Cosine equation is used:

$$w_{a,b} = \frac{N_{a,b}}{\sqrt{N_a \cdot N_b}}$$

In this relationship, the main presupposition is that each term or word group which reflects a concept, technology, tools or other things are in relationship with any other term. This expression states that closeness between two words is a function of patent ratio that that has applied two terms concurrently; each variable above is as follow:

$N_{a,b}$, N_a , N_b , $W_{a,b}$ is the number of patents that have applied two terms concurrently; the number of patents that have applied the term a, the number of patents that have applied the term b, the correlation between two terms. Further, to identify the most fundamental terms at technology area, it is essential to use other models. The most recognized model has been TF-IDF. The main logic in recognizing terms has been based two leading elements as follow:

- 1-count of terms
- 2-focus on terms

Hence, mixing two elements above can be summarized in the expression below:

$$tf_{ik} \times \log\left(\frac{N}{n_k}\right)$$

N_k , N , Tf_{ik} is the number of documents in which term k appeared, number of all the study units under study, frequency of repetition for term k in all documents, respectively.

9. SWOT analysis

Using SWOT analysis, it was addressed to an investigation into strengths, weaknesses, opportunities and weaknesses at Ezam Company using questionnaire tools. Using results from SWOT analysis, strategic issues were recognized and analysis of gap between strengths, weaknesses, opportunities and weaknesses was conducted.

Variables of external analysis

- Emerging technologies
- Competitors
- Opportunities

10. Variables of internal analysis

- Technology auditory
- System and organization
- Strengths and weaknesses

Finally, an investigation into gaps regarding results from s-curve analysis, technology-based strategy formulation in Ezam holding company was carried out

11. Data analysis

In this section, the descriptive statistics and the related tables are presented. The recognition of sample features is useful due to its applications that help researchers to determine the overall specification of evaluated population. Furthermore this recognition causes that this information will be used in order to extend the result to the other populations or to design the T-test questions for other populations.

The abundance distribution of respondents in accordance with gender

Table 1 indicates that 43% of respondents are women and 57% of respondents are men.

Table 1: The abundance distribution of respondents in accordance with gender

Gender	Abundance	Percent
Female	86	43
Male	114	57
Total	200	100

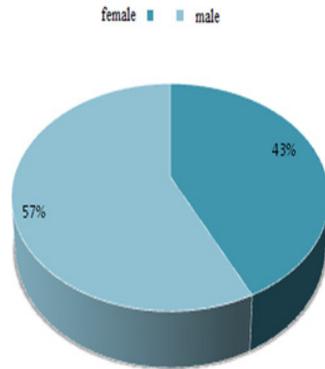


Fig. 1: The abundance distribution of respondents in accordance with gender

The abundance distribution of respondents in accordance with marital status

Table 2 indicates that the marital status of respondents is evaluated in the nominal measurement scale is placed in the two levels, furthermore 37.8% of respondents are married and 62.2% of respondents are single.

Table 2: the abundance distribution of respondents in accordance with marital status

Marital status	Abundance	Percent
Married	76	38
Single	124	62
Total	200	100

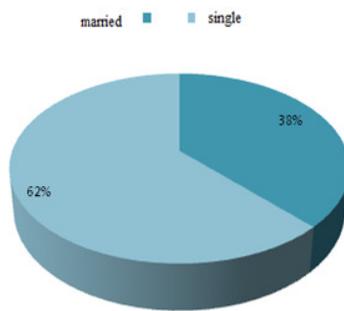


Fig. 2: The abundance distribution of respondents in accordance with marital status

The abundance distribution of respondents in accordance with educations

Table 4 indicates that maximum number of the respondents with rate of 50.24%, are master's degree and the minimum number of respondents with rate of 11.44% are doctorate.

Table 3: The abundance distribution of respondents in accordance with educations

Educations	Abundance	Percent
Bachelor's degree	77	38.3
Master's degree	101	50.24
Doctorate	23	11.44
Total	201	100

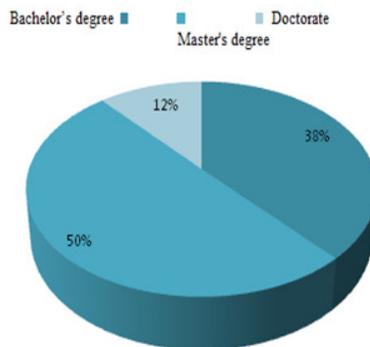


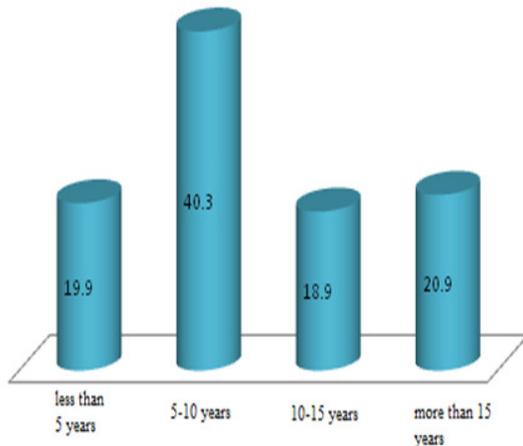
Fig. 3: The abundance distribution of respondents in accordance with educations

The abundance distribution of respondents in accordance with years of service

Table 4 indicates that maximum number of the respondents with rate of 40.3%, have 5 till 10 years of service and the minimum number of respondents with rate of 19.9% have less than 5 years of service.

Table 4: The abundance distribution of respondents in accordance with years of service

Years of service	Abundance	Percent
Less than 5 years	40	19.9
5-10 years	81	40.3
10-15 years	38	18.9
More than 15 years	42	21.0
Total	200	100

**Fig. 4:** The abundance distribution of respondents in accordance with years of service

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