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Extracting Future Business Model Orientation through Scenario Development for Developing Countries

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Abstract

Today the competition is not only among businesses but also among business models. The future environment should reflect on the future business models currently being designed. Previous research has pursued the concept of a future business model through future methodologies with respect to specific cases, but the literature does not suggest any method for understanding the successful orientation of business model components under future plausible scenarios at the macro analysis level. One of the industries that is especially impressible is Iran's software industry. This paper chose this example to introduce a method for making the future of Iran's software industry apparent in addition to identifying the best orientation for the software firms' business model components to be clearer for the future. In this regard, the related literature is reviewed, and then the effective factors, drivers, and uncertainties of Iran's software industry are explored. Then, based on two uncertainties, four scenarios are introduced based on the ideas of the members in an expert panel. Subsequently, the priority of elements of business model components will be analyzed based on each scenario. The business model components are reduced to value proposition and revenue model in this paper since the core part of the business model is proposing the value and capturing it via the revenue model. This study is a qualitative research supplemented with quantitative measures with regard to its data collection method. The successful orientation of Iran's future software business model is induced through a prioritizing method (GAHP) to attain the priorities of business model attributes for each element of business model components in each scenario. Iran's software entrepreneurs can map the priorities of the business model elements in designing the specific revenue model and value proposition of their own company. Other contexts can utilize the method to unfold the best business model choices.

Keywords: Scenario development; Business model; Software industry; GAHP.

Introduction

A business is in interaction with environmental forces that shape opportunities and pose threats to the company. According to the institutional theory, the institutional environment intensely impacts the formation of official structures in an organization (Peng, Wang, & Jiang, 2008). While this environment is uncontrollable, the success of a company depends on its ability to adapt to it. However, the changing and unstable current business conditions (Botha, Kourie, & Snyman, 2014), including variables such as innovation speeds, product development, customer behaviours, competition threats, governmental regulations, suppliers and investors (Banu & Miles, 2011), lead to complexity and increases the future uncertainty (Chesbrough, 2010). In such an dynamic atmosphere, businesses ought to make changes in their business models regularly in order to maintain competitiveness and adjust or shift the business form (Andries & Debackere, 2006; Casadesus-Masanell & Zhu, 2010). Indeed, the competition is not only among businesses but among business models as well (Morris, 2014).

On the other hand, foresight (Saghafi, Pour, & Abadi, 2010) and futures studies is capable of sketching the alternative futures of the industry environment (Olsmats & Kaivo-oja, 2014) and proposing several approaches for insight acquisition regarding the state of the future (Bouman, Haaker, & De Reuver, 2012). Among these approaches, scenario planning (Ghazinoory, Saghafi, & Kousari, 2016) has been considered, by organizational leaders, an effective method for understanding future uncertainties, readiness against undetermined a future, mental model changes, decision tests and performance enhancements (Chermack, Lynham, & Ruona, 2001).

One of the most fundamental elements of changing business models is the ability to collect, process and analyse the industry situation from the political, economic, social and technological perspectives over time (Gnatzy & Moser, 2012). Gathering and interpreting such information in emerging economies (e.g. Iran) is very complicated with many unknown factors and vague effect mechanisms (Hoskisson, Eden, Lau, & Wright, 2000). This challenge worsens when this information is expected to sketch futures that enable businesses to design or revise their business models in accordance with them. This is exacerbated by Iran's institutional instability resulting from opacity in decision making in governmental institutions relating to management and culture (Rofoogar Astane & Dehkhodaei, 2010).

Iran's current business environment is vague due to several uncertainties such as sanction omission, shifts in reliance on oil economy, and government approaches toward trades. One of the industries that is not only crucial for economic development but also intensely impressible by this situation is the software industry. Furthermore, the prosperity of software companies depends on their business models (Veit et al., 2014). According to Rajala, Rossi and Tuunainen (2003), at the time when many companies with new innovative business models have experienced bankruptcy, it is worth taking a closer look at the viable business models for software companies. In an uncertain environment, these companies need guides to plan their future paths more wisely.

Previous research has pursued the concept of a future business model through future methodologies with respect to specific cases (e.g. Ballon, 2004; Stordahl, 2008; Pagani, 2009; Bouwman, Faber, & Van der Spek, 2005), but the literature does not suggest the ideal state of the business model elements. "A good business model is a profitable investment for owners, a beneficial service for customer, a rewarding and knowhow-favourable work organization for employees and a competitive business strategy compared to competitors" (Räsänen, 1997). However, the need for understanding the successful orientation of business model components under alternative futures still remains unfolded. Therefore, this paper aims to make the future of Iran's software industry apparent in addition to identifying the best orientation of the software firms' business model components to be clear for the future. In this regard, after reviewing the related literature, Iran's software industry uncertainties will be explored in order to introduce four

explorative scenarios based on expert ideas and secondary data. The result of this research can help to scientist and stakeholders of ICT industries for describing normative scenarios for this industry based on back casting (Saghafi, Aliahmadi, Noori, & Hourali, 2013). Subsequently, the priority of the elements of business model components will be analysed based on each scenario. The business model components are reduced to value proposition and revenue model in this paper since the core part of the business model is proposing the value and capturing it via the revenue model (Boons & Lüdeke-Freund, 2013). Ghazinoory, Saghafi, Mirzaei, Ghahfarokhi and Ghahfarokhi (2016) partly introduced the method and consequently they put the method into practice in this paper.

Literature Review

The secret for the success of a company lays in the future orientation of the company, paired with strong foresight capabilities based on flexible and adaptable systems (Battistella, 2014). One of the systems (Zott & Amit, 2010) that the company should have the capability to adapt to the future is its business model(s).

Futures studies and business model

There are studies that have approached the concept of business model via future scenarios. De Reuver, Bouwman and Maclnnes (2009) suggest external factors are important in understanding how business models are used in practice. Chesbrough and Rosenbloom (2002) state the cognitive role of BMs and the "strategic prototyping" function. Voelpel†, Leibold, and Tekie (2004) propose a BM innovation approach. Pateli and Giaglis (2005) propose a method for defining the scenarios for new BMs focusing on an analysis of the impact of new technology on existing BMs. Bouman et al. (2012) classify these researches in the ICT industry into two parts. The first part points to how external factors often force companies to rethink their business models. Based on scenario analyses, it can be determined whether the business models fit generic trends, one specific scenario, or all scenarios. Depending on the results, it can be decided whether or not to pursue the current business model. They believe that scenarios help reduce uncertainty and direct design issues. In the same line, Ballon works on scenarios and business models for 4G (Ballon, 2004). Storbahl (2008) used quantitative scenario analysis to analyse different business models for different product–market combinations. Pagani (2009) integrates planning and scenario methodology in a quantitative analysis of the future of 3G mobile TV. Bouwman, Faber, and Van der Spek (2005) introduce an approach for insurance intermediaries to connect future scenarios to their business models. Bouwman, De Vos, and Haaker (2008) use four reference scenarios to examine the telecommunications industry. Finally, Gnatzy and Moser (2012) discuss the use of Delphi-based scenarios (Saghafi, Zarei, Dolat Abadi, & Shahkooh, 2011) for the development of business model innovations in emerging markets.

In the second perspective that is called "wind-tunneling" approach, the robustness of specific business models would be tested through what-if scenarios. In Haaker and Van Buuren's (2005) work, future scenarios are developed to assess the viability of service concepts for managed content services based on innovative person-based DRM technology. As a result, a set of 'robust' viable services in all four scenarios is chosen. Moreover, Klemettinen (2007) tested four suggested generic business models against four relevant future scenarios to understand how they would behave in different future environments.

All the above works lack a universal view on future business models' orientation in the mindset of business persons in a specific industry. However, the current paper argues that under the developed future states, the main orientation of any successful and acceptable business model can be explored by prioritizing the elements of the core part. This paper suggests that the method to do this in various contexts and thus introduces the method with the example of Iran's information technology software (Mamaghani, Samizadeh, & Saghafi, 2011) industry.

Scenario Development

"Scenario planning is a process of positing several informed, plausible and imagined alternative future environments in which decisions about the future may be played out, for the purpose of changing current thinking, improving decision making, enhancing human and organizational learning and improving performance" (Chermack, Lynham, & Ruona, 2001). However, in spite of the successful application of scenarios at the national and corporate levels, developing scenarios at industry level, where competitors and co-operators exist in the same sector, is barely used (Pagani, 2009). Van der Hejden (2011) suggests that scenarios are the best language for strategic issues since they represent different futures in addition to creating a common perception of the future for individuals to make better decisions. They are also useful in confronting uncertainties. In such a situation, the intuition as well as analysis is crucial for understanding future drivers (Van der Heijden, 2011). The scenario planning approach reduces the risk of focusing on a single expected future instead of considering all plausible futures (Bishop, Hines, & Collins, 2007). Furthermore, they should be created from all the stakeholders' points of view. The aim of scenarios is to recognize the change components that have an intense effect on the industry despite their undetermined consequences. Generally, scenarios are built in a two-dimension matrix, which makes scenarios different from each other (Van der Heijden, 2011).

At the next level, there are different approaches for developing scenarios that are classified by Bradfield, Wright, Burt, Cairns, & Van Der Heijden (2005) as "The intuitive logics school," "The probabilistic modified trends school," and "The La prospective school." Huss and Honton (1987) also categorized scenario planning methodology approaches as intuitive logics, trend impact analysis and cross-impact analysis, believing that since 'the intuitive logic approach is not tied to any mathematical algorithm, it can, with careful tailoring, adjust to the particular needs and political environment of the company." The approach's basic presumption is that the decisions of the company are based on a bundle of complicated relations among economic, political, technological, social and environmental factors; and the changes and effects of them should be recognized.

The abundance of various methods of Intuitive Logic depict that the number of these methods is as many as the researchers applying them (Bradfield & El-Sayed, 2009). One of the attractions of the approach is its adaptability to any circumstance. The possibility of applying creative methods for performing the processes or combinations and manipulating them is another advantageous of this approach (Jungermann, 1985). Researchers believe that there is no theoretically, operationally and publicly acceptable methodology for scenario development in this approach (Bunn & Salo, 1993; Jungermann, 1985). Ramirez and Wilkinson (2014) enumerate the following advantages of the 2 × 2 Intuitive Logic method in addition to its usefulness for uncertain environments: (1) It provides an intellectual feel to address problems. (2) It avoids the reductionist extreme of rationality. (3) It clarifies or clearly models a complex situation of alternative perspectives. (4) It is easy to communicate. (5) It encourages the consideration of more 'extreme' futures outcomes.

One of the techniques (Bishop et al., 2007) of the mentioned approach is GBN, which starts with listing future variables and trends and classifying them according to (1) trends and variables with certain effects on the subject, (2) trends and variables with no certain effects on the subject, and (3) trends and variables with uncertain effects on the subject. It then uses those as the basis for alternative futures. This technique contains the following processes (Schwartz, 1996), which are in common with other intuitive logics scenario methods (Wright, Bradfield, & Cairns, 2013): (1) setting the agenda, (2) determining the driving forces, (3) clustering the driving forces, (4) defining the two cluster extremes, (5) building the impact/uncertainty matrix, (6) framing and scoping the scenarios, (7) developing the scenarios, (8) defining guiding indicators (Schwartz, 1996).

In this paper, GBN technique is used due to its inherent uncertainty in predictive forecasting, which means information is not sufficient, human systems are in chaos, and emergent state and

related human behaviour theories are not as determined as mathematical ones. The technique is the focal subject of this paper, and the paper uses it as a default scenario technique (Bishop et al., 2007).

Business Model

Business models are commonly defined as the logic of the enterprise, the way it operates, and how it creates and captures value for its stakeholders (Brea-Solís, Casadesus-Masanell, & Grifell-Tatjé, 2015). Being studied for various purposes, business model components or taxonomies are developed (De Reuver et al., 2009). In accordance with the purpose of this article, the business model component approach is applicable to clarify the underlying priorities of business model elements under each scenario. Among several proposed models, (Alt & Zimmermann, 2001), (Bouwman, Faber, Haaker, Kijl, & De Reuver, 2008), (Mahadevan, 2000) and (Weill & Vitale, 2013), the business model canvas (Osterwalder, 2004) is chosen due to three reasons. First, it is a popular tool that makes it simple for practitioners to design business models in a creative session (De Reuver, Bouwman, & Maclnnesm, 2009). As a result, many business reviewers of this article may use this tool, thus the findings of this paper should be compatible with their chosen tool. Second, since this papers does not focus on a single case and has a general point of view, it picks the canvas with a vivid classification of every aspect of a business model can be generally applicable for an industry. Finally, its ontological approach, which creates a hierarchical classification of business model components, their elements and their attributes in three levels, makes an appropriate structure for the prioritizing purpose of this paper.

The canvas introduces nine components including value proposition and revenue model. Revenue model is the ability of a firm to translate the value that it offers its customers into money and incoming revenue streams; value proposition is described as defining how items of value, such as products and services as well as complementary value-added services, are packaged and offered to satisfy the customers' needs (Osterwalder, 2004). The hierarchical structure of such a business model is illustrated in Figure (1).

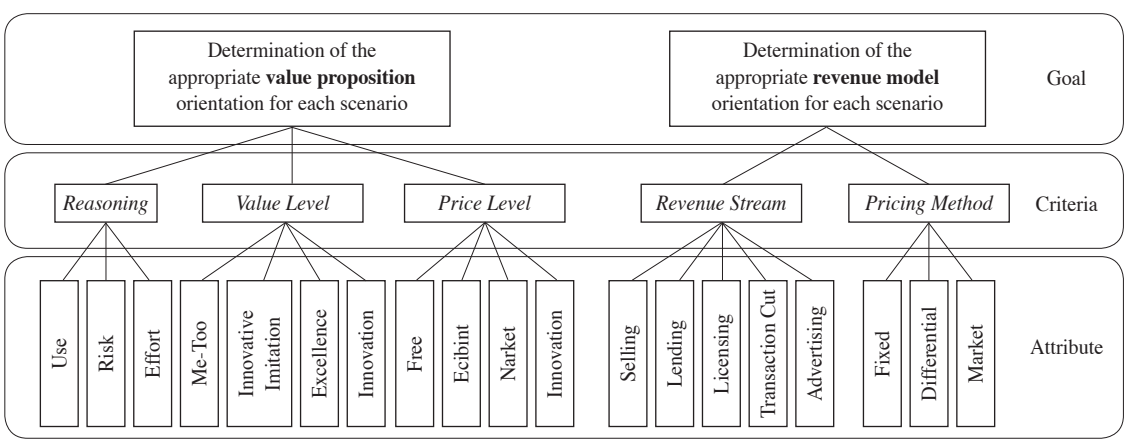

Figure 1. Hierarchical structure of business model

Table 1. *Criteria and attributes definition (Osterwalder, 2004)*

Criteria and attributes	Definition
Reasoning	the reasoning on why the firm thinks its value proposition or a specific elementary offering could be valuable to the customer
Use	value is produced when assumed customer value matches perceived customer value after the consumption of a value proposition or a specific elementary offering
Risk	Value created by reducing the customer's several risks.
Effort	value created making their customers' life as easy as possible
Value Level	the utility for the customer
Me-too	the value of the bundle of products and services the firm offers its customers that does not differentiate itself from the one of the competition's
Innovative Imitation	imitates an existing value proposition or elementary offering, but improves value by adding innovative elements
Excellence	pushed value to its extremes
Innovation	introducing either a completely new product or service or a revolutionary combination of products and services
Price Level	criteria comparing the value proposition's price level with the one's of their competitors
Free	offering a value proposition to the customer without asking for financial compensation
Economy	the low-end of the price scale where a company offers a price that is more attractive than the one of the bulk of its competitors
Market	little price demarcation from the rest of the market
High-End	upper boundary of the price scale
Revenue Stream	the type of economic activity with which a company generates a revenue stream
Selling	the activity of giving away certain aspects of ownership of a good or service in exchange for money
Lending	the activity of giving something to someone for a period of time, expecting it to be given back
Licensing	giving someone official permission to do or have something
Transaction Cut	commission is the fee that is paid to the party that has organized, facilitated, or performed the deal
Advertising	any paid message communicated by an advertising media
Pricing Method	pricing mechanisms
Fixed Pricing	prices mechanisms that do not differentiate in function of customer characteristics, are not volume dependent and are not based on real-time market conditions
Differential Pricing	pricing mechanisms that produce prices that are either based on customer or product characteristics, are volume dependent, or are linked to customer preferences, but not based on real-time market conditions
Market Pricing	pricing mechanisms that produce prices based on real-time market conditions

Methodology of the research

This article aims to investigate the future orientation of the business models of the Iranian software industry in the horizon of 2025. Thus, in terms of the objective, this is an applied study. Moreover, this study is a quantitative research supplemented with quantitative measures with regard to its data collection method and the final results. The proposed scenarios of this research are explorative (Börjeson, Höjer, Dreborg, Ekvall, & Finnveden, 2006). The paper includes two general parts: (1) developing the scenarios of the software industry, and (2) prioritizing the business model. The former includes three steps in its own.

Part one: Scenario development

Step 1

In this step, the environmental data were specified based on the institutional theory (Meyer, Estrin, Bhaumik, & Peng, 2009) using PEST framework and Porter's market forces (Porter, 2008) in the environment of the Iran software industry through studying the available literature including documents from journals, newspapers and articles. Twenty nine key factors were determined. Then, the conventional content analysis was used (Hsieh & Shannon, 2005) to discover the driving forces of the software industry.

In conventional content analysis, researchers avoid using preconceived categories; instead, they allow the categories and their names to flow from the data. Researchers immerse themselves in the data to allow new insights to emerge (Kondracki, Wellman, & Amundson, 2002).

At the end of this step, a classification of 10 driving forces was obtained.

Step 2

In this step, we used semi-structured face-to-face interviews with an open-ended questionnaire in order to determine the key uncertainties (Gabzdylova, Raffensperger, & Castka, 2009). These interviews encompassed two parts taking place in two separate sections. The first part dealt with the mentioned forces and asking the experts' opinions; and the second part dealt with asking the level of importance and ambiguity of the key factors for discovering the key uncertainties. The future uncertainties are two-fold or multi-fold and concern the coming future of any field. Thus, the mentioned questionnaire discusses the mentioned factors of the second step with the respondents using Likert three-scale questions for measuring the ambiguity level of α (highly vague, probable, very unlikely) and the importance of the effectiveness of β (higher importance, average importance, lower importance).

Then each of the Likert scales are converted to numerical measures so that the value 1 implies high importance and high vagueness; the value 0.5 implies average vagueness or importance, and the value 0.1 implies low importance or vagueness. Their multiplication in a 3 × 3 matrix is shown in the following table (Zou, Zhang, & Wang, 2007).

Then, the importance level of the uncertainty is calculated by equation (1) as explained in detail by Zou, Zhang, & Wang (2006).

Equation (1) $r_{ij} = \alpha_{ij}\beta_{ij}$

Where r_{ij} is the uncertainty score assessed by respondent j for the factor i; i = ordinal number of risk, i∈(1,m); m = total number of uncertainty; j = ordinal number of expert i, j∈(1,n); n = total number of experts i; α_{ij} = vagueness level of the factor i, assessed by expert j; β_{ij} = importance level of the factor i, assessed by expert j.

The average score for each uncertainty is calculated through Eq. (2), which is used for ranking uncertainties. R_i equals the significance index score for uncertainty i.

Equation (2) $$R_i = \frac{\sum_{j=1}^{n} r_{ij}}{n} = \frac{1}{n}\sum_{j=1}^{n} \alpha_{ij}\beta_{ij}$$

The uncertainties are ranked based on their scores, and then the first two factors are selected as the most important ones and as the logic for the formation of the scenarios.

The statistical population of the research includes all active experts of the software industry and managing directors of the software companies regardless of their age. The samples were completed using snowball sampling method by 5 experts because the experts' opinions were saturated (Saghafi, Noorzad Moghaddam, & Aslani, 2017) and the persons were introduced repeatedly.

Since the average level in both indexes (i.e. the importance and ambiguity) equals 0.25, we considered the uncertainty limit as 0.25 and the factors with higher values are considered uncertainties. On the other hand, the two factors with the highest value are selected as the key uncertainties and are selected as the framework for the formation of the scenario matrix. Figure (2) reveals the obtained score of each factor.

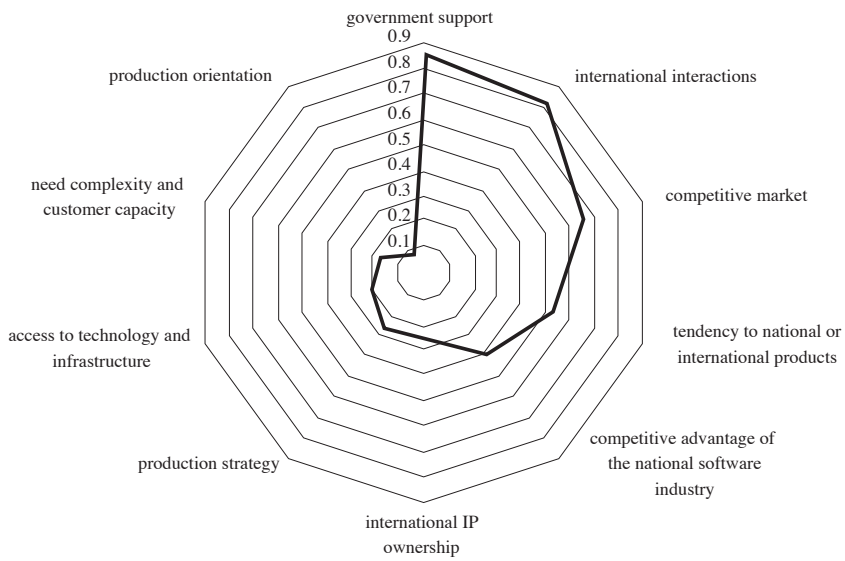

Figure 2.Iran software industry uncertainties

Thus, the two general uncertainties of the Iranian software industry (along with their different dimensions) are as follow:

International interactions of the Iranian software industry

First dimension – global player: In this dimension, Iran has the fundamental capabilities(Soofi, & Ghazinoory, 2011) and requirements for its presence in the global market, and it can be actively present as a global actor in the field of software production. Moreover, the international companies will be active in Iran.

Second dimension – local player: In this dimension, due to a lack of the capabilities and requirements for being present in the international markets of the software, Iran has to limit its present only in local and regional markets (i.e. Iran and the neighboring countries). Moreover, the international companies cannot officially attend in Iran due to the lack of suitable rules and business conditions in Iran.

Policy and executive support of the Iranian government for the software industry

First dimension – supportive government: In this dimension, the government guarantees its support for the policies and implementation of the software industry and makes such a policy as one of the basic plans of the country.

Second dimension – government inadvertence: In this dimension, the government continues to neglect any support for this industry and doesn't recognize the growth of this industry as a priority of the country.

The key uncertainties of the structure of the scenario matrix are illustrated in figure (3).

Step 3

In this step, we have to enrich and present the scenarios. For formulating the scenarios, we have to consider the logic of the scenarios as the framework of each scenario. Then the scenarios are formulated by investigating the effects of the key uncertainties on the several factors, as identified in previous steps, and their dynamics in each scenario. Hence we formulated four scenarios and presented them to the experts of the field and their corrective advices were applied in a panel of experts.

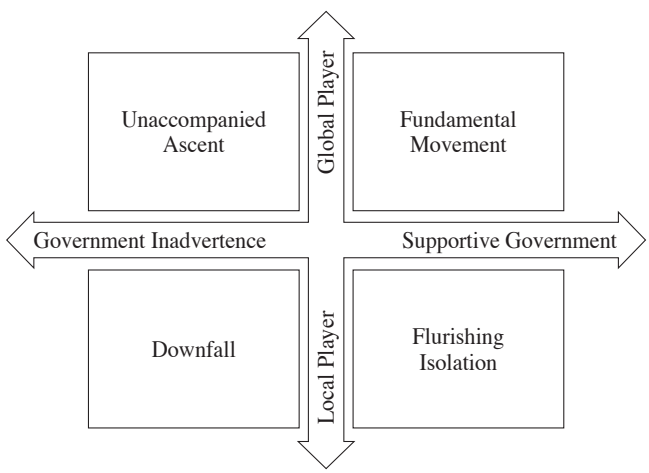

Figure 3.The scenario matrix

Part two: prioritizing the business model

In order to understand the successful orientation of the future software business model in a normative approach, a prioritizing method (MADM) was used to attain the priorities of business model attributes for each element of business model components. Therefore, Analytic Hierarchy Process (GAHP) method identified the weight of each attribute set per scenario. For implementing GAHP separately in a form of five pairs, wise comparison questionnaires under each scenario were used. Three of them pertained to the value proposition and two of them referred to the revenue model component. In total, experts were asked to answer 20 questions or perform 112 comparisons. The comparison of each attribute was considered and finally the decision matrix was obtained. Then, using GAHP method, prioritizing attributes of the business model components for each scenario were formed. This part of the research methodology is a kind of descriptive survey. The experts were chosen by snowball sampling among ERP firms' CEOs.

AHP is a powerful method in decision making, firstly introduced by (Saaty & Vargas, 2013) to pattern subjective decision-making procedures based on multiple features in a hierarchical system. The four main steps of the AHP can be summarized as follows (Tzeng & Huang, 2011):

Step 1: Fix the hierarchical system by dispersing and decomposing the problem into a hierarchy of interconnected elements (Figure 1);

Step 2: Compare the comparative weight between the features/attributes of the decision elements to form the reciprocal matrix;

Step 3: Synthesize the individual subjective judgment and assess/estimate the relative weight;

Step 4: Aggregate the relative weights of the elements to specify the best alternatives.

AHP can be particularly useful with groups. Each member's assessments can, of course, be evaluated for priorities and inconsistency, and then the group rollup may be synthesized and viewed the same way. This is considered a powerful way to build consensus. If the group has a high inconsistency ratio (more than 0.1, or so), segmenting might reveal where the differences in agreement are and why. That, too, can help lead to better understanding and consensus (Irani, Sharif, Kamal, & Love, 2014). The methodology chart is depicted in figure (4).

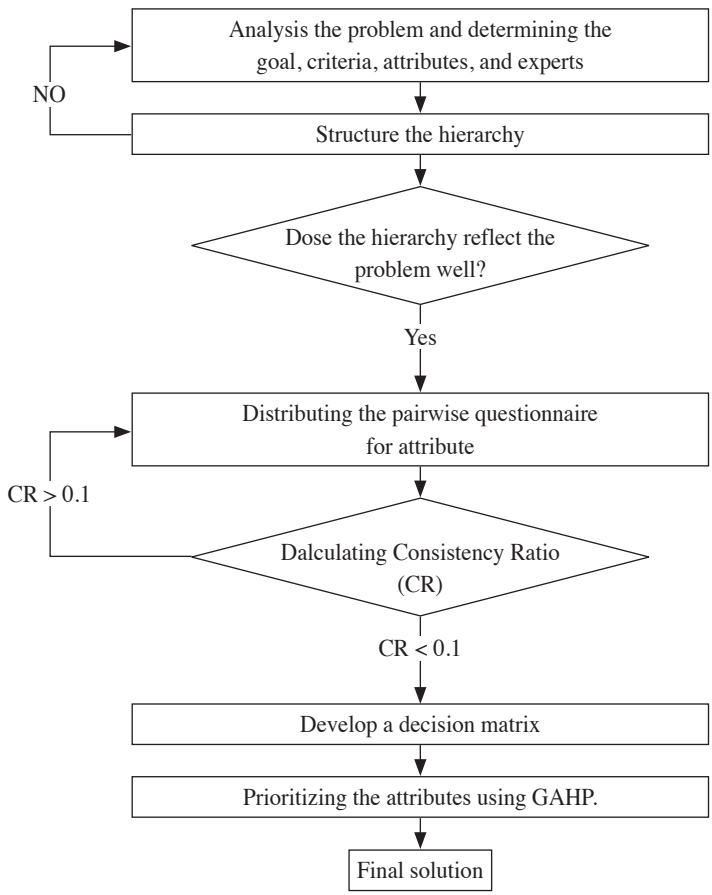

Figure 4. AHP methodology chart

Findings

The obtained results of the whole methodology include two parts: developed scenarios and prioritization of the business model components in each scenario.

Part one: scenarios

The obtained scenarios are summarized as follows:

First scenario: Fundamental movement

This scenario includes the Iranian software industry as a global player; governmental commitment to the law and support for the industry; political and economic security and stability in stable conditions; removal of the international limitations; international investment in Iran; respecting the legal requirements and obligations of the global commerce in Iran; the existence and legal guarantee of the intellectual property (Ghazinoory, Ghazinoori, Azadegan-Mehr, 2011) rights for national and international products; access to markets in neighboring and other countries; participation of the huge international countries in Iran; unequal competition with the international competitors and the decline of such a competition; purchasing Iranian companies by foreigners or merging the Iranian companies; moving toward the closed-source and commercial software; recognition of the software industry as one of the basic industries of the country by the government; increasing the technical infrastructures; reducing the filtering and bandwidth constraints; regulating some industry-specific legal mechanisms; defining a specific judicial system for the software industry in order to prevent and solve the relevant crimes; applying the tax exemptions for the software industry; intense internal competition and consequent need for the cooperation of the companies to win such competitions; defining specific standards and criteria for the tenders of the field by the government; training the professionals and preventing the movement and replacement of the professional labor forces due to their cooperation with the international companies; increasing the information culture and being open to information technology; access to the most updated technologies while respecting the costs and the rights of the intellectual ownership; recognizing the complicated needs of the customers; identification and reinforcement of the competitive advantage of the Iranian software industry; and the well-known and trustful Iranian brands internationally.

Second scenario: Unaccompanied ascent

This scenario includes the participation of the Iranian company in the global markets without governmental support for this industry; removal of the international barriers against the presence of the Iranian software companies in the global market; the lack of a governmental integrated strategy and perspective of the industry; failure to identify and focus on the competitive advantage; no Iranian brand, while the companies do the exports on their own; the existence of problems and challenges for the participation of the international software companies in Iran due to the lack of governmental support; neglecting the requirements of global commerce; the lack of any right for the international intellectual properties in Iran; free access to the foreign software technologies and products; welcoming the free products among the Iranian users; production strategy based on the closed-source and commercial software; professional trainings for the experts and consequently the decrease of the replacement of professional labor forces due to their limited cooperation with international companies; lack of any tax exemption; lack of any specific standard and criterion for the fair tenders and governmental rents; unequal competition of the small and medium companies and consequently the reluctance of cooperation between the companies; lack of IT and software-specific judicial systems; the increase of the size of the domestic market due to the openness of the market for other industries after the removal of international constrains; the increase of the complexity of customers' needs; lack of the governmental supervision upon the software industry and the multiplicity of the related authorities; limitations in regulating the rules, infrastructures and bandwidth; and facing several challenges for establishing software companies due to the unsupportive environment.

Third scenario: Flourishing isolation

This scenario includes the Iranian software industry only as a local (domestic and regional) player due to the failure to enter the global market; comprehensive support of the Iranian government for the national software industry; recognition of the industry and wealth-creating

priority; the persistence of the international constrains; unstable economy; lack of interaction with the international companies and the limitations of the direct learning; difficulties in accessing the updated technologies; orientation of the production toward the open-source productions; lack of rights of intellectual properties; a tendency of the customers to choose the domestic products due to their quality and price based on the governmental supports; the increase of the technical infrastructures; minimization of the constrains by the government; serious implementation of the right of internal intellectual properties and the existence of its legal and executive requirements; facilitating mechanisms; establishment of the professional judicial system for the IT and software industry; prosperity of entrepreneurship in the field of software; the main customer of the internal products are governmental organizations; the creation of a healthy competition between the companies due to the well-ordered structure and good governmental support; the software industry benefits from an integrated strategy and it has just a single authority; identification and reinforcement of the competitive advantage in the internal software industry; and a well-known and trusted Iranian software brand in the region.

Fourth scenario: Downfall

This scenario considers the internal and regional nature of the Iranian software industry; lack of the governmental support; economic and political instability; lack of international investment; the persistence of the international limitations; lack of international companies in Iran and lack of any relationship with them; difficulties in accessing the technologies; lack of proper implementation of the right of intellectual properties; lack of intellectual ownership for the foreign products; local sale market; lack of orientation of the production to open-source or closed-source products; lack of integrity and consistency in the governmental approach to the software industry; multiplicity of the authorities of the software industry; lack of any integrated and inclusive strategy and perspective in the government for the industry; lack of competitive advantage for the software industry of Iran; lack of any well-known Iranian brand; failing to be successful in the regional markets; government is the main customer of the software products; lack of standards and criteria for governmental tenders; prevalence of the governmental rents in governmental projects; unhealthy competitions and lack of cooperation between the companies; dominance of the bigger companies; persistence of the infrastructural constraints, and limitations of filtering and bandwidth; awkward legal infrastructures and lack of professional judicial system for the software industry; tendency of the internal customers to choose the external free products.

The validity of any qualitative research depends upon the abilities and efforts of the researcher. Though in quantitative research we separately deal with the validity and reliability of the research, these two terms cannot be imagined separately (Long & Johnson, 2000). Instead, other terminologies are used, such as validation, transferability, etc., that include both concepts (Lincoln & Guba, 1985). Moreover, in the qualitative research, the findings and the involvement of the partners, interviewees, experts' judgements, etc. are critically important for the validity of the interpretation of interview data (Adler & Adler, 1994).

Considering the above-mentioned explanations and the lack of distinguishing between validity and reliability in the qualitative research, the first part of this research and the process of the interviews and data collection are valid for the following reasons: (A) Data collection has been performed precisely; (B) We used our best efforts to conduct the interviews without any prejudice and bias; (C) The experts' opinions were the main factor for choosing the uncertainties; (D) the experts have been selected properly and precisely; (E) The data have been collected and monitored in three steps while each step was conducted before going to the next one; (F) The experts confirmed the comprehensiveness of the questions for covering all effective environmental factors; (G) the academic and professional experts confirmed the validity of the questions of the questionnaire and the research procedure; (H) The interviews were conducted in two different periods of time. It

should be mentioned that such interviews led to the identity of the key uncertainties for building the matrix of scenarios and to identify the effective factors with a high level of probability. The results of the interviews play the most important role in formulating the scenarios.

Part two: Prioritizing the business model components in the Iranian software industry

The results of prioritizing the attributes of the business model components and elements under each scenario are computed and illustrated in figures 5 to 8. As figure (5) depicts "Fundamental Movement," it seems that in the "reasoning" element, the "effort" attribute has gained the highest score (47.33%), the "risk" stands at the second rank (31.06%) and the last one is "use" (21.61%). As the "consistency ratio" shows, this ranking is consistent (0.017<0.1). This means that if the first scenario occurs, the best choice of the experts for the reasoning element of the designed or changed business model would be the effort attributes. In other words, for designing a more prosperous business model in the case of first scenario occurrence, a company should focus more on reduction of the customers' "efforts" than on "risk" reduction and "use." Furthermore, in case of this scenario occurrence, the "innovation" would be the best option for "value level" element, "market" also would be the best choice for the "price level," and "licensing" can make more success for attaining revenues while the fixed-pricing method would be the best choice.

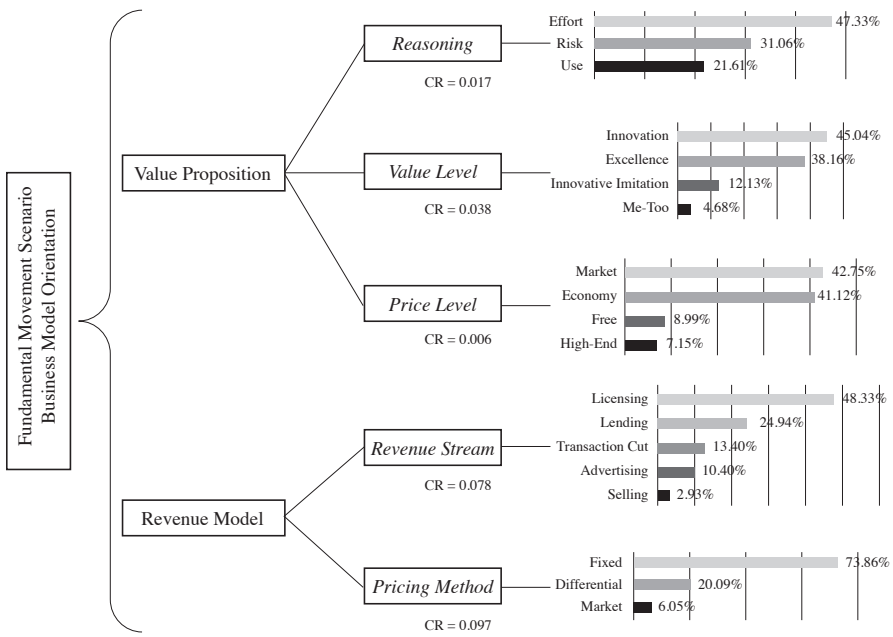

Figure 5.Successful business model orientation in first scenario

As figure (5) illustrates, the "risk" reduction, "excellence" and "economy" price level for the value proposition component, "lending" revenue stream, and "differential" pricing method would be the most appropriate options for the revenue model in case of the " Unaccompanied Ascent" scenario incidence.

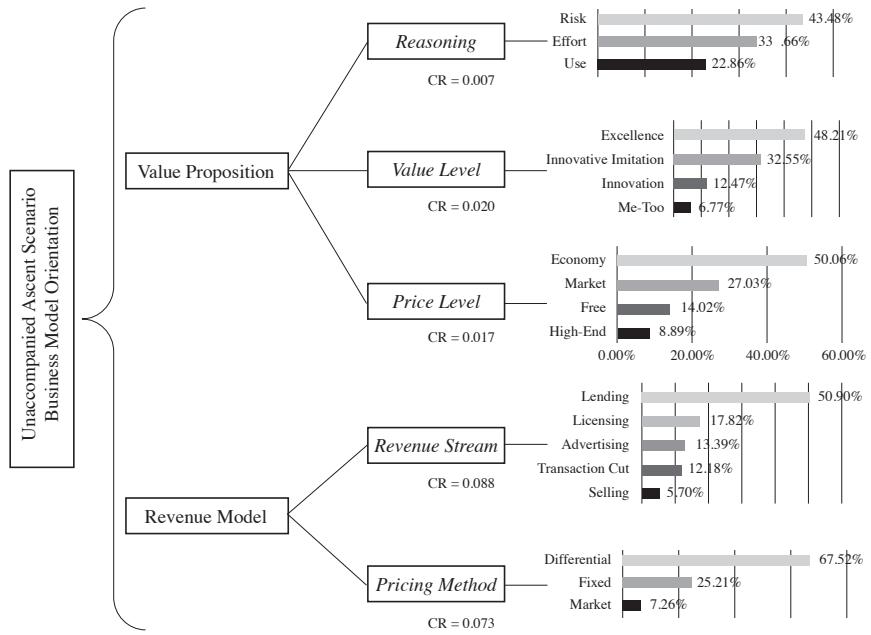

Figure 6.Successful business model orientation in second scenario

Figure (7) correspondingly conveys that "use," "excellence" and "economy" for value proposition on one hand, and "licensing" and "differential" pricing method on the other hand, are the most fitting attribute choices in the "Flourishing Isolation" scenario.

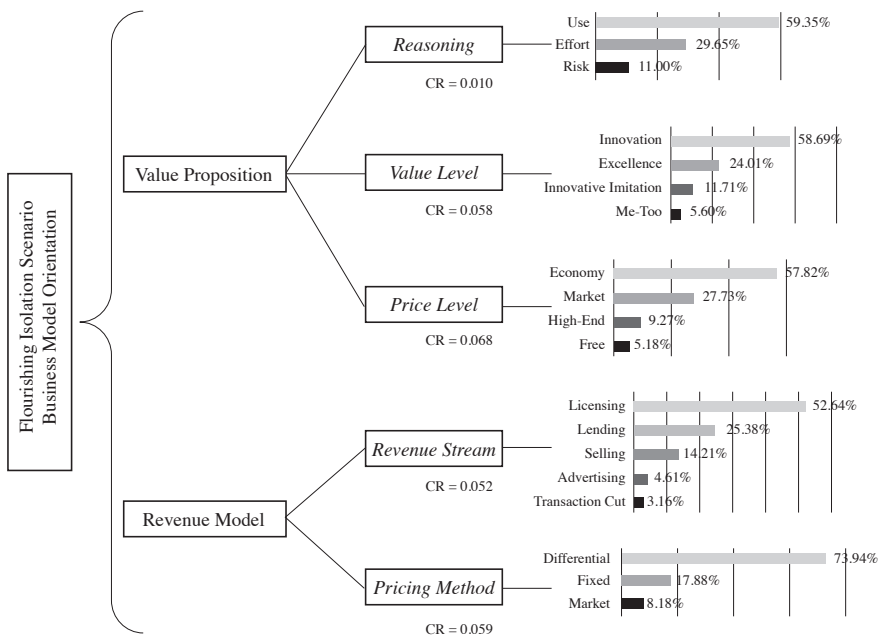

Figure 7.Successful business model orientation in third scenario

In the final scenario "Downfall," the suitability of the "use" attribute for the business model element "reasoning," "innovative imitation" for "value level," and "market" for "price level" would

be the source of value in the collective opinion of experts, whereas "lending" as a "revenue stream" and "market" as a "pricing method" represent the preferences of experts for survival figure (8).

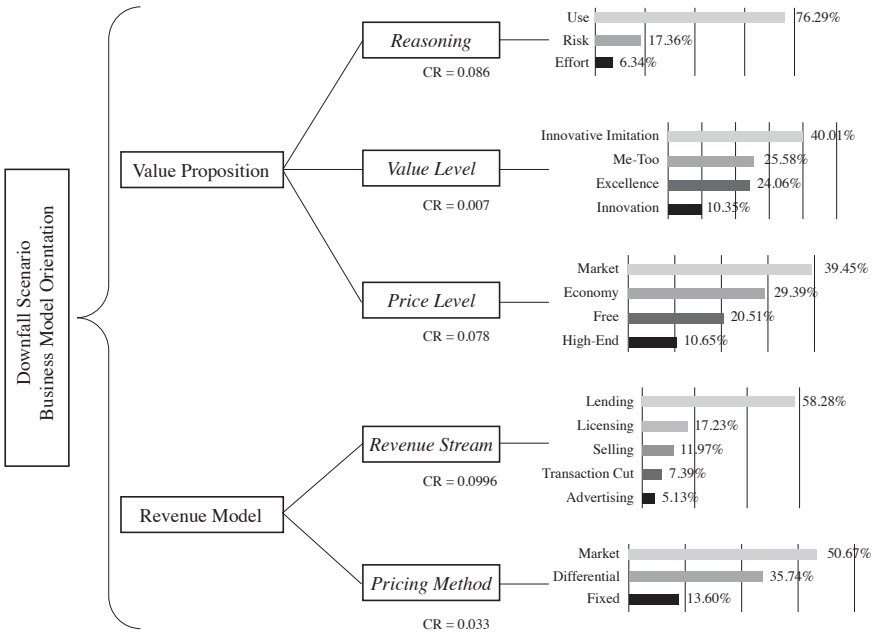

Figure 8. Successful business model orientation in fourth scenario

Conclusion and discussion

As a developing country that needs the development of knowledge-based businesses in the field of information technology, government has to comprehend the future environment since the businesses that are established today are supposed to grow in the future. Thus, businesses have to pay attention to the way their interaction with the environment affects their changes and challenges. The software businesses' specific problems are the reasons we have to draw the future for aiding the entrepreneurs of this field.

In this research we studied four plausible scenarios of future from a descriptive point of view. Obviously, the problems of the Iranian software industry are different from other countries. Based on the obtained uncertainties, it is clear that the main drivers of change are the governmental plan in policy-making, the effective implementation of these policies in developing the software industry, and the prosperity of internal businesses. Accordingly, the main factor is indeed endogenous. Consequently, the fulfillment of the best future for this industry is quite possible, and the software industry of Iran can be a consolidated advantage in its professional market in light of the government's will and capability. Hence, the Iranian software industry can use its possible competitive advantage to develop its cooperation and access.

Another driver of the change is the transformation of the Iranian software industry into an international actor. If so, the Iranian software industry can be present in the international market and export its products to other countries on one hand, and it would be invaded by the strong international companies on the other hand. Thus, it will experience several ups and downs until it manages to adjust itself with the new situation at a higher-level system in terms of the market, technology and customers. Although there is relevant literature on other Iranian industries, the international limitations are the first and most important drivers; in the case of the software

industry, the international limitations have not been strong because of the lack of access to the communications technologies and free access to products (due to the lack of foreign intellectual property rights). Of course, currently some Iranian entrepreneurs have several agencies and representatives outside the Iranian borders despite the rigorous international limitations. But such companies are very vulnerable despite their capacities because of the lack of any Iranian brand in the international markets.

On the other hand, the future successfulness of the business models depends on the proactive approach to such changes. Thus, if the companies manage to be aware of the successful orientation of such business model components in the future scenarios, then they would be able to benefit from the mentioned general model in designing the business models of their company. Being aware of the future scenarios, software entrepreneurs can map the priorities of the business model elements on designing the specific revenue model and value proposition of their own company. Moreover, they can consider the results of this article as the starting point of their business model roadmap (Ghazinoory, Dastranj, Saghafi, Kulshreshtha, & Hasanzadeh, 2017) and pay attention to the planning of needed technologies and attaining the needed resources.

By and large, each scenario of the future of Iran's software industry has some threats and opportunities for the active companies and future entrepreneurs. Companies and entrepreneurs can survive in such an environment by choosing the best design of the business model for their services and products. Thus this research is practically useful both for entrepreneurs and the policy-makers who are supposed to support the future of the industry.

It seems that currently Iran stands in the Downfall scenario due to a lack of unified policy making and execution, and international interaction. However, the probable scenario appears to be Unaccompanied Ascent because of the continuous insufficient government support and serious will for international market entrance. Finally, the desirable scenario is Fundamental Movement, which encompasses internal support and external interaction. Accordingly, entrepreneurs and policy makers can adjust their decision making according to the mentioned states.

Every research faces its own limitations. The most important limitation of this research was the insufficiency of secondary accessible resources on the environment of the Iran software industry such as statistics, researches, reports and books.

To conduct better research in this area, we suggest using other future study methods such as morphology and cross impact methods for the scenarios in combination with the business models. Moreover we suggest referring to international experts who have a wider view and are more open-minded towards this specific subject.

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References

Adler, P. A., & Adler, P. (1994). Observational techniques. Handbook of Qualitative Research, 1, 377-392.

Alt, R., & Zimmermann, H. (2001). Introduction to special section-business models. *Electronic Markets-The International Journal, 11*(1), 1019-6781. doi:10.1080/10196780151105302

Andries, P., & Debackere, K. (2006). Adaptation in new technology-based ventures: Insights at the company level. *International Journal of Management Reviews, 8*(2), 91-112. doi:10.1111/j.1468-2370.2006.00122.x

Ballon, P. (2004). Scenarios and business models for 4G in Europe. *Info, 6*(6), 363-382. doi:10.1108/14636690410568641.

Banu G., A, & Miles, G. (2011). Innovation speed and radicalness: Are they inversely related? *Management Decision, 49*(4), 533-547. doi:10.1108/00251741111126477

Battistella, C. (2014). The organisation of Corporate Foresight: A multiple case study in the telecommunication industry. *Technological Forecasting and Social Change*, 87, 60-79. doi:10.1016/j.techfore.2013.10.022

Bishop, P., Hines, A., & Collins, T. (2007). The current state of scenario development: An overview of techniques. *Foresight, 9*(1), 5-25. doi:10.1108/14636680710727516.

Boons, F., & Lüdeke-Freund, F. (2013). Business models for sustainable innovation: State-of-the-art and steps towards a research agenda. *Journal of Cleaner Production*, 45, 9-19. doi:10.1016/j.jclepro.2012.07.007

Börjeson, L., Höjer, M., Dreborg, K., Ekvall, T., & Finnveden, G. (2006). Scenario types and techniques: Towards a user's guide. *Futures, 38*(7), 723-739. doi:10.1016/j.futures.2005.12.002

Botha, A., Kourie, D., & Snyman, R. (2014). Coping with continuous change in the business environment: Knowledge management and knowledge management technology: Elsevier.

Bouman, H., Haaker, T., & De Reuver, M. (2012). Some reflections on the high expectations as formulated in the Internet Bubble era. *Futures, 44*(5), 420-430. doi:10.1016/j.futures.2012.03.004

Bouwman, H., Faber, E., Haaker, T., Kijl, B., & De Reuver, M. (2008). Conceptualizing the STOF model. In *Mobile service innovation and business models* (pp.31-70). Springer, Berlin, Heidelberg.

Bouwman, H., Faber, E., & Van der Spek, J. (2005). Connecting future scenarios to business models

of insurance intermediaries. BLED 2005 Proceedings, 16.
Bradfield, R., & El-Sayed, H. (2009). Four scenarios for the future of the pharmaceutical industry. *Technology Analysis & Strategic Management, 21*(2), 195-212. doi:10.1080/09537320802625280
Bradfield, R., Wright, G., Burt, G., Cairns, G., & Van Der Heijden, K. (2005). The origins and evolution of scenario techniques in long range business planning. *Futures, 37*(8), 795-812. doi:10.1016/j.futures.2005.01.003
Brea-Solís, H., Casadesus-Masanell, R., & Grifell-Tatjé, E. (2015). Business model evaluation: Quantifying Walmart's sources of advantage. *Strategic Entrepreneurship Journal, 9*(1), 12-33. doi:10.1002/sej.1190
Bunn, D. W., & Salo, A. A. (1993). Forecasting with scenarios. *European Journal of Operational Research, 68*(3), 291-303. doi:10.1016/0377-2217(93)90186-Q
Casadesus-Masanell, R., & Zhu, F. (2010). Business Model Innovation and Competitive Imitation: Citeseer.
Chermack, T., Lynham, S. A., & Ruona, W. (2001). A review of scenario planning literature. *Futures Research Quarterly, 17*(2), 7-32.
Chesbrough, H. (2010). Business model innovation: opportunities and barriers. Long range planning, 43(2), 354-363. doi=10.1016/j.lrp.2009.07.010
Chesbrough, H., & Rosenbloom, R. S. (2002). The role of the business model in capturing value from innovation: evidence from Xerox Corporation's technology spin-off companies. *Industrial and Corporate Change, 11*(3), 529-555. doi:10.1093/icc/11.3.529
De Reuver, M., Bouwman, H., & Maclnnes, I. (2009). Business model dynamics: A case survey. *Journal of Theoretical and Applied Electronic Commerce Research, 4*(1), 1-11. doi:10.4067/S0718-18762009000100002.
Frishammar, J. (2005). Managing information in new product development: A literature review. *International Journal of Innovation and Technology Management, 2*(03), 259-275.
Gabzdylova, B., Raffensperger, J. F., & Castka, P. (2009). Sustainability in the New Zealand wine industry: drivers, stakeholders and practices. *Journal of Cleaner Production, 17*(11), 992-998. doi:10.1016/j.jclepro.2009.02.015
Galliers, R. (1987). Information analysis: selected readings: Addison-Wesley Longman Publishing Co., Inc.
Ghazinoory, S., Dastranj, N., Saghafi, F., Kulshreshtha, A., & Hasanzadeh, A. (2017). Technology roadmapping architecture based on technological learning: Case study of social banking in Iran. *Technological Forecasting and Social Change*, *122*, 231-242.
Ghazinoory, S., Ghazinoori, S., & Azadegan-Mehr, M. (2011). Iranian academia: Evolution after revolution and plagiarism as a disorder. *Science and engineering ethics*, *17*(2), 213-216.
Ghazinoory, S., Saghafi, F., Mirzaei, M., Ghahfarokhi, M. B., & Ghahfarokhi, P. B. (2016). Future Approach to Find Business Model Orientation for Technological Businesses. In *Information Technology: New Generations* (pp.101-110). Springer International Publishing.
Ghazinoory, S., Saghafi, F., & Kousari, S. (2016). Ex-post evaluation of scenarios: the case of nanotechnology societal impacts. *Quality & Quantity*, *50*(3), 1349-1365.
Gnatzy, T., & Moser, R. (2012). Scenario development for an evolving health insurance industry in rural India: INPUT for business model innovation. *Technological Forecasting and Social Change, 79*(4), 688-699. doi:10.1016/j.techfore.2011.08.
Haaker, T., & Buuren, R. Van. (2005). Future scenarios approach for aiding the design of innovative systems. Paper presented at the 16th European ITS Regional Conference, Porto, Portugal.
Hoskisson, R. E., Eden, L., Lau, Ch. M., & Wright, M. (2000). Strategy in emerging economies. *Academy of Management Journal, 43*(3), 249-267. doi:10.2307/1556394
Hsieh, H., & Shannon, S. E. (2005). Three approaches to qualitative content analysis. *Qualitative*

Health Research, 15(9), 1277-1288. doi:10.1177/1049732305276687
Huss, W. R., & Honton, Ed. J. (1987). Scenario planning—what style should you use? *Long range planning, 20*(4), 21-29. doi:10.1016/0024-6301(87)90152-X
Irani, Z., Sharif, A., Kamal, M. M., & Love, P. Ed. (2014). Visualising a knowledge mapping of information systems investment evaluation. *Expert Systems with Applications, 41*(1), 105-125. doi:10.1016/j.eswa.2013.07.015
Jungermann, H. (1985). Inferential processes in the construction of scenarios. *Journal of Forecasting, 4*(4), 321-327. doi:10.1002/for.3980040402
Klemettinen, M. (2007). Enabling technologies for mobile services: The MobiLife book: John Wiley & Sons.
Kondracki, N. L., Wellman, N. S., & Amundson, D. R. (2002). Content analysis: Review of methods and their applications in nutrition education. *Journal of Nutrition Education and Behavior, 34*(4), 224-230. doi:10.1016/S1499-4046(06)60097-3.
Lincoln, Y. S., & Guba, E. G. (1985). Naturalistic inquiry (Vol. 75): Sage.
Long, T., & Johnson, M. (2000). Rigour, reliability and validity in qualitative research. *Clinical Effectiveness in Nursing, 4*(1), 30-37. doi:10.1054/cein.2000.0106
Mahadevan, B. (2000). Business models for Internet-based e-commerce. *California Management review, 42*(4), 55-69. doi:10.2307/41166053
Mamaghani, N. D., Samizadeh, R., & Saghafi, F. (2011). Developing a Combined Framework for Evaluating IT Projects based on IT-BSC and COBIT. *International Journal of Digital Content Technology and its Applications*, *5*(5), 10-22.
Meyer, K. E., Estrin, S., Bhaumik, S., & Peng, M. W. (2009). Institutions, resources, and entry strategies in emerging economies. *Strategic Management Journal, 30*(1), 61-80.
Morris, L. (2014). Business model warfare: The strategy of business breakthroughs. *Journal of Business Models, 1*(1). doi:10.5278/ojs.jbm.v1i1.617
Olsmats, C., & Kaivo-oja, J. (2014). European packaging industry foresight study—identifying global drivers and driven packaging industry implications of the global megatrends. *European Journal of Futures Research, 2*(1), 1-10. doi:10.1007/s40309-014-0039-4
Osterwalder, A. (2004). The business model ontology: A proposition in a design science approach. University of Lausanne, Ecole des Hautes Etdes Commerciales. (HEC 173)
Pagani, M. (2009). Roadmapping 3G mobile TV: Strategic thinking and scenario planning through repeated cross-impact handling. *Technological Forecasting and Social Change, 76*(3), 382-395. doi:10.1016/j.techfore.2008.07.003
Pateli, A. G., & Giaglis, G. M. (2005). Technology innovation-induced business model change: A contingency approach. *Journal of Organizational Change Management, 18*(2), 167-183. doi: http://dx.doi.org/10.1108/09534810510589589
Peng, M. W., Wang, D. YL., & Jiang, Y. (2008). An institution-based view of international business strategy: A focus on emerging economies. *Journal of International Business Studies, 39*(5), 920-936. doi:10.1057/palgrave.jibs.8400377
Porter, M. E. (2008). The five competitive forces that shape strategy. *Harvard Business Review 86*(1), 78-93.
Rajala, R., Rossi, M., & Tuunainen, V. K. (2003). A framework for analyzing software business models. Paper presented at the ECIS, Naples, Italy.
Ramirez, R., & Wilkinson, A. (2014). Rethinking the 2 × 2 scenario method: Grid or frames? *Technological Forecasting and Social Change*, 86, 254-264. doi:10.1016/j.techfore.2013.10.020
Räsänen, K. (1997). Kehittyvä liiketoiminta. *Haaste Tulevaisuuden Osaajille,* 1(3).
Ringland, G., Schwartz, & Peter P. (1998). Scenario planning: Managing for the future: John Wiley & Sons.
Rofoogar Astane, H, & Dehkhodaei, R. (2010). Iran Software Industry Pathology. Tehran: Retrieved

from http://rc.majlis.ir/fa/report/show/783761
Saaty, T. L., & Vargas, L. G. (2013). The Logic of Priorities: Applications of Business, Energy, Health and Transportation: Springer Science & Business Media.
Saghafi, F., Aliahmadi, A., Noori, S. S. G., & Hourali, M. (2013). Offering the Reference Model of Backcasting Approach for Achieving Sustainable Development. *Journal of Futures Studies, 18*(1), 63-84.
Saghafi, F., Noorzad Moghaddam, E., & Aslani, A. (2017). Examining effective factors in initial acceptance of high-tech localized technologies: Xamin, Iranian localized operating system. *Technological Forecasting and Social Change*, *122*, 275-288.
Saghafi, F., MohamedPour, M., & Abadi, A. K. D. (2010, April). Customized e-government foresight model in Iran. In *Information Technology: New Generations (ITNG), 2010 Seventh International Conference on* (pp.608-612). IEEE.
Saghafi, F., Zarei, B., Dolat Abadi, A. K., & Shahkooh, K. A. (2011). An integrated strategic framework for e-government initiatives. *Information Resources Management Journal, 24*(2), 1-15.
Soofi, A. S., & Ghazinoory, S. (2011). The network of the Iranian techno-economic system. *Technological Forecasting and Social Change*, *78*(4), 591-609.
Schwartz, P. (1996). The art of the long view: Paths to strategic insight for yourself and your company: Broadway Business.
Storbahl, K. (2008). Long-term broadband evolution-forecasts and impact of new technologies. *Telektronnik, 104*(3/4), 4-17.
Tzeng, G., & Huang, J. (2011). Multiple attribute decision making: Methods and applications: CRC press.
Van der Heijden, K. (2011). Scenarios: The art of strategic conversation: John Wiley & Sons.
Veit, D., Clemons, E., Benlian, A., Buxmann, P., Hess, T., Kundisch, D., et al. (2014). Business models. *Business & Information Systems Engineering, 6*(1), 45-53. doi:10.1007/s12599-013-0308-y
Voelpel†, S. C., Leibold, M., & Tekie, E. B. (2004). The wheel of business model reinvention: How to reshape your business model to leapfrog competitors. *Journal of Change Management, 4*(3), 259-276. doi:10.1080/1469701042000212669
Weill, P., & Vitale, M. (2013). Place to space: Migrating to eBusiness Models: Harvard Business Press.
Wright, G., Bradfield, R., & Cairns, G. (2013). Does the intuitive logics method–and its recent enhancements–produce "effective" scenarios? *Technological Forecasting and Social Change, 80*(4), 631-642. doi:10.1016/j.techfore.2012.09.003
Zott, C., & Amit, R. (2010). Business model design: An activity system perspective. *Long range planning, 43*(2), 216-226. doi:10.1016/j.lrp.2009.07.004
Zou, P. XW., Zhang, G., & Wang, J. (2006). Identifying key risks in construction projects: Life cycle and stakeholder perspectives. Paper presented at the Pacific Rim Real Estate Society Conference.
Zou, P. XW., Zhang, G., & Wang, J. (2007). Understanding the key risks in construction projects in China. *International Journal of Project Management, 25*(6), 601-614. doi:10.1016/j.ijproman.2007.03.001