

# Innovation in New Business (Experimental Evidence: Face book)

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*Abstract— Facebook is a highly important global social network, and many businesses are active in this medium. This study aimed to explain innovation in new business, with Facebook as the experimental evidence. To this end, theoretical basis and previous domestic and foreign studies conducted on assessment of innovation were examined to find the required indicators for the explanation framework. Then, according to the strengths and weaknesses of approaches to innovation assessment, and also based on the comparative measures of indicators of innovation approaches and frameworks presented, the framework of the OECD was considered as the basic framework for measuring innovation in the medium of Facebook. This is a descriptive-analytical study that fits into the applied research framework. Statistical population of the study comprises all Facebook users whose number exceeds 100,000 people as well as all managers and businesses that earn money on the Facebook. Research data were collected using a questionnaire. According to the results obtained, the required indicators for measuring innovation in Facebook were divided into 8 categories of R&D and investment in knowledge, human resources, innovation performance, information and communication technology, globalization, innovation policies, global economic affairs, productivity and trade, and potential influence of each of these indicators, according to the degree of membership acceptance in the Facebook business setting was identified.*

**Keywords:** innovation, business, Facebook.

## I. INTRODUCTION

Today, post-industrial organizations are knowledge-based organizations whose survival and status depends on creativity, innovation, discovery, and application. Today, innovation is increasingly considered a major factor in company's long-terms success in a competitive market. In today's competitive and dynamic environment, innovation is more than ever considered, due to the following three major trends: fierce international competition, and changing technology[11]. Innovation is a process of coming up with new ideas through satisfied customers. Transforming new science into new products and services is also called innovation. One of the results of innovation is value creation and increased efficiency that leads to commercial growth. This triggers organizations and people to move forward and upward. However, how can an organization establish and implement innovation so that it is in line with its objectives and also fundamentally alters its role in the competition compared to competitors? Results of studies on successful and evolved organizations reveal that they had emphasized "strategic innovation".

Strategic innovation means competing in existing industry in a totally different manner in which customer values are re-defined and promoted. As opposed to the traditional innovation, this different mode of competition does not merely involve product innovation. Such an innovation may be associated with related concept of product, production, or marketing of products and services[2]. The current century is overwhelmed with various innovations in the fields of new technologies, commodity and services. But, never before, like today, has the need for innovation been so critical. Undoubtedly, intensity of competition in global markets is increasing on daily basis to provide products and services by various industrial sectors, and in the coming decades, much more intense competitions shall be witnessed. To survive in the global markets and defeat competitors, old and traditional methods must be eliminated. It is only through the provision of new products and their derivatives that significant value can be created for the company [13]. Based on the discussion, the purpose of this study is to determine status of Facebook as an innovation in business and the framework used according to the subjective literature review relevant to the framework of Organization for Economic Cooperation and Development (OECD) that has divided innovation measurement indicators into 8 categories of R&D and investment in knowledge, human resources, innovation performance, information and communication technology, globalization, innovation policies, global economic affairs, and productivity and trade. Accordingly, the present study attempts to find an answer to the question; "what is the position of Facebook as an innovation in business".

## II. RESEARCH LITERATURE REVIEW

### A. Research theoretical basis

**1. Business in social networks:** Every day, small and medium size businesses show more interest in social networks, and consider these networks useful for promoting their business. Despite problems faced by small and medium size businesses in using social networks, 84% have reported their decision to increase use of these networks in future. Results of various studies also confirm this[6]. There are many ongoing debates about social networks and their level of influence on marketing. Many organizations have created specific pages for themselves in Facebook, Twitter, and other virtual social networks. The real value of social networks is yet to be fully understood. With websites constantly moving toward becoming interactively more dynamic and responsive, not only

recognition value and credibility of their principle customers does not decrease, but it increases day-by-day[3].

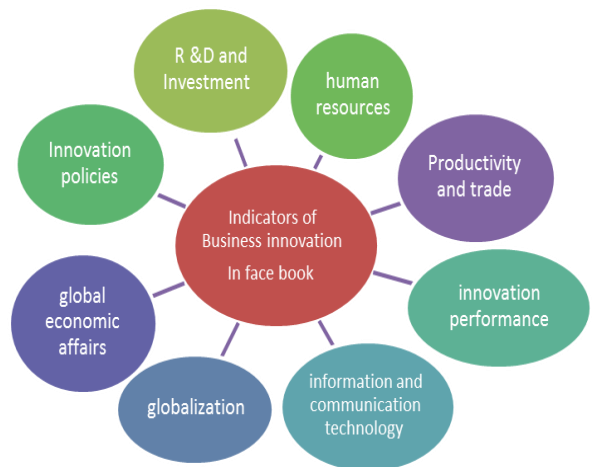
**2. Facebook:** Facebook is a social network launched by its young inventor; Mark Zakerberg on Feb 4<sup>th</sup>, 2004. Currently, in terms of number of members and expert users, this site is considered to have the most audience worldwide [1]. Zakerberg considers removing barriers and transforming the world into a freer, more transparent, and honest world the main goal of Facebook [5]. Facebook, Twitter, Google-plus are familiar names of current networks that provide an environment for reflecting views of their audience often in line with publishing clandestine objectives in the virtual space [8].

**3. Importance of innovation:** Innovation is a key concept that is remembered as the axis of the 21<sup>st</sup> century commercial achievements. Small and large organizations alike, have taken action to re-evaluate their products and operations to create culture of innovation. This revision of organizational objectives takes place because, nurturing culture of innovation within an organization is the best guarantee that the organization can survive in a fast-moving market environment. Innovation culture is also the best guarantee for long-term survival and sustainability in today's science-driven economy. The factor in increasing importance of innovation is to a large extent globalization of markets and emergence of advanced technologies that have made rapid product design possible, and shorter production periods more economical. Innovation is a conceptual process that entails many misunderstandings, and its value is often neglected [9].

**B. Experimental basis of research**

Kia & Moradi, aiming to investigate associated factors with students' tendency toward Facebook social network, concluded that by entering the age of information and networking society, we are witnessing various technological evolutions in most areas. Given Facebook's large audience, compared to other networks, the main focus is on Facebook. They also concluded that social networks provide the possibility for people to exchange views and thoughts and communicate. This type of media is different from others because anyone can create a impact, express opinion, and add to the content in social media [7]. Sadeghi, aiming to examine position and ability of network leaders in Facebook social network, and concluded that we live in the age of networks. Social network sites have become the most popular destinations in recent years, and in recent decades, billions of people have changed their lives by creative use of social media and by connecting to the worldwide network. Despite the constraints, Facebook also has many users in Iran. Finally, they conclude that Facebook is an extremely important and efficient social network for many people these days[12]. Costa & Tavares, aiming to investigate whether social network businesses are

innovative concepts for improving operational involvement, concluded that businesses have begun a new move toward social networking to progress. Finally, they concluded that electronic innovation businesses in the World Wide Web emerged due to the new work paradigms, and should be included in internet business operating systems. In this networking economy, business tends to focus on unity, cooperation, and development of advanced technology [4]. Nadkareni & Hafmann investigated why people use Facebook, and arrived at the conclusion that sites such as Facebook have gained huge amount of popularity around the world. People's motivation for using Facebook social network is summarized in two essential needs: need to belong and need to be seen. Finally, the conclusion was drawn that Facebook is a social network that many people use to communicate with their friends, or find new friends. Members of all societies possess the need to belong and the need to be seen. But the need to belong, in collectivist cultures is more than the need to be seen, and in individualistic societies, the need to be seen is stronger. Generally, many studies indicate that Facebook can well reflect the user's personality [10]. Documented in the literature review related to the research framework for explaining innovation in business organizations Economic Cooperation and Development Face book Mabna was



ected to the framework.

**III. CONCEPTUAL FRAMEWORK OF RESEARCH**

**Fig 1: Research conceptual framework [12]**

It should be noted that the 2007 edition of the OECD, due to the high rate of innovation in some advanced technologies, introduced specific technology fields as an important measure for evaluation and assessment of a country's rate of innovation. Yet, since the aim of this study is to define a framework for innovation assessment in a specific area, indicators of this area cannot be used for innovation assessment. Consequently, in this study, indicators of 8 domains have been used to define a framework for assessment of innovation in Facebook businesses. Based on the conceptual framework, study

questions included: Main question: How is the status of Facebook as an innovation in business?

Sub- questions:

- ❖ How is the status of Facebook as a business innovation in the domains of R & D and investment in knowledge?
- ❖ How is the status of Facebook as a business innovation in the domain of human resources in science and technology activities?
- ❖ How is the status of Facebook as a business innovation in the domain of innovation policies?
- ❖ How is the status of Facebook as a business innovation in the domain of operational innovation?
- ❖ How is the status of Facebook as a business innovation in the domain of information and communication technology?
- ❖ How is the status of Facebook as a business innovation in the domain of science and technology globalization?
- ❖ How is the status of Facebook as a business innovation in the domain of global economic affairs?
- ❖ How is the status of Facebook as a business innovation in the domain of trade and productivity?

#### IV. STUDY METHOD

In terms of data collection, this is a descriptive-analytical study, and in terms of objective, it is an applied research. The study was conducted between the second half of 2012 and the first half of 2013. Data collection sources included primary and secondary information. In relation to the secondary information, articles, books, research, studies, and dissertations in this area (gathered through libraries and internet sites) were used. Primary information was collected through a questionnaire. The questionnaire's items were categorized according to the indicators in the 8 dimensions of the OECD. To determine the importance of each indicator, the present study's questionnaire (47 items in 8 domains) was prepared according to the 5-point Likert scale (from unimportant to very important), and issued to experts in the field. Statistical population in this study included all Facebook member users that are in excess of 100,000 people and also all managers and those businesses that make money in Facebook. Given the limitless population and its unknown distribution, sample size was determined as follows: A total of 12 questionnaires (47 items in 8 domains) were issued to experts in the field as preliminary sample, and data obtained were analyzed.

#### V. ANALYSIS OF DATA

In this study, data were analyzed using FUZZY AHP method, in which, first demographic details were examined, and then the main question of this study was answered. Finally, collected data were presented as valuable information for application after analysis.

##### A. Details of respondents

Details of statistical sample were variables of gender, age, and education. 80% of respondents were men, and majority aged between 20 and 30 years. Results obtained showed 30% were qualified to Bachelor's Degree.

##### B. Confirmation of factors

The experts were asked to identify degree of importance of the indicators as unimportant=1 to really important=10. Indicators scoring higher than 7 were selected. In this study, the mean score of importance for all indicators was higher than 7.

##### C. Paired comparison analysis

All factors were compared in pairs, two by two by the experts. Paired comparison was carried out to identify priority of factors in relation to one another, according to the table below. If N represents number of factors, then, the required number of paired comparisons is found using the formula below;

$$N(N-1)/2$$

##### D. Extracting data from questionnaire

The experts' comments on indicators of business innovation assessment in Facebook that were based on the hourly 9-point range are transformed into triangular numbers (l-m-u) according to the following method:

Table 2: Range of fuzzy numbers and linguistic scale for determining weight

Linguistics criterion	Equal Importance	Slightly Important	Important	Very Important	Extremely Important
Triangular fuzzy numbers	(1-1-1)	(1-3-5)	(3-5-7)	(5-7-9)	(7-9-11)

##### E. Calculation of factors' combined extended fuzzy

The triple components sum  $\Sigma(l_{ij}-m_{ij}-u_{ij})$  of all matrix squares (all rows and columns) is calculated, which result in three numbers. They are reversed and shown in fuzzy form. In this way, the first and the third elements swap places. Then, the sum of the triple numbers of each row is multiplied by the three previously calculated inverted numbers. Result will produce the table below:

$$\sum_{i=1}^m \sum_{j=1}^n M_{ij} = \left( \sum_i^n l_i, \sum_i^n m_i, \sum_i^n u_i \right)$$

$$\left[ \sum_{i=1}^n \sum_{j=1}^m M_{ji} \right]^{-1} = \left( \frac{1}{\sum_{i=1}^n u_i}, \frac{1}{\sum_{i=1}^n m_i}, \frac{1}{\sum_{i=1}^n l_i} \right)$$

**Table 3: Main factors' of combined extended fuzzy**

$S_i$	$u_{ij}$	$m_{ij}$	$l_{ij}$
R & D and investment in knowledge	1.06	0.61	0.41
Human resources in science and technology	1.18	0.68	0.45
Innovation policies	0.42	0.24	0.16
Innovation performance	0.70	0.40	0.27
Communication and information technology	0.80	0.46	0.31
Trade and productivity	0.65	0.37	0.25
Global economic affairs	0.23	0.13	0.09
Science and technology globalization	0.25	0.14	0.02

❖ **Calculation of feasibility matrix of possible binary states**

At this stage, analyses are performed in columns. If value of  $m_{ij}$  of one factor is greater than value of  $m_{ij}$  of another factor, number 1, and if it is less, the following calculations are performed and results are tabulated. Otherwise

**Table 4: Feasibility of possible binary states**

	R&D and investment in knowledge	Human resources in science and technology	Innovation policies	Innovation performance	Communication and information technology	Trade and productivity	Global economic affairs	Science and technology globalization
R&D and investment in knowledge		1	0.40	0.67	0.76	0.62	0.23	1.00
Human resources in science and technology	0.90		0.36	0.60	0.69	0.56	0.21	1.01
Innovation policies	1	1		1	1	1	0.58	1.00
Innovation performance	1	1	0.61		1	0.93	0.35	1.00
Communication and information technology	1	1	0.53	0.87		0.82	0.31	1.00
Trade and productivity	1	1	0.53	1	1		0.38	1.00
Global economic affairs	1	1	1	1	1	1		1
Science and technology globalization	1	1	1	1	1	1	0.94	

❖ **Minimum feasibility of each column and calculation of final weight and rank of each indicator (column) through normalization**

**Table 5: Final weight and rank of each indicator (column)**

Factor	R&D and investment in knowledge	Human resources in science and technology	Innovation policies	Innovation performance	Communication and information technology	Trade and productivity	Global economic affairs	Science and technology globalization	Total
Minimum feasibility	0.90	1	0.36	0.60	0.69	0.56	0.21	1	5.35
Final weight	0.16	0.18	0.06	0.11	0.12	0.10	0.39	0.18	
Rank	3	2	7	5	4	6	1	2	

❖ **Compatibility of fuzzy paired comparison matrices**

Gogas & Butcher (1998) presented the following method for calculation of degree of incompatibility matrices of fuzzy paired comparisons. In this method, in order to assess incompatibility, it is necessary to form two separate matrices from the paired comparison matrix of combined experts' comments ( $A_{n \times n}$ ):  $A^g$  and  $A^m$ .

❖ **Calculation of  $A^m$  matrix**

Based on the obtained matrix of the combined paired comparison, only the middle part is included, and the matrix below is derived:

$$A^m = [a_{ijm}]$$

❖ **Normalization of  $A^m$  matrix and calculation of  $W^m$**

The above matrix is normalized using the equation given below and ( $W^m$ ) is calculated for every factor;

$$w^m = [w_i^m] \quad \text{where} \quad w_i^m = \frac{1}{n} \sum_{j=1}^n \frac{a_{ijm}}{\sum_{i=1}^n a_{ijm}}$$

❖ **Calculating  $\lambda_{max}$**

The largest value ( $\lambda_{max}$ ) for the above matrix is calculated using the equation below. Every single components of  $A^m$  matrix is multiplied into relevant  $W^m$  column, and then divide by the relevant  $W^m$  row. Finally, the resulting sum is divided by matrix dimension n.

$$\lambda_{max}^m = \frac{1}{n} \sum_{i=1}^n \sum_{j=1}^n a_{ijm} (w_j^m / w_i^m)$$

= 8.76  $\lambda_{max}$

❖ Calculating Compatibility Index (CI)

$$CI^m = \frac{(\lambda_{max}^m - n)}{(n - 1)}$$

CI = 0.109

❖ Finding Random Index (RI)

For the present problem Random Index RI was found 1.34 using the Gogaus &Butcher tables.

❖ Calculating compatibility ratio (CR)

CR = CI/RI = 0.109/1.34 = 0.081

The ratio found is less than 0.10, hence acceptable.

❖ Calculating matrix A<sup>g</sup>

According to the combined paired comparison matrix found, A<sup>g</sup> matrix is constructed from the geometric mean of the upper and lower triangular fuzzy numbers:

$$A^g = \sqrt{a_{ijl} \cdot a_{iju}}$$

❖ Normalization of A<sup>g</sup> and calculating W<sup>g</sup>

The equation given below is used to normalize A<sup>g</sup> matrix and also to W<sup>g</sup> weight for each factor.

$$w^g = [w_i^g] \quad \text{where} \quad w_i^g = \frac{1}{n} \sum_{j=1}^n \frac{\sqrt{a_{iju} \cdot a_{ijl}}}{\sum_{i=1}^n \sqrt{a_{iju} \cdot a_{ijl}}}$$

❖ Calculating  $\lambda_{max}$

For the above matrix, the highest special value ( $\lambda_{max}$ ) is found using the equation given below. Every component of A<sup>g</sup> matrix is multiplied by W<sup>g</sup> in the relevant column, and then divided by W<sup>g</sup> in the relevant row. Finally, the sum obtained is divided by n (matrix dimensions);

$$\lambda_{max}^g = \frac{1}{n} \sum_{i=1}^n \sum_{j=1}^n \sqrt{a_{iju} \cdot a_{ijl}} (w_j^g / w_i^g)$$

$\lambda_{max} = 8/286$

Calculating Compatibility Index (CI)

$$CI^g = \frac{(\lambda_{max}^g - n)}{(n - 1)}$$

CI = 0/040

❖ Determining Ransom Index (RI)

To determine Random Index RI, Gagaus & Butcher tables are used, for the present problem RI was found 0.416.

❖ Calculating Compatibility Ratio (CR)

CR = CI/RI = 0.040/0.4164 = 0.098

Since CR value is less than 0.10, this value is acceptable.

A <sup>m</sup>	R&D and investment in knowledge	Human resources in science and technology	Innovation policies	Innovation performance	Communication and information technology	Trade and productivity	Global economic affairs	Science and technology globalization
R&D and investment in knowledge	1	3.32	2.12	2.53	2.66	3.05	3.07	3.43
Human resources in science and technology	0.30	1	3.21	3.10	3.26	2.73	5.43	4.99
Innovation policies	0.47	0.31	1	2.78	0.95	0.90	1.02	0.71
Innovation performance	0.39	0.32	0.35	1	0.73	0.82	4.99	5.16
Communication and information technology	0.37	0.30	1.04	1.35	1	4.39	3.43	4.03
Trade and productivity	0.32	0.36	1.10	1.20	0.22	1	4.17	4.39
Global economic affairs	0.32	0.18	0.97	0.20	0.29	0.23	1	1.02
Science and technology globalization	0.29	0.20	1.39	0.19	0.24	0.22	0.97	1
Total	3.48	6.01	11.21	12.38	9.39	13.38	24.11	24.77

Table 6: A<sup>m</sup> matrix based on the combined pair comparison

## VI. DISCUSSION AND CONCLUSION

### A. Results

Results of the experts' descriptive test showed that 80% were male. Most participants were aged between 20 and 30, and 30% had Bachelor's Degree qualifications. For confirmation of factors, the experts were requested to identify degree of importance of the indicators according as unimportant=1 to vitally important=10. Indicators scoring higher than 7 are selected. Confirmation of factors has shown status of Facebook business innovation, and mean of all variables are higher than 7. Results of the fuzzy paired comparison matrices A<sup>m</sup> and A<sup>g</sup> indicated that:

#### 1. Matrix A<sup>m</sup>

$$\lambda_{\max} = 8.765$$

Compatibility Index (CI)

$$CI = 0.109$$

Compatibility Ratio (CR)

$$CR = 0.081$$

Since CR is less than 0.10, it is acceptable

#### 2. Matrix A<sup>g</sup>

$$\lambda_{\max} = 8.286$$

Compatibility Index (CI)

$$CI = 0.041$$

Random Index (RI)

Using Gasgus & utcher tables, RI was found 0.416.

Compatibility Ratio (CR)

$$CR = 0.098$$

Since it is less than 0.10, this value is acceptable.

### B. Discussion

Face book is a social network that has drawn interests of many users from around the world. In Iran also, this social network has found popularity and many businesses use this network to introduce their brands to others. The social network of Facebook is a suitable environment for internet marketing through creating a business page as the most popular social network with over one billion active users. All the above studies have somehow socially investigated Facebook, with such questions as: why do people use Facebook? And how is the effect Facebook as an electronic-social business? However, in the present study, attempts were made to identify and prioritize indicators of innovation assessment in Facebook business in a uniform and complete perspective. But, none of the above researchers have used this method or indices. Therefore, efforts were made to have an innovative method in this study. Based on relevant subjective literature review, indicators selected as the basic framework by the OECD as suitable framework for defining business innovation in Facebook included R & D and investment in knowledge, human resources, business innovation policies in Facebook, innovation performance, information and

communication technology, global economic affairs, and productivity and trade, and globalization of science and technology, which were prioritized using FAHP (fuzzy AHP) technique.

## VII. CONCLUSION

Results of the present study showed that priority of indicators was as follows. Small and medium businesses every day are showing more interest in social networking and use these networks to improve their business and helpful. Facebook and Google Plus social network also welcomes businesses have been amazing;

**1. Global economic affairs;** This reflects the influence of globalization and globalization has had on all aspects of economic, political, cultural, social and even military. And the increasing economic importance of information technology, especially the Internet, global communications, it is clearly shown by the software industry. Therefore, managers must be Internet-based electronic commerce, economic development and social services in the developing countries should improve noticeably.

**2. Science and technology globalization** indicators, and human resources in science and technology activities. Development of science and technology in the country is the results of interaction between various entities in a large system interact with each other. Transfer International technology for sustainable development in developing countries is vital. It requires a cultural change - technology, traditional models of technology transfer that are derived from the native economy. Therefore, managers should transfer the new model combines the latest technology available technology (research and development) to operate in international markets.

**3. R & D and investment in science.** Managers must know that they will succeed in the long run communities where your HR comes about properly developing their education, therefore, it is recommended to use proper authorities and managers of human resources as the most valuable and important are the greatest wealth of any society.

### 4. Application recommendations

- Prioritizing influential factors on internet business using FAHP technique
- Prioritizing influential factors on targeted marketing in internet business using FAHP technique

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**Table 1: A questionnaire sample completed by experts**

Criterion	Extremely Important	Very Important	Important	Slightly Important	Equal Importance	Slightly Important	Important	Very important	Extremely important	Criterion
Human resources in science and technology	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	x	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	R & D and investment in knowledge
Innovation policies	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	x	<input type="checkbox"/>	<input type="checkbox"/>	R & D and investment in knowledge
Innovation performance	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	x	<input type="checkbox"/>	R & D and investment in knowledge
Communication and information technology	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	x	R & D and investment in knowledge
Trade and productivity	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	x	<input type="checkbox"/>	R & D and investment in knowledge
Global economic affairs	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	x	<input type="checkbox"/>	<input type="checkbox"/>	R & D and investment in knowledge
Science and technology globalization	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	x	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	R & D and investment in knowledge
Innovation policies	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	x	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Human resources in science and technology
Innovation performance	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	x	<input type="checkbox"/>	Human resources in science and technology
Communication and information	<input type="checkbox"/>	<input type="checkbox"/>	x	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Human resources in science and

technology										technology
Trade and productivity	☐	☐	☐	☐	☐	☐	×	☐	☐	Human resources in science and technology
Global economic affair	☐	☐	☐	☐	☐	×	☐	☐	☐	Human resources in science and technology
Science and technology globalization	☐	☐	×	☐	☐	☐	☐	☐	☐	Human resources in science and technology
Innovation performance	☐	☐	☐	×	☐	☐	☐	☐	☐	Innovation policies
Communication and information technology	☐	☐	☐	☐	☐	☐	×	☐	☐	Innovation policies
Trade and productivity	☐	☐	☐	☐	☐	×	☐	☐	☐	Innovation policies
Global economic affairs	☐	×	☐	☐	☐	☐	☐	☐	☐	Innovation policies
Science and technology globalization	☐	☐	☐	×	☐	☐	☐	☐	☐	Innovation policies
Communication and information technology	☐	☐	☐	☐	☐	☐	☐	×	☐	Innovation performance
Trade and productivity	☐	☐	☐	☐	☐	×	☐	☐	☐	Innovation performance
Global economic affairs	☐	☐	☐	×	☐	☐	☐	☐	☐	Innovation performance
Science and technology globalization	☐	☐	☐	☐	☐	×	☐	☐	☐	Innovation performance
Trade and productivity	☐	☐	☐	☐	☐	☐	×	☐	☐	Communication and information technology
Global economic affairs	☐	☐	×	☐	☐	☐	☐	☐	☐	Communication and information technology
Science and technology globalization	☐	☐	☐	☐	☐	×	☐	☐	☐	Communication and information technology
Global economic affairs	☐	☐	☐	☐	☐	☐	×	☐	☐	Trade and productivity
Science and technology globalization	☐	☐	×	☐	☐	☐	☐	☐	☐	Trade and productivity
Science and technology globalization	☐	×	☐	☐	☐	☐	☐	☐	☐	Global economic affairs