INTERNATIONAL JOURNAL OF
COASTAL, OFFSHORE & ENVIRONMENTAL ENGINEERING IJCOE Vol.11/No. 1/Winter 2026 (1-33)

Available online at: www. Ijcoe.org

A model of human capital in the law of Marine Agile Project-Oriented Organizations

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ARTICLE INFO

Article History:
Receive: 26 Jun 2025
Accepted : 23 Dec 2025

Keywords:
***Human Capital, Project-Based Organization, Agile Organization, law,* Marine Organizations**

ABSTRACT

High-tech industries technology industries that have superior technology and technical knowledge, innovation and creativity, attention to its definition and development, need to create a knowledge management system in such a way that the flow of knowledge required by the organization and individuals is effective and timely. By examining the main dimensions of human capital of Marine Agile Project-Oriented Organizations, law, indicators related to these dimensions and their relationship with each other; Relationship between human capital components in the human capital model of Marine Agile Project-Oriented Organizations We prioritized the dimensions and components presented. Considering that extensive research in such organizations has not been done so far; Therefore, the results of this research can be very useful for completing the circle of knowledge management and achieving the goals of knowledge flow in high-tech industries organizations, as well as making available and transferring the experiences of people working in this field, as well as saving time and reducing costs

1. Introduction

Research shows that human capital is the highest, most valuable and largest asset of any organization or country. Today, organizations are well aware that they need the best talent to succeed in a complex global economy and staying competitive in the business environment. In this environment, organizations need to work together to strengthen their human capital. The results show that by choosing the best human capital for organizations, success can be achieved and an effective step can be taken to advance the goals of the organization. On the other hand, given that the world is changing, organizations need to change to progress and compete, and in a word, to be "agile." Agility means the ability to respond quickly and successfully to environmental changes(Armstrong & Taylor, 2020). An organization will be agile when it is able to coordinate and support all the required resources quickly and efficiently by leveraging knowledge and cooperation (internally and with other organizations), sharing sensitive information with suppliers, partners and Share customers, anticipate market changes and changes in customer value. Numerous studies show that countries have higher economic growth with educated, skilled and adequate labor. Continuing the research process suggests that proper human capital management is one of the biggest challenges facing projects. The goal of all project-oriented organizations is the successful implementation of projects(Ekambaram, Sørensen, Bull-Berg, & Olsson, 2018). One of the important dimensions in project implementation is the discussion of human capital management and related processes. So far, various models have been proposed to explain the different dimensions as well as measuring the human capital of organizations; general models that have measured this capital in general and do not consider the differences in the structure and texture of different areas(Wright, 2014). It is also worthwhile to consider competence, speed, flexibility, accountability, and cultivate them within oneself as much as possible (Kerzner, 2017). It is essential that organizations develop. Accordingly, the main goal of the present study is to provide a model for the:

1) What are the main dimensions of human capital of Marine Agile Project-Oriented Organizations?

2) What are the indicators related to the key dimensions of human capital of Marine Agile Project-Oriented Organizations?

3) What is the relationship between the key dimensions of human capital in the human capital model of Marine Agile Project-Oriented Organizations?

4) how is the relationship between the components of human capital in the human capital model of agile project-based organizations?

5) What is the priority of the dimensions and components of human capital in the model of Marine Agile Project-Oriented Organizations?

2. Theoretical foundations and background of research

Leslie and Zerley (2003). Human capital is the result of a combination of professional knowledge of employees, leadership skills, risk-taking, and problem-solving ability. According to Bonites, human capital represents the knowledge of individuals in an organization that lies within its employees. Human capital is a combination of knowledge, the power of innovation, and the ability of individuals to perform their duties, values, culture, and philosophy(Birasnav, Rangnekar, & Dalpati, 2011). Human capital refers to knowledge, education, job competencies, and psychometric assessments. Human capital is very important because of its scarcity, value, irreplaceability and imitation. Human capital is an important factor in determining the growth of countries or explains

the difference in productivity between countries(Premalatha, 2016).

"Maritime law, sometimes referred to as admiralty law, is the branch of law that governs all aspects of the sea. Maritime law encompasses various issues, including: The regulation of shipping and insurance. The navigation and passage of ships through different jurisdictions and in the open seas. The rights of seafarers"

2.1 Project-based organization

It is an organization that is ultimately a priority with the project and does most of its work in the form of a project (Kerzner, 2017). An organization that organizes its work in the form of separate projects in such a way that it organizes skilled and capable people to perform innovative and complex tasks for different purposes and customers (Gemünden, Lehner, & Kock, 2018). It is an organization in which employees have a permanent employment relationship with the organization, but have a temporary employment relationship with the project (Sparrow & Cooper, 2012).According to Pakandorf, the initial dependence of project staff on the organization and the project is routine. In general, it can be said that the project-based organization is an organization that has six characteristics: 1- Objectivism 2- Central and knowledge-based team 3- Temporality 4- Multi-task and inter-unit structure 5- Stress generation 6- Multi-employment.

Project-based organizations are organizations whose operations consist mainly of projects. These organizations are divided into two categories. Organizations whose main income comes from project implementation in the form of a contract for others, and organizations that have accepted project-based management. Project-oriented organizations are a type of matrix organization that has flexible, smooth, fast structures and is based on teams and projects. Project-based organizations are usually in areas of industry, especially construction, information technology, communication, Cars, media and professional services are active. Their strategy is to create results to meet the demand of specific customers by organizing projects to temporarily employ internal specialized employees and run the business in a limited time frame(Cattani, Ferriani, Frederiksen, & Täube, 2011). Project-based organizations are also referred to as knowledge-based and learning organizations. These organizations have dynamic boundaries because the number and type of projects are constantly changing(Pemsel, Müller, & Söderlund, 2016).

2.2 Agile organization

Today, rapid and unexpected changes due to technological innovations, changing customer needs, and a lack of confidence in competitive environments have hampered the flexibility and responsiveness of organizations; Thus, the formation of this critical situation has left no choice but to make major reforms in the strategic perspective, reviewing traditional models and business priorities for organizations; therefore, organizations are well aware that to overcome these challenges. The environment and the preservation of competitiveness, approaches and solutions have lost their capability and the current strategic and modern weapon environment requires new paradigms and perspectives; therefore, agility to take advantage of potential opportunities and The opposite is true of environmental threats(Hamalainen, Kosonen, & Doz, 2012) .Agile organizations are more integrated than traditional organizations. In these organizations, goals can change weekly or even daily. Agile organizations think beyond adaptation to change and tend to use potential opportunities in a turbulent environment and gain a steady position They remember their innovations and merits. Agile organizations think differently about meeting customer needs. Not only do they sell their products, but they also offer solutions to meet the real needs of their customers, believing that their products are not perfect and enriching their customers' values and creating added value by enriching their product.

This makes the position of agile organizations inaccessible to competitors (Andzulis, Panagopoulos, & Rapp, 2012).

In fact, agility refers to an organization's ability to anticipate, respond effectively and efficiently, think quickly and intelligently, and use appropriate selection strategies to deal with factors affecting organizational performance(Triaa, Gzara, & Verjus, 2016). Since the beginning of the third millennium, intense competition over technology development, increasing customer expectations, increasing cost pressures, instability and market instability, etc., have been among the factors that necessitate the use of new patterns, procedures and tools for organizations to succeed and survive. Impose. The intensification of global competition has prompted organizations to choose agility in human capital as the dominant paradigm in the face of these challenges, among the various solutions offered to deal with the turbulent environment. Ability to streamline human capital can bring a wide range of benefits to the organization, such as speeding up the learning curve, improving quality, better customer service, and saving in scope and depth(Tolf, Nyström, Tishelman, Brommels, & Hansson, 2015). so, agility can be considered as active responses to change, the use of change as inherent opportunities in a turbulent environment, and the ability to survive and thrive in a changing and unpredictable environment(Nafei, 2016).

In fact, agile human capital has the potential to conquer new markets with the flag of innovation, to develop, to ensure the excellence of the organization, and to paint a bright future for it (Rodina, Simpkis and Foxx, 2003).

3. General models of human capital

Table 1 presents the general models of human capital of organizations and the main dimensions proposed for each of these models.

Table 1: Different models of human capital of organizations

researcher	Components and indicators of human capital
(Dhir, 2019)	Rational capital, social capital, emotional capital
(Gendron, Kouremenou, & Rusu, 2016)	Human intellectual capital, Human social capital, Human emotional capital
(Shastry, 2012)	Education,Wages,Communication,Human capital
(Trivellas, Akrivouli, Tsifora, & Tsoutsa, 2015)	Organizational competencies and , Learning Motivation , Culture ، Leadership and management satisfaction
(Bailey, Albassami, & Al-Meshal, 2016)	Employee satisfaction, job satisfaction and employee commitment
(Dobson, Rose, Parton, & Hart, 2020)	Leadership, employee participation, access to knowledge, labor optimization and learning capacity
(Ulvenblad, Berggren, & Winborg, 2013)	Ability, Skills, Competence, Education, Experience, Number of Company People Related to Previous Field, Accurate Distribution of Customer Liability Responsibilities

(Aldrich & Meyer, 2015)	Rational capital, social capital, and emotional capital
(Karamustafaoğlu, 2011)	Knowledge, skills, ability
(Tan, 2016)	Knowledge: Higher education, knowledge-based staff, periodic training, organizational leadership knowledge Skills and Abilities: Knowledgeable Staff, Expert Advisors, Information Technology, Ability to Upgrade to Management Levels - Using Knowledge-Based Team Structure Attitude: Loyalty and commitment of Daneshvar staff, Daneshvar staff satisfaction, evaluation of Daneshvar's attitude and opinions, organization's ability to motivate Daneshvar.
(Kashi, 2017)	Competence: experience and expertise, competencies, skills and training Attitude: employee motivation and satisfaction, teamwork spirit, valuable adaptability of the organization and leadership Intellectual agility: creativity and innovation, problem-solving ability, mental flexibility
(Schuler, Jackson, & Tarique, 2011)	Leadership, cultural communication, strategic integration, intelligence and talent, knowledge management
(Subramanian, Abdulrahman, Wu, & Nath, 2016)	General knowledge, employee competence
(Hong, Hao, Kumar, Ramendran, & Kadiresan, 2012)	Employee competence, which includes strategic management leadership; employee traits; employee learning ability; employee training efficiency; employee ability to participate in decision-making and management; technical and management staff training; Employee attitudes that include the acquisition of identity from organizational values; Satisfaction rate; Employee dropout rate; Moderate useful life of employees and employee creativity that includes employee creativity ability; Income from employees' creative thoughts
Quintana, Mora,) Pérez, & Vila, (2016	Technical knowledge, education, work-related knowledge, work-related competence, entrepreneurial spirit, skills related to innovation and the effectiveness of change or flexibility, professional competence

Human capital in project-oriented organizations

Table 2: presents the dimensions and components of human capital in project-based organizations.

Reference	Dimensions and components
(Kleitman, Stankov, Allwood, Young, & Mak, 2012)	Education level, verbal and communication skills, self-confidence, leadership power
(Hislop, Bosua, & Helms, 2018)	Motivation, general and specialized knowledge, work experience, knowledge sharing and application, high flexibility and quick response
(Yan, 2020)	Riskability
(Lin & Chen, 2017)	Knowledge sharing and application, specialized knowledge

(Lin & Chen, 2017)	Creating alignment structures, implementing strategies and producing knowledge
(Sabeeh, Mustapha, & Mohamad, 2018)	Goal-based management as an organizational strategy
(Decker, 2018)	Expert knowledge, skills and resources, flexible response to changing customer needs, risks and uncertainty
(Azeez, 2015)	Experience, training, creativity, skill and health
(Turner & Pennington, 2015)	Knowledge, ability, motivation

Human capital in agile organizations

Table 3: presents the dimensions and components of human capital in agile organizations.

)Liu, Zhang, Liao, Hao, & Mao, 2016(	Strengthen employee creativity, integrate employee ideas
(Afsar & Badir, 2017)	Flexibility in providing services, nurturing employees with skills, worthy and compatible with technologies, creating motivation, knowledge, skills
(Chang, Gong, Way, & Jia, 2013)	Trained and flexible human resources, responsiveness and rapid adaptability
(Ghajargar, Zenezini, & Montanaro, 2016)	Flexibility in service delivery, speed and quality of meeting customer needs, managing and motivating employees, capability, skill, technology compatibility
(Laureiro-Martínez & Brusoni, 2018)	Ability, flexibility, decision-making ability and problem solving
(Charan, 2017)	Accept new responsibilities, be willing to develop and train yourself, be able to solve problems, adapt to changes, new ideas and technologies, and accept new responsibilities
(Casey & Sieber, 2016)	Involve employees, train and motivate employees
(Sotsh, 2014)	Efficiency: Reading the market, having a broad vision, customer orientation, foresight, having knowledge about the market, the environment and direction of the organization and being result-oriented, spontaneous cooperation, constructive behavior, education and learning Focus: Ability to prioritize, find solutions and solutions, patience and speed of action Being productive: Skillful in organizational matters, quick learning, welcoming experience, willingness to use new knowledge and teamwork spirit
(Sousa & Rocha, 2019)	Competency: Acceleration of essential skills, changes in business processes, speed of innovation of management skills, speed of acquisition of software skills, new information technology and speed of development of new skills and competencies Intelligence: Responding to changing market conditions, the business environment, and changing customer needs

(Enalls-Fenner, 2015)	Flexibility and positive attitude towards change, tolerance in uncertain situations, constructive interaction with stress, intelligence, competence, cooperation, culture, information system, active behavior
(Harden, Laidlaw, & Mmed, 2020)	Responding to external changes, benchmarks for assessing skills and speed in skills development, speed of adaptation to the new work environment, speed of access to information, use of fluid technology, independence in the workplace, participatory technologies, knowledge sharing and employee empowerment
(Nayak, 2016)	IT skills, teamwork and negotiation knowledge, technology and production strategies knowledge, capable, multi-tasking staff and self-governing teams
(Cetin, Demirciftci, & Bilgihan, 2016)	Ability to change ability and capacity, training, knowledge, skills

By examining the type of expression of the subject, the dimensions and components of human capital in agile project-based organizations were identified and the initial research model was presented.

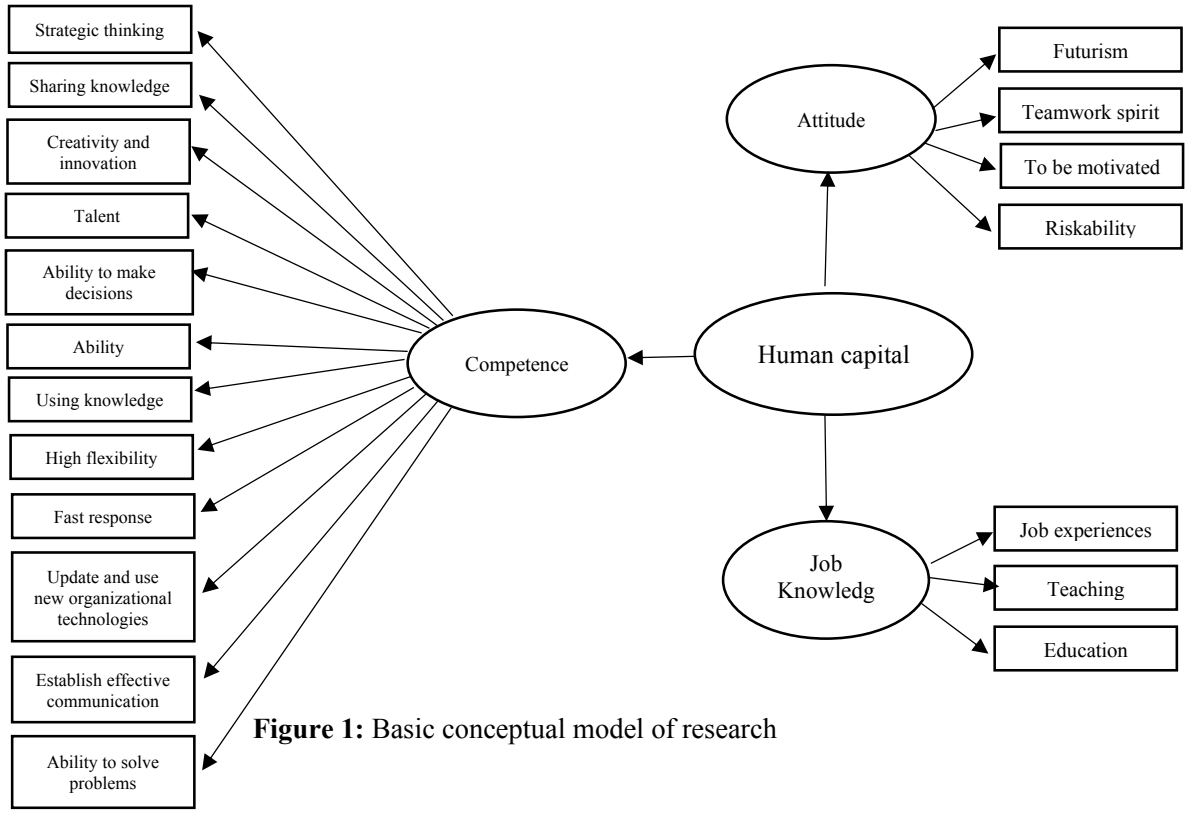

Figure 1: Basic conceptual model of research

4. Research methodology

This research is applied from the perspective of the research goal because it tries to put the results of this research into practical use and with the help of its results, to solve the problems of the organization. But this research is from the perspective of collecting descriptive-survey research information. When research is attempted to rely on library studies of the early model of human capital, research is descriptive, but when it is attempted with the help of an expert questionnaire, the opinion of experts on the model is survey research. The statistical population of this study consists of experts who are familiar with the subject and also familiar with project-based organizations and agile organizations. On the other hand, due to the specialization of the subject, determining the sampling method and also determining the sample size has not been very effective and efforts have been made to emphasize more on the qualification of individuals and their familiarity with relevant issues. In total, in this research, the opinions of 8 experts who have been informed about snowballs have been used. In this research, to collect the necessary data for designing the conceptual model of the research, the method of reviewing library documents has been used. For this purpose, the necessary searches were carried out in databases and libraries, and after reviewing and reading numerous articles, three dimensions and nineteen components were identified. In addition, expert interviews were conducted, and finally a questionnaire was used to test the model's expertise.

4.1 Expert interview

After reviewing articles and resources related to human capital in project-based and agile organizations, expert interviews were conducted with relevant experts. These interviews were conducted with the aim of presenting the dimensions and components extracted from library studies to experts and consulting relevant experts. Also, for variables that may have been neglected in library studies, a better understanding of the variables for their operational definition, appropriate classification, was also surveyed.

4.2 Formation of the proposed framework (dimensions and components) of the proposed research model

According to experts, the components of ethics, legalism, tolerance, secrecy, and attention to the benefits of the organization were added to the attitude. Also, according to experts, the components mentioned in the attitude dimension are among the dimensions of personality traits because human personality is a constant and stable trait that characterizes the commonalities and differences between a person and others, but the attitude of any kind of expression of opinion. It is about an object or a person or an event in which judgment and evaluation lie (regardless of whether it is positive or negative).

Feeling +
Interpretation⇨Perception⇨Attitude⇨
behavior⇨ personality

So then the attitude towards personality traits changed.

In terms of job knowledge, the components of education and training were eliminated, and the components of general knowledge and specialized knowledge were proposed. General knowledge includes university education, and specialized knowledge includes job-related education and on-the-job training. They also confirmed the component of job experiences that were considered as research findings.

In the competency dimension, the skill component was eliminated due to competency overlap. It was suggested that the component of knowledge application be integrated with the component of knowledge sharing and be considered as knowledge sharing and application of knowledge. It was also suggested that the component of decision-making ability and problem-solving ability be integrated with each other, so it was considered as decision-making and problem-solving ability. After interviewing

various experts, the components: interaction with the external environment (customers, competitors), systemic thinking were added to the model.

Table 2 shows the variables calculated from the literature and the expert interview.

Table 4: Human Capability Variables in Project-Based Organizations

Extract from		Variable	Extract from		Variable
interview	Dialect		interview	Dialect	
*	*	Knowledge Sharing and Knowledge Application	*	*	Futurism
*	-	Interact With The External environment (customers, competitors)	*	*	Riskability
*	*	Ability to Make Decisions and Solve Problems	*	*	To be motivated
*	-	Systematic Thinking	*	*	Team Work Sprint
*	*	Update and Use New Organizational Technologies	*	*	obligation
*	*	Establish Effective Communication and Interaction	*	*	General Knowledge
*	*	Creativity and Innovation	*	*	Dedicated Knowledge
*	*	Strategic Thinking	*	*	Job experiences
*	*	Work Talent	*	*	High Flexibility
-	*	Skill	*	*	Fast Response
*	-	Secrecy	*	-	Ethical
*	-	Pay Attention to The Interests of The Organization	*	-	Legitimacy
*	-	Honesty	*	-	Tolerance

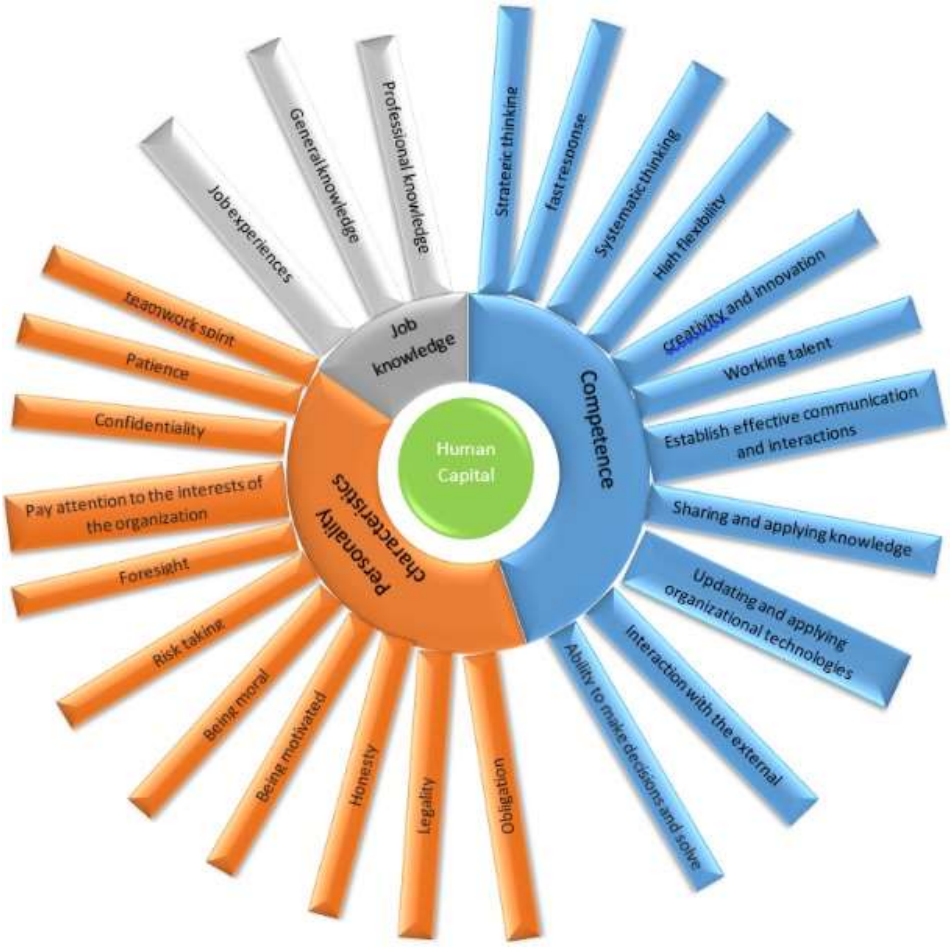

Figure 2: The final model of human capital in Marine Agile Project-Oriented Organizations

4.3 Expert testing of the dimensions and components of the proposed model

After designing the proposed research model, this model was tested on a large scale and using the opinions of 8 experts. To this end, the DANP Expert Questionnaire was designed, in which experts assessed the importance and appropriateness of the proposed components according to the DANP method.

4.4 Expert Questionnaire

DANP questionnaire was used in this study. The measurement tool must have the necessary validity and reliability so that the researcher can collect data appropriate to the research and through these data and their analysis, test the desired hypotheses and answer the research questions. Given that all the components and indicators that make up the questions were derived from the literature and related theories, and in this questionnaire the couple comparison, all the two-to-two factors are compared. This eliminates all chances of ignoring a criterion or question. Also, before duplicating the questionnaire, it was examined with several experts, and the validity of the questionnaire was confirmed from the very beginning of the research with the opinion of experts and experts.

The following relation is used in the DANP method to calculate the measurement of data reliability.

$$g = \frac{1}{n(n-1)} \sum_{i=1}^{n} \sum_{j=1}^{n} \frac{\left| t_{ij}^{p} - t_{ij}^{p-1} \right|}{t_{ij}^{p}} \times 100$$

That g is the discrepancy rate and $\mathbf{t_{ij}^{p}}$, indicating the matrix values and $\mathbf{t_{ij}^{p-1}}$ Indicates the matrix values of the mean of the experts' opinions by deleting the experts No. **i** and **n** , the number of criteria.

5. Data analyzing method

DANP method steps

5.1 calculate the direct communication matrix

The evaluation of the relationships between the criteria (the effect of one criterion on another criterion) is based on the opinions of research experts using a rating range of 0 to 4, in which 0 means no effect, 1 means little effect, 2 means moderate effect, 3 means high impact and 4 means very high impact. Experts are asked to determine the effect of one criterion on another.

$$D = \begin{bmatrix} d_c^{11} & \dots & d_c^{1j} & \dots & d_c^{1n} \\ \vdots & & \vdots & & \vdots \\ d_c^{i1} & \dots & d_c^{ij} & \dots & d_c^{in} \\ \vdots & & \vdots & & \vdots \\ d_c^{n1} & \dots & d_c^{nj} & \dots & d_c^{nn} \end{bmatrix}$$

The D-direct communication matrix is normalized using the following equation and the N-matrix is obtained.

$$N = VD;\ V = \min\left\{1/\max_i \sum_{j=1}^{n} d_c^{ij},\ 1/\max_j \sum_{i=1}^{n} d_c^{ij}\right\}.\ i.j \in \{1,2,\dots,n\}$$

$$T = N + N^2 + \cdots + N^h = N(I - N)^{-1},\ \text{when} \lim Nh \to \infty$$

Reliability is also obtained from the following equation:

Reliability = 1-g

If the g value is less than 5% (reliability above 95%), the reliability of the data (validity) is confirmed.

Here the value of the discrepancy rate was calculated to be 0.48493546, and since it is less than 0.05, the compatibility of the comparisons is accepted and shows that it is reliable.

That is, if they believe that the criterion i affects the criterion j, they must show it as d_c ^ ij. Therefore, the matrix D = [d_c ^ ij] will be obtained from the direct relation. In the DANP method, when we have criteria and sub-criteria, we only form the sub-criteria. In fact, we form the DANP method for the sub-criteria and draw conclusions from it for the criteria. Therefore, considering that the research model has 25 components, it is a matrix with dimensions of 25 * 25. Combine the opinions of the 8 experts by means of an arithmetic mean to form the initial matrix.

5.2 Normalize the direct communication matrix

Step 3 - Calculate the total communication matrix

Once the D matrix is normalized and the N matrix is obtained, the complete communication matrix will be obtained through the following equation. In this regard, I represents the unit matrix.

The total communication matrix can be calculated by the criteria shown in T_C :

$$T_c = \begin{array}{c} \\ D_1 \\ \vdots \\ D_i \\ \vdots \\ D_n \end{array} \begin{array}{c} \begin{array}{cccccc} D_1 & & D_j & & D_n \\ c_{11}\ldots c_{1m_1} & \cdots & c_{j1}\ldots c_{jm_j} & \cdots & c_{n1}\ldots c_{nm_n} \end{array} \\ \begin{bmatrix} T_c^{11} & \cdots & T_c^{1j} & \cdots & T_c^{1n} \\ \vdots & & \vdots & & \vdots \\ T_c^{i1} & \cdots & T_c^{ij} & \cdots & T_c^{in} \\ \vdots & & \vdots & & \vdots \\ T_c^{n1} & \cdots & T_c^{nj} & \cdots & T_c^{nn} \end{bmatrix} \end{array}$$

The r_i index represents the sum of the i-th row and the c_j represents the sum of the j-column. The r_i + c_j index is obtained from the sum of the row i and the column j (i = j). This index indicates the importance of the i-th criterion. Similarly, the r_i-c_j index is the result of the difference between the sum of the i-row and the j-column and indicates the influence or effectiveness of the i-criterion. In general, if r_i-c_j is positive (i = j), the i-th criterion is one of the causal or influential criteria. If r_i-c_j is negative (i = j), criterion i-th is part of the group of influential criteria. The scientific diagram can be drawn based on the two mentioned indicators, which is known as the network relations map. According to this map, it is possible to decide how the dimensions and criteria can be improved.

$$T_D = \begin{bmatrix} t_{11}^{D_{11}} & \cdots & t_{1j}^{D_{1j}} & \cdots & t_{1m}^{D_{1m}} \\ \vdots & \vdots & \vdots & \vdots & \vdots \\ t_{i1}^{D_{i1}} & \cdots & t_{ij}^{D_{ij}} & \cdots & t_{im}^{D_{im}} \\ \vdots & \vdots & & \vdots & \vdots \\ t_{m1}^{D_{m1}} & \cdots & t_{mj}^{D_{mj}} & \cdots & t_{mm}^{D_{mm}} \end{bmatrix} \begin{array}{l} \longrightarrow d_1 = \sum_{j=1}^{m} t_{1j}^{D_{1j}} \\ \\ \longrightarrow d_i = \sum_{j=1}^{m} t_{ij}^{D_{ij}} \\ \\ \longrightarrow d_m = \sum_{j=1}^{m} t_{mj}^{D_{mj}} \end{array} \quad , d_i = \sum_{j=1}^{m} t_{ij}^{D_{ij}}, i = 1,\ldots,m$$

Normalize the relationship matrix of the whole criteria ($T_C^{\propto}$)

Normalization of T_C with the sum of the degrees of impact and effectiveness of the criteria and dimensions for obtaining $T_C^{\propto}$ as follows:

Step 4 - Analyze the results

In this step, the sum of the rows and columns of the total connection matrix is calculated separately according to the following equation.

$$T = [t_{ij}], \quad i, j \in \{1, 2, \ldots, n\}$$

$$r = [r_i]_{n\times 1} = \left[\sum_{j=1}^{n} t_{ij}\right]_{n\times 1} \qquad c = [c_j]_{1\times n} = \left[\sum_{i=1}^{n} t_{ij}\right]_{1\times n}$$

5.3 DANP technique for finding effective weights in any criterion

Normalize the communication matrix of all dimensions($T_D^{\propto}$)

The T_D matrix is obtained from the average T_C^{ij}. Ij. This matrix will be normalized according to the following method, so that the sum of each row is calculated and each element is divided by the sum of the elements of the corresponding row. The normalized $T_D$total communication matrix is shown as $T_D^{\propto}$.

$$T_C^{\alpha} = \begin{array}{c} \\ D_1 \\ \vdots \\ D_i \\ \vdots \\ D_n \end{array} \begin{array}{c} \begin{array}{cccccc} D_1 & & D_j & & D_n \\ c_{11}\ldots c_{1m_1} & \cdots & c_{j1}\ldots c_{jm_j} & \cdots & c_{n1}\ldots c_{nm_n} \end{array} \\ \begin{bmatrix} T_c^{\alpha 11} & \cdots & T_c^{\alpha 1j} & \cdots & T_c^{\alpha 1n} \\ \vdots & & \vdots & & \vdots \\ T_c^{\alpha i1} & \cdots & T_c^{\alpha ij} & \cdots & T_c^{\alpha in} \\ \vdots & & \vdots & & \vdots \\ T_c^{\alpha n1} & \cdots & T_c^{\alpha nj} & \cdots & T_c^{\alpha nn} \end{bmatrix} \end{array}$$

$$T_D^{\alpha} = \begin{bmatrix} t_{11}^{D_{11}}/d_1 & \cdots & t_{1j}^{D_{1j}}/d_1 & \cdots & t_{1m}^{D_{1m}}/d_1 \\ \vdots & \vdots & \vdots & \vdots & \vdots \\ t_{i1}^{D_{i1}}/d_i & \cdots & t_{ij}^{D_{ij}}/d_i & \cdots & t_{im}^{D_{im}}/d_i \\ \vdots & \vdots & & \vdots & \vdots \\ t_{m1}^{D_{m1}}/d_m & \cdots & t_{mj}^{D_{mj}}/d_m & \cdots & t_{mm}^{D_{mm}}/d_m \end{bmatrix} = \begin{bmatrix} t_D^{\alpha 11} & \cdots & t_D^{\alpha 1j} & \cdots & t_D^{\alpha 1n} \\ \vdots & & \vdots & & \vdots \\ t_D^{\alpha i1} & \cdots & t_D^{\alpha ij} & \cdots & t_D^{\alpha in} \\ \vdots & & \vdots & & \vdots \\ t_D^{\alpha n1} & \cdots & t_D^{\alpha nj} & \cdots & t_D^{\alpha nn} \end{bmatrix}$$

An example of how to normalize $T_C^{\propto 11}$ is described below, as are other $T_c^{\propto nm}$ calculations.

$$\mathbf{d_{ci}^{11}} = \sum_{\mathbf{j=1}}^{\mathbf{m_1}} \mathbf{t_{cij}^{11}} \ , \mathbf{i = 1, 2, \ldots, m_1}$$

$$\mathbf{T_C^{\propto 11}} = \begin{bmatrix} t_{c11}^{11}/d_{c1}^{11} & \cdots & t_{c1j}^{11}/d_{c1}^{11} & \cdots & t_{c1m1}^{11}/d_{c1}^{11} \\ \vdots & & \vdots & & \vdots \\ t_{ci1}^{11}/d_{ci}^{11} & \cdots & t_{cij}^{11}/d_{ci}^{11} & \cdots & t_{cim1}^{11}/d_{ci}^{11} \\ \vdots & & \vdots & & \vdots \\ t_{cm11}^{11}/d_{cm1}^{11} & \cdots & t_{cm1j}^{11}/d_{cm1}^{11} & \cdots & t_{cm1m1}^{11}/d_{cm1}^{11} \end{bmatrix} =$$

$$\begin{bmatrix} t_{c11}^{\propto 11} & \cdots & t_{c1j}^{\propto 11} & \cdots & t_{c1m1}^{\propto 11} \\ \vdots & & \vdots & & \vdots \\ t_{ci1}^{\propto 11} & \cdots & t_{cij}^{\propto 11} & \cdots & t_{cim1}^{\propto 11} \\ \vdots & & \vdots & & \vdots \\ t_{cm1\,1}^{\propto 11} & \cdots & t_{cm1j}^{\propto 11} & \cdots & t_{cm1m1}^{\propto 11} \end{bmatrix}$$

Form an unbalanced super matrix W

In this step, the full matrix song matrix is normalized, $T_C^{\propto}$ Is calculated, and the W matrix is obtained. For example, if a matrix such as the W^{11} matrix is empty or zero, it means that the corresponding matrices are independent.

Form a balanced super matrix

$$\mathbf{W} = (\mathbf{T_C^{\propto}})' = \begin{bmatrix} W^{11} & \cdots & W^{i1} & \cdots & W^{n1} \\ \vdots & & \vdots & & \vdots \\ W^{1j} & \cdots & W^{ij} & \cdots & W^{nj} \\ \vdots & & \vdots & & \vdots \\ W^{1n} & \cdots & W^{in} & \cdots & W^{nn} \end{bmatrix}$$

In order to form a harmonic super matrix, the normal $T_D^{\propto}$ complete communication matrix is transposed and multiplied by the unbalanced super matrix.

$$\mathbf{W^{\propto}} = \mathbf{T_D^{\propto} W} = \begin{bmatrix} t_D^{\propto 11} \times W^{11} & \cdots & t_D^{1i1} \times W^{i1} & \cdots & t_D^{\propto n1} \times W^{n1} \\ \vdots & & \vdots & & \vdots \\ t_D^{\propto 1j} \times W^{1j} & \cdots & t_D^{\propto ij} \times W^{ij} & \cdots & t_D^{\propto nj} \times W^{nj} \\ \vdots & & \vdots & & \vdots \\ t_D^{\propto 1n} \times W^{1n} & \cdots & t_D^{\propto in} \times W^{in} & \cdots & t_D^{\propto nn} \times W^{nn} \end{bmatrix}$$

Limit rhythmic super matrix

We limit the balanced super matrix by reaching a large number like Z, until the super matrix converges and stabilizes. The output of this step will be the effective DANP weights.

$$\lim_{Z \to \infty} (W^{\propto})^{Z}$$

Findings using DANP method

Table 1: Decision matrix

T(norm)	a1	a2	a3	a4	a5	a6	a7	a8	a9	a10	a11	b1	b2	b3	b4	b5	b6	b7	b8	b9	b10	b11	c1	c2	c3
a1	0	0.039	0.039	0.022	0.022	0.051	0.017	0.051	0.041	0.039	0.017	0.029	0.012	0.002	0.036	0.038	0.038	0.039	0.031	0.022	0.038	0.024	0.005	0.005	0.019
a2	0.038	0	0.010	0.026	0.007	0.019	0.031	0.041	0.027	0.039	0.031	0.033	0.041	0.009	0.034	0.034	0.034	0.039	0.031	0.038	0.041	0.019	0.026	0.024	0.024
a3	0.045	0.017	0	0.017	0.046	0.050	0.017	0.043	0.039	0.039	0.033	0.022	0.015	0	0.031	0.026	0.045	0.024	0.022	0.015	0.043	0.014	0.015	0.015	0.019
a4	0.015	0.033	0.021	0	0.015	0.021	0.033	0.050	0.024	0.019	0.017	0.045	0.034	0.017	0.038	0.038	0.050	0.043	0.043	0.041	0.046	0.024	0.022	0.021	0.026
a5	0.031	0.021	0.051	0	0	0.048	0	0.039	0.043	0.019	0.024	0.019	0	0	0.019	0.015	0.019	0.015	0.014	0.015	0.022	0.015	0.015	0.015	0.019
a6	0.055	0.019	0.050	0.019	0.045	0	0.009	0.050	0.039	0.033	0.019	0.019	0.015	0	0.017	0.017	0.039	0.036	0.036	0.024	0.043	0.015	0.015	0.015	0.024
a7	0.017	0.022	0.015	0.034	0	0.015	0	0.026	0.022	0.033	0.043	0.027	0.024	0	0.034	0.027	0.034	0.024	0.050	0.028	0.034	0.019	0	0.022	
a8	0.048	0.034	0.026	0.050	0.019	0.050	0.027	0	0.043	0.029	0.041	0.029	0.027	0.026	0.038	0.038	0.046	0.046	0.045	0.046	0.048	0.026	0.024	0.027	0.033
a9	0.048	0.019	0.036	0.009	0.019	0.031	0.017	0.050	0	0.022	0.015	0.022	0.015	0	0.026	0.031	0.029	0.024	0.033	0.021	0.039	0.019	0.017	0.017	0.024
a10	0.034	0.038	0.031	0.017	0.012	0.041	0.031	0.029	0.029	0	0.024	0.038	0.034	0.019	0.050	0.046	0.046	0.050	0.046	0.029	0.053	0.034	0.027	0.026	0.038
a11	0.021	0.024	0.033	0.007	0.019	0.015	0.050	0.027	0.007	0.010	0	0.019	0.021	0.002	0.024	0.021	0.045	0.021	0.029	0.033	0.041	0.009	0.010	0.009	0.024
b1	0.019	0.027	0.021	0.046	0.017	0.027	0.027	0.046	0.029	0.036	0.021	0	0.031	0.012	0.043	0.043	0.046	0.041	0.048	0.039	0.046	0.039	0.027	0.027	0.038
b2	0.017	0.033	0.017	0.027	0.017	0.017	0.026	0.031	0.017	0.038	0.021	0.036	0	0.034	0.043	0.041	0.033	0.031	0.055	0.043	0.043	0.027	0.031	0.045	0.038
b3	0	0.015	0	0.026	0	0.002	0.017	0.024	0	0.021	0.022	0.027	0.039	0	0.015	0.024	0.021	0.038	0.039	0.036	0.015	0.017	0.043	0.046	0.041
b4	0.022	0.027	0.021	0.034	0.015	0.015	0.027	0.043	0.027	0.051	0.024	0.043	0.034	0.019	0	0.015	0.045	0.048	0.048	0.046	0.050	0.024	0.026	0.026	0.033
b5	0.041	0.034	0.022	0.039	0.015	0.015	0.022	0.041	0.021	0.050	0.022	0.043	0.036	0.017	0.050	0	0.050	0.050	0.050	0.048	0.048	0.027	0.031	0.031	0.038
b6	0.026	0.029	0.048	0.022	0.022	0.036	0.029	0.046	0.026	0.045	0.031	0.045	0.034	0.022	0.048	0.055	0	0.031	0.034	0.045	0.053	0.027	0.038	0.033	0.045
b7	0.034	0.033	0.024	0.038	0.015	0.022	0.036	0.046	0.024	0.046	0.024	0.045	0.033	0.033	0.046	0.046	0.043	0	0.046	0.050	0.043	0.029	0.055	0.055	0.055
b8	0.031	0.038	0.029	0.026	0.021	0.019	0.046	0.041	0.038	0.034	0.039	0.015	0.041	0.036	0.046	0.045	0.050	0.038	0	0.041	0.050	0.039	0.039	0.041	0.048
b9	0.012	0.036	0.019	0.051	0.019	0.021	0.036	0.048	0.026	0.026	0.027	0.043	0.041	0.033	0.048	0.048	0.041	0.043	0.043	0	0.039	0.026	0.043	0.045	0.046
b10	0.024	0.031	0.045	0.041	0.022	0.029	0.026	0.050	0.022	0.050	0.029	0.043	0.027	0.010	0.050	0.048	0.053	0.039	0.050	0.036	0	0.027	0.026	0.022	0.039
b11	0.022	0.010	0.010	0.033	0.007	0.010	0.026	0.029	0.012	0.031	0.034	0.039	0.021	0.009	0.031	0.034	0.034	0.031	0.038	0.024	0.029	0	0.024	0.019	0.027
c1	0.005	0.015	0.005	0.038	0.003	0.007	0.027	0.017	0.010	0.031	0.034	0.045	0.039	0.039	0.043	0.048	0.048	0.050	0.051	0.048	0.039	0.031	0	0.050	0.050
c2	0.015	0.019	0	0.041	0	0.015	0.027	0.033	0.015	0.027	0.034	0.048	0.043	0.043	0.043	0.050	0.048	0.050	0.053	0.050	0.038	0.033	0.053	0	0.050
c3	0.019	0.021	0.034	0.048	0.021	0.017	0.036	0.033	0.010	0.036	0.027	0.048	0.043	0.034	0.043	0.050	0.048	0.046	0.051	0.039	0.043	0.031	0.051	0.050	0

Table 2: Normalized matrix

Criteria	a1	a2	a3	a4	a5	a6	a7	a8	a9	a10	a11	b1	b2	b3	b4	b5	b6	b7	b8	b9	b10	b11	c1	c2	c3
a1	0	2.75	2.75	1.625	1.625	3.75	1.25	3.75	3	2.875	1.25	2.125	0.875	0.125	2.625	2.75	2.75	2.875	2.25	1.625	2.75	1.75	0.375	0.375	1.375
a2	2.75	0	0.75	1.875	0.5	1.375	2.25	3	2	2.875	2.25	2.375	3	0.625	2.5	2.5	2.75	2.875	2.25	2.75	3	1.375	1.875	1.75	1.75
a3	3	1.25	0	1.25	3.375	3.625	1.25	3.125	2.875	2.875	2.375	1.625	1.125	0	2.25	1.875	3.25	1.75	1.625	1.125	3.125	1	1.125	1.125	1.375
a4	1.125	2.375	1.5	0	1.125	1.5	2.375	3.625	1.75	1.375	1.25	3.25	2.5	1.25	2.75	2.75	3.625	3.125	3.125	3	3.375	1.75	1.625	1.5	1.875
a5	2.25	1.5	3.75	0	0	3.5	0	2.875	3.125	1.375	2	1.375	0	0	1.375	1.125	1.375	1.125	1	1.125	1.625	1.125	1.125	1.125	1.375
a6	4	1.375	3.625	1.375	3.25	0	0.625	3.625	2.875	2.375	1.375	1.375	1.125	0	1.25	1.25	2.875	2.625	2.625	1.75	3.125	1.125	1.125	1.125	1.75
a7	1.25	1.625	1.125	2.5	0	1.125	0	1.875	1.625	2.375	3.125	2	1.75	0	2.5	2	2.5	1.75	3.625	2.75	2.5	1.375	0	0	1.625
a8	3.5	2.5	1.875	3.625	1.375	3.625	2	0	3.125	2.125	3	3.125	2	1.875	2.75	2.75	3.375	3.375	3.25	3.375	3.5	1.875	1.75	2	2.375
a9	3.5	1.375	2.625	0.625	1.375	2.25	1.25	3.625	0	1.625	1.125	1.625	1.125	0	1.875	2.25	2.125	1.75	2.375	0.875	2.875	1.375	1.25	1.25	1.75
a10	2.5	2.75	2.25	1.25	0.875	3	2.25	2.125	2.125	0	1.75	2.75	2.5	1.375	3.625	3.375	3.375	3.625	3.375	2.125	3.875	2.5	2	1.875	2.75
a11	1.5	1.75	2.375	0.5	1.375	1.125	3.625	2	0.5	0.75	0	1.375	1.5	0.125	1.75	1.5	3.25	1.75	3.125	2.375	3	0.625	0.75	0.625	1.75
b1	1.375	2	1.5	3.375	1.25	2	2	3.375	2.125	2.625	1.5	0	2.25	0.875	3.125	3.125	3.375	3	3.5	2.875	3.375	2.875	2	2	2.75
b2	1.25	2.375	1.25	2	1.25	1.25	1.875	2.25	1.25	2.75	1.5	2.625	0	2.5	3.125	2.5	2.375	2.25	4	3.125	3.125	2	2.25	2.5	2.75
b3	0	1.125	0	1.875	0	0.125	1.25	1.75	0	1.5	1.625	2	2.875	0	1.25	1.75	1.5	2.75	2.875	2.625	1.125	1.25	3.125	3.375	3
b4	1.625	2	1.5	2.5	1.125	1.125	2	3.125	2	3.75	1.75	3.125	2.5	1.375	0	3.625	3.75	3.25	3.5	3.375	3.625	1.75	1.875	1.875	2.375
b5	3	2.5	1.625	2.875	1.125	1.125	1.625	3	1.5	3.625	1.625	3.125	2.625	1.25	3.625	0	3.625	3.625	3.625	3.5	3.5	2	2.25	2.25	2.75
b6	1.875	2.125	3.5	3.125	1.625	2.625	2.125	3.375	1.875	3.25	2.25	3.25	2.5	1.625	3.5	4	0	2.25	2.5	3.25	3.875	2	2.75	2.75	3.25
b7	2.5	2.375	1.75	2.75	1.125	1.625	2.625	3.375	1.75	3.375	1.75	3.25	2.375	2.375	3.375	3.125	3.125	0	3.375	0.375	3.125	2.125	4	4	4
b8	2.25	2.75	2.125	1.875	1.5	1.375	3.375	3	2.75	2.5	2.875	3.75	3	2.625	3.375	3.25	3.625	2.75	0	3	3.625	2.875	4	3	3.5
b9	0.875	2.625	1.375	3.75	1.375	1.5	2.625	3.5	1.875	1.875	2	3.125	3	2.375	3.5	3.5	3	3.125	3.125	0	2.875	1.875	3.125	3.25	3.375
b10	1.75	2.25	3.25	3	1.625	2.125	1.875	3.625	1.625	3.625	2.125	3.125	2	0.75	3.625	3.5	3.875	2.875	3.625	2.625	0	2	1.875	1.625	2.875
b11	1.625	0.75	0.75	2.375	0.5	0.75	1.875	2.125	0.875	2.25	0.25	2.875	1.5	0.625	2.25	2.5	2.5	2.25	2.75	1.75	2.125	0	1.75	1.375	2
c1	0.375	1.125	0.375	2.75	0.25	0.5	2	1.25	0.75	2.25	0.25	3.25	2.875	2.875	3.125	3.5	3.5	3.625	3.75	3.5	2.875	2.25	0	3.625	3.625
c2	1.125	1.375	0	3	0	1.125	2	2.375	1.125	2	0.25	3.5	3.125	3.125	3.125	3.625	3.5	3.625	3.875	3.625	2.75	2.375	3.875	0	3.625
c3	1.375	1.5	2.5	3.5	1.5	1.25	2.625	2.375	0.75	2.625	2	3.5	3.125	2.5	3.125	3.625	3.5	3.375	3.75	2.875	3.125	2.25	3.75	3.625	0

Table 3: TC matrix

TC	a1	a2	a3	a4	a5	a6	a7	a8	a9	a10	a11	b1	b2	b3	b4	b5	b6	b7	b8	b9	b10	b11	c1	c2	c3
a1	0.71	0.22	0.11	0.13	0.07	0.12	0.05	0.15	0.22	0.15	0.05	0.13	0.05	0.05	0.14	0.14	0.15	0.14	0.05	0.12	0.15	0.06	0.05	0.18	0.11
a2	0.11	0.05	0.05	0.11	0.05	0.12	0.05	0.15	0.08	0.14	0.03	0.14	0.22	0.09	0.15	0.15	0.16	0.14	0.01	0.14	0.16	0.09	0.01	0.11	0.13
a3	0.12	0.06	0.07	0.10	0.09	0.12	0.01	0.15	0.11	0.13	0.06	0.12	0.09	0.05	0.13	0.13	0.15	0.02	0.13	0.11	0.15	0.08	0.09	0.09	0.11
a4	0.06	0.12	0.09	0.10	0.07	0.07	0.17	0.17	0.10	0.13	0.01	0.14	0.22	0.01	0.16	0.16	0.18	0.06	0.17	0.15	0.17	0.04	0.17	0.11	0.13
a5	0.09	0.07	0.11	0.06	0.04	0.07	0.15	0.12	0.09	0.09	0.07	0.09	0.06	0.04	0.08	0.09	0.00	0.09	0.09	0.08	0.10	0.05	0.09	0.07	0.09
a6	0.13	0.05	0.12	0.10	0.09	0.07	0.05	0.15	0.11	0.12	0.08	0.12	0.09	0.05	0.12	0.12	0.17	0.05	0.14	0.12	0.15	0.08	0.09	0.09	0.12
a7	0.08	0.07	0.08	0.10	0.04	0.08	0.06	0.12	0.08	0.11	0.02	0.12	0.10	0.05	0.13	0.11	0.13	0.01	0.17	0.12	0.13	0.08	0.07	0.07	0.04
a8	0.14	0.03	0.12	0.16	0.08	0.13	0.03	0.19	0.12	0.15	0.02	0.17	0.13	0.08	0.17	0.18	0.19	0.08	0.20	0.17	0.20	0.12	0.13	0.13	0.13
a9	0.13	0.05	0.10	0.10	0.06	0.09	0.08	0.14	0.06	0.10	0.07	0.11	0.09	0.08	0.17	0.12	0.13	0.01	0.14	0.08	0.15	0.08	0.07	0.09	0.07
a10	0.13	0.03	0.12	0.13	0.07	0.12	0.02	0.16	0.11	0.12	0.05	0.16	0.13	0.08	0.18	0.17	0.19	0.02	0.19	0.15	0.19	0.12	0.12	0.12	0.16
a11	0.08	0.06	0.09	0.08	0.06	0.07	0.02	0.11	0.06	0.11	0.06	0.10	0.09	0.04	0.09	0.11	0.14	0.02	0.14	0.11	0.13	0.05	0.07	0.07	0.10
b1	0.11	0.12	0.12	0.15	0.07	0.11	0.13	0.17	0.11	0.15	0.01	0.13	0.13	0.08	0.17	0.17	0.18	0.07	0.19	0.17	0.20	0.12	0.12	0.15	
b2	0.10	0.12	0.09	0.13	0.08	0.09	0.11	0.15	0.09	0.15	0.06	0.15	0.10	0.10	0.16	0.15	0.16	0.06	0.19	0.16	0.17	0.12	0.13	0.14	0.15
b3	0.06	0.08	0.06	0.10	0.07	0.06	0.08	0.11	0.06	0.10	0.04	0.11	0.11	0.05	0.10	0.11	0.12	0.12	0.16	0.12	0.10	0.08	0.11	0.12	0.12
b4	0.11	0.12	0.02	0.14	0.07	0.09	0.02	0.12	0.10	0.11	0.05	0.17	0.14	0.08	0.11	0.11	0.19	0.07	0.08	0.17	0.19	0.11	0.13	0.12	0.15
b5	0.13	0.03	0.11	0.15	0.07	0.10	0.03	0.18	0.11	0.17	0.01	0.17	0.14	0.09	0.18	0.14	0.20	0.02	0.20	0.18	0.20	0.12	0.12	0.13	0.16
b6	0.12	0.04	0.14	0.15	0.08	0.13	0.01	0.19	0.12	0.16	0.01	0.18	0.14	0.09	0.19	0.14	0.15	0.09	0.19	0.18	0.20	0.12	0.14	0.14	0.17
b7	0.14	0.04	0.12	0.16	0.08	0.12	0.04	0.19	0.14	0.18	0.02	0.19	0.15	0.11	0.19	0.20	0.20	0.15	0.21	0.19	0.20	0.13	0.17	0.16	0.19
b8	0.13	0.03	0.13	0.15	0.08	0.11	0.05	0.16	0.13	0.17	0.01	0.13	0.16	0.10	0.19	0.19	0.21	0.08	0.19	0.19	0.21	0.13	0.17	0.16	0.19
b9	0.11	0.02	0.08	0.08	0.07	0.11	0.03	0.19	0.13	0.15	0.01	0.18	0.15	0.10	0.18	0.19	0.19	0.02	0.19	0.19	0.19	0.12	0.14	0.15	0.18
b10	0.12	0.03	0.13	0.15	0.08	0.12	0.01	0.16	0.11	0.17	0.01	0.17	0.14	0.08	0.18	0.18	0.20	0.09	0.19	0.16	0.15	0.12	0.15	0.12	0.16
b11	0.11	0.08	0.07	0.12	0.05	0.07	0.09	0.01	0.01	0.11	0.05	0.13	0.09	0.06	0.12	0.13	0.13	0.01	0.14	0.11	0.13	0.06	0.02	0.11	0.11
c1	0.09	0.10	0.08	0.15	0.06	0.09	0.02	0.14	0.09	0.14	0.06	0.16	0.14	0.02	0.17	0.17	0.18	0.07	0.18	0.17	0.17	0.12	0.10	0.14	0.16
c2	0.10	0.11	0.05	0.15	0.06	0.06	0.01	0.17	0.09	0.14	0.07	0.18	0.15	0.01	0.17	0.18	0.19	0.02	0.19	0.17	0.18	0.12	0.11	0.10	0.17
c3	0.11	0.10	0.08	0.15	0.08	0.11	0.04	0.17	0.10	0.16	0.01	0.18	0.16	0.10	0.18	0.19	0.20	0.05	0.20	0.17	0.19	0.13	0.16	0.15	0.13

Table 4: TD matrix

Criteria	a	b	c
a	0/101795	0/124025	0/101532
b	0/117689	0/151299	0/138173
c	0/112881	0/164711	0/139849

Table 5:

T(norm)	a1	a2	a3	a4	a5	a6	a7	a8	a9	a10	a11	b1	b2	b3	b4	b5	b6	b7	b8	b9	b10	b11	c1	c2	c3
a1	0.00	0.04	0.04	0.02	0.02	0.05	0.02	0.05	0.04	0.04	0.02	0.03	0.01	0.00	0.04	0.04	0.04	0.04	0.03	0.02	0.04	0.02	0.01	0.01	0.02
a2	0.04	0.00	0.01	0.03	0.01	0.02	0.03	0.04	0.03	0.04	0.03	0.03	0.04	0.01	0.03	0.03	0.03	0.04	0.03	0.04	0.04	0.02	0.03	0.02	0.02
a3	0.04	0.02	0.00	0.02	0.05	0.05	0.02	0.04	0.04	0.04	0.03	0.02	0.02	0.00	0.03	0.03	0.04	0.02	0.02	0.02	0.04	0.01	0.02	0.02	0.02
a4	0.02	0.03	0.02	0.00	0.02	0.02	0.03	0.05	0.02	0.02	0.02	0.04	0.03	0.02	0.04	0.04	0.05	0.04	0.04	0.04	0.05	0.02	0.02	0.02	0.03
a5	0.03	0.02	0.05	0.00	0.00	0.05	0.00	0.04	0.04	0.02	0.02	0.02	0.00	0.00	0.02	0.02	0.02	0.02	0.01	0.02	0.02	0.02	0.02	0.02	0.02
a6	0.05	0.02	0.05	0.02	0.04	0.00	0.01	0.05	0.04	0.03	0.02	0.02	0.02	0.00	0.02	0.02	0.04	0.04	0.04	0.02	0.04	0.02	0.02	0.02	0.02
a7	0.02	0.02	0.02	0.03	0.00	0.02	0.00	0.03	0.02	0.03	0.04	0.03	0.02	0.00	0.03	0.03	0.03	0.02	0.05	0.03	0.03	0.02	0.00	0.02	
a8	0.05	0.03	0.03	0.05	0.02	0.05	0.03	0.00	0.04	0.03	0.04	0.03	0.03	0.03	0.04	0.04	0.05	0.05	0.04	0.05	0.05	0.03	0.02	0.03	0.03
a9	0.05	0.02	0.04	0.01	0.02	0.03	0.02	0.05	0.00	0.02	0.02	0.02	0.02	0.00	0.03	0.03	0.03	0.02	0.03	0.02	0.04	0.02	0.02	0.02	0.02
a10	0.03	0.04	0.03	0.02	0.01	0.04	0.03	0.03	0.03	0.00	0.02	0.04	0.03	0.02	0.05	0.05	0.05	0.05	0.05	0.03	0.05	0.03	0.03	0.03	0.04
a11	0.02	0.02	0.03	0.01	0.02	0.02	0.05	0.03	0.01	0.01	0.00	0.02	0.02	0.00	0.02	0.02	0.04	0.02	0.03	0.03	0.04	0.01	0.01	0.01	0.02
b1	0.02	0.03	0.02	0.05	0.02	0.03	0.03	0.05	0.03	0.04	0.02	0.00	0.03	0.01	0.04	0.04	0.05	0.04	0.05	0.04	0.05	0.04	0.03	0.03	0.04
b2	0.02	0.03	0.02	0.03	0.02	0.02	0.03	0.03	0.02	0.04	0.02	0.04	0.00	0.03	0.04	0.04	0.03	0.03	0.05	0.04	0.04	0.03	0.03	0.04	0.04
b3	0.00	0.02	0.00	0.03	0.00	0.00	0.02	0.02	0.00	0.02	0.02	0.03	0.04	0.00	0.02	0.02	0.02	0.04	0.04	0.04	0.02	0.02	0.04	0.05	0.04
b4	0.02	0.03	0.02	0.03	0.02	0.02	0.03	0.04	0.03	0.05	0.02	0.04	0.03	0.02	0.00	0.02	0.04	0.05	0.05	0.05	0.05	0.02	0.03	0.03	0.03
b5	0.04	0.03	0.02	0.04	0.02	0.02	0.02	0.04	0.02	0.05	0.02	0.04	0.04	0.02	0.05	0.00	0.05	0.05	0.05	0.05	0.05	0.03	0.03	0.03	0.04
b6	0.03	0.03	0.05	0.02	0.02	0.04	0.03	0.05	0.03	0.04	0.03	0.04	0.03	0.02	0.05	0.05	0.00	0.03	0.03	0.04	0.05	0.03	0.04	0.03	0.04
b7	0.03	0.03	0.02	0.04	0.02	0.02	0.04	0.05	0.02	0.05	0.02	0.04	0.03	0.03	0.05	0.05	0.04	0.00	0.05	0.05	0.04	0.03	0.05	0.05	0.05

b8	0.03	0.04	0.03	0.03	0.02	0.02	0.05	0.04	0.04	0.03	0.04	0.02	0.04	0.04	0.05	0.04	0.05	0.04	0.00	0.04	0.05	0.04	0.04	0.04	0.05
b9	0.01	0.04	0.02	0.05	0.02	0.02	0.04	0.05	0.03	0.03	0.03	0.04	0.04	0.03	0.05	0.05	0.04	0.04	0.04	0.00	0.04	0.03	0.04	0.04	0.05
b10	0.02	0.03	0.04	0.04	0.02	0.03	0.03	0.05	0.02	0.05	0.03	0.04	0.03	0.01	0.05	0.05	0.05	0.04	0.05	0.04	0.00	0.03	0.03	0.02	0.04
b11	0.02	0.01	0.01	0.03	0.01	0.01	0.03	0.03	0.01	0.03	0.03	0.04	0.02	0.01	0.03	0.03	0.03	0.03	0.04	0.02	0.03	0.00	0.02	0.02	0.03
c1	0.01	0.02	0.01	0.04	0.00	0.01	0.03	0.02	0.01	0.03	0.03	0.04	0.04	0.04	0.04	0.05	0.05	0.05	0.05	0.05	0.04	0.03	0.00	0.05	0.05
c2	0.02	0.02	0.00	0.04	0.00	0.02	0.03	0.03	0.02	0.03	0.03	0.05	0.04	0.04	0.04	0.05	0.05	0.05	0.05	0.05	0.04	0.03	0.05	0.00	0.05
c3	0.02	0.02	0.03	0.05	0.02	0.02	0.04	0.03	0.01	0.04	0.03	0.05	0.04	0.03	0.04	0.05	0.05	0.05	0.05	0.04	0.04	0.03	0.05	0.05	0.00

Table 6: D + R and D-R values for all components

TC	a1	a2	a3	a4	a5	a6	a7	a8	a9	a10	a11	b1	b2	b3	b4	b5	b6	b7	b8	b9	b10	b11	c1	c2	c3		D
a1	0.08	0.12	0.11	0.11	0.07	0.12	0.09	0.16	0.11	0.14	0.09	0.13	0.10	0.05	0.14	0.14	0.15	0.14	0.15	0.12	0.15	0.10	0.08	0.08	0.11		1.20
a2	0.11	0.08	0.08	0.12	0.06	0.09	0.11	0.15	0.10	0.14	0.10	0.14	0.13	0.06	0.15	0.15	0.16	0.15	0.15	0.14	0.16	0.09	0.11	0.11	0.13		1.15
a3	0.12	0.09	0.07	0.10	0.09	0.12	0.09	0.15	0.11	0.13	0.10	0.12	0.09	0.05	0.13	0.13	0.15	0.12	0.13	0.11	0.15	0.08	0.09	0.09	0.11		1.15
a4	0.10	0.12	0.10	0.10	0.07	0.10	0.12	0.17	0.10	0.13	0.09	0.16	0.13	0.08	0.16	0.16	0.18	0.16	0.17	0.15	0.17	0.10	0.11	0.11	0.13		1.18
a5	0.09	0.07	0.10	0.06	0.04	0.10	0.05	0.12	0.09	0.09	0.07	0.09	0.06	0.03	0.09	0.09	0.10	0.09	0.09	0.08	0.10	0.06	0.07	0.07	0.08		0.88
a6	0.13	0.09	0.12	0.10	0.09	0.07	0.08	0.15	0.11	0.12	0.08	0.12	0.09	0.05	0.12	0.12	0.15	0.13	0.14	0.12	0.15	0.08	0.09	0.09	0.12		1.16
a7	0.08	0.09	0.08	0.11	0.04	0.07	0.07	0.12	0.08	0.11	0.10	0.12	0.10	0.04	0.13	0.12	0.13	0.11	0.15	0.12	0.13	0.08	0.07	0.07	0.10		0.95
a8	0.14	0.13	0.12	0.16	0.08	0.14	0.13	0.14	0.13	0.15	0.13	0.17	0.13	0.09	0.17	0.18	0.19	0.18	0.19	0.18	0.20	0.12	0.13	0.13	0.16		1.45
a9	0.11	0.08	0.10	0.09	0.06	0.09	0.08	0.14	0.06	0.10	0.07	0.11	0.09	0.04	0.12	0.12	0.13	0.11	0.13	0.10	0.14	0.08	0.08	0.08	0.11		1.00
a10	0.13	0.13	0.12	0.13	0.07	0.12	0.12	0.16	0.11	0.12	0.11	0.16	0.14	0.08	0.18	0.18	0.19	0.18	0.19	0.15	0.19	0.12	0.12	0.12	0.16		1.32
a11	0.08	0.08	0.09	0.08	0.06	0.07	0.11	0.11	0.06	0.09	0.06	0.10	0.09	0.04	0.11	0.11	0.14	0.10	0.13	0.11	0.13	0.07	0.07	0.07	0.10		0.89
b1	0.11	0.12	0.11	0.15	0.07	0.11	0.12	0.17	0.11	0.15	0.10	0.13	0.13	0.08	0.17	0.17	0.18	0.17	0.19	0.16	0.18	0.12	0.12	0.12	0.15		1.68
b2	0.10	0.12	0.10	0.13	0.07	0.09	0.11	0.15	0.10	0.15	0.10	0.15	0.10	0.09	0.16	0.16	0.16	0.15	0.19	0.16	0.17	0.11	0.12	0.14	0.15		1.62
b3	0.06	0.08	0.06	0.10	0.04	0.06	0.08	0.11	0.06	0.10	0.08	0.11	0.11	0.05	0.10	0.11	0.12	0.12	0.14	0.12	0.11	0.08	0.11	0.11	0.12		1.18
b4	0.11	0.12	0.11	0.14	0.07	0.10	0.12	0.17	0.11	0.17	0.11	0.17	0.14	0.08	0.13	0.18	0.19	0.17	0.19	0.17	0.19	0.11	0.12	0.12	0.15		1.72
b5	0.13	0.13	0.11	0.15	0.07	0.10	0.12	0.18	0.11	0.17	0.11	0.17	0.14	0.08	0.18	0.14	0.20	0.18	0.20	0.18	0.19	0.12	0.13	0.13	0.16		1.79
b6	0.12	0.13	0.14	0.16	0.08	0.13	0.13	0.19	0.12	0.17	0.12	0.18	0.14	0.09	0.19	0.20	0.15	0.17	0.19	0.18	0.20	0.12	0.14	0.14	0.17		1.81
b7	0.13	0.14	0.12	0.16	0.08	0.12	0.14	0.19	0.12	0.18	0.12	0.19	0.15	0.11	0.19	0.20	0.20	0.15	0.21	0.19	0.20	0.13	0.16	0.16	0.19		1.90
b8	0.13	0.14	0.12	0.15	0.08	0.11	0.15	0.19	0.13	0.16	0.13	0.19	0.15	0.11	0.19	0.19	0.21	0.18	0.16	0.18	0.20	0.14	0.15	0.15	0.18		1.89
b9	0.11	0.13	0.11	0.17	0.08	0.11	0.13	0.18	0.11	0.15	0.11	0.18	0.15	0.10	0.18	0.19	0.19	0.18	0.19	0.13	0.19	0.12	0.14	0.15	0.17		1.79
b10	0.12	0.13	0.13	0.15	0.08	0.12	0.12	0.18	0.11	0.17	0.11	0.17	0.13	0.08	0.18	0.18	0.20	0.17	0.19	0.16	0.15	0.12	0.13	0.12	0.16		1.73
b11	0.08	0.08	0.07	0.11	0.05	0.07	0.09	0.12	0.07	0.11	0.06	0.13	0.09	0.05	0.12	0.13	0.13	0.12	0.14	0.11	0.13	0.06	0.09	0.09	0.11		1.21
c1	0.09	0.10	0.08	0.14	0.06	0.08	0.12	0.14	0.09	0.14	0.08	0.16	0.14	0.10	0.17	0.17	0.18	0.17	0.18	0.17	0.17	0.11	0.10	0.14	0.16		0.40
c2	0.10	0.11	0.08	0.15	0.06	0.10	0.12	0.16	0.10	0.14	0.09	0.18	0.15	0.11	0.17	0.18	0.19	0.18	0.19	0.17	0.18	0.12	0.15	0.10	0.17		0.42
c3	0.11	0.12	0.12	0.16	0.08	0.11	0.14	0.17	0.10	0.16	0.11	0.18	0.15	0.10	0.18	0.19	0.20	0.18	0.20	0.17	0.19	0.13	0.16	0.15	0.13		0.44

R	1.16	1.09	1.09	1.16	0.72	1.09	1.05	1.57	1.07	1.14	1.00	1.77	1.44	0.92	1.81	1.85	1.93	1.75	1.96	1.74	1.92	1.22	0.40	0.40	0.46		
D+R	2.36	2.23	2.24	2.34	1.60	2.25	2.01	3.02	2.07	2.63	1.89	3.45	3.06	2.09	3.53	3.64	3.74	3.65	3.86	3.52	3.65	2.44	0.80	0.82	0.90		
D-R	0.04	0.06	0.06	0.02	0.15	0.06	0.10	0.12	0.75	0.00	0.10	0.88	0.18	0.26	0.97	0.62	0.13	0.15	0.69	0.05	0.18	0.90	0.32	0.02	0.21		

Table 7: D + R and D-R values for model components

Ceriteria	C1	C2	C3	D
C1	0.101795	0.124025	0.101532	0.327352
C2	0.117689	0.151299	0.138173	0.407162
C3	0.112881	0.164711	0.139849	0.41744
R	0.332365	0.440035	0.379554	
D+R	0.659717	0.847197	0.796995	
D-R	-0.00501	-0.03287	0.037886	

Figure 2: Impact and impact of the dimensions and components of the research model

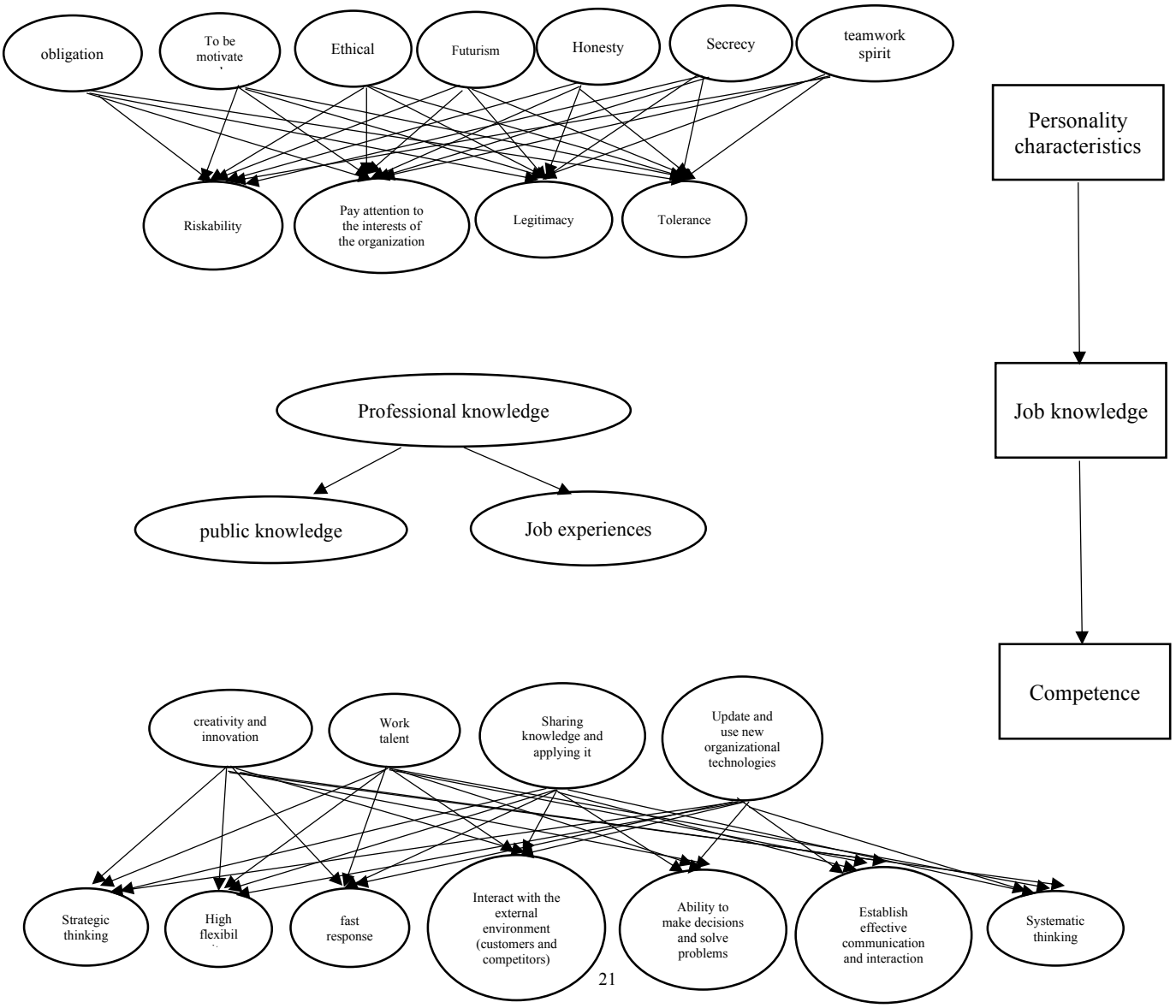

Table 8: Normalized total communication matrix

Ceriteria	C1	C2	C3
C1	0.310965	0.378875	0.31016
C2	0.289048	0.371594	0.339358
C3	0.270411	0.394573	0.335016

Table 9: Transposed normal total communication matrix

Ceriteria	C1	C2	C3
C1	0.310965	0.289048	0.270411
C2	0.378875	0.371594	0.394573
C3	0.31016	0.339358	0.335016

Table 10: Normalized communication matrix of all indicators

	a1	a2	a3	a4	a5	a6	a7	a8	a9	a10	a11	b1	b2	b3	b4	b5	b6	b7	b8	b9	b10	b11	c1	c2	c3
a1	0.08	0.12	0.11	0.11	0.07	0.12	0.09	0.16	0.11	0.14	0.09	0.13	0.10	0.05	0.14	0.14	0.15	0.14	0.15	0.12	0.15	0.10	0.08	0.08	0.11
a2	0.11	0.08	0.08	0.12	0.06	0.09	0.11	0.15	0.10	0.14	0.10	0.14	0.13	0.06	0.15	0.15	0.16	0.15	0.15	0.14	0.16	0.09	0.11	0.11	0.13
a3	0.12	0.09	0.07	0.10	0.09	0.12	0.09	0.15	0.11	0.13	0.10	0.12	0.09	0.05	0.13	0.13	0.15	0.12	0.13	0.11	0.15	0.08	0.09	0.09	0.11
a4	0.10	0.12	0.10	0.10	0.07	0.10	0.12	0.17	0.10	0.13	0.09	0.16	0.13	0.08	0.16	0.16	0.18	0.16	0.17	0.15	0.17	0.10	0.11	0.11	0.13
a5	0.09	0.07	0.10	0.06	0.04	0.10	0.05	0.12	0.09	0.09	0.07	0.09	0.06	0.03	0.09	0.09	0.10	0.09	0.09	0.08	0.10	0.06	0.07	0.07	0.08
a6	0.13	0.09	0.12	0.10	0.09	0.07	0.08	0.15	0.11	0.12	0.08	0.12	0.09	0.05	0.12	0.12	0.15	0.13	0.14	0.12	0.15	0.08	0.09	0.09	0.12
a7	0.08	0.09	0.08	0.11	0.04	0.07	0.07	0.12	0.08	0.11	0.10	0.12	0.10	0.04	0.13	0.12	0.13	0.11	0.15	0.12	0.13	0.08	0.07	0.07	0.10
a8	0.14	0.13	0.12	0.16	0.08	0.14	0.13	0.14	0.13	0.15	0.13	0.17	0.13	0.09	0.17	0.18	0.19	0.18	0.19	0.18	0.20	0.12	0.13	0.13	0.16
a9	0.11	0.08	0.10	0.09	0.06	0.09	0.08	0.14	0.06	0.10	0.07	0.11	0.09	0.04	0.12	0.12	0.13	0.11	0.13	0.10	0.14	0.08	0.08	0.08	0.11
a10	0.13	0.13	0.12	0.13	0.07	0.12	0.12	0.16	0.11	0.12	0.11	0.16	0.14	0.08	0.18	0.18	0.19	0.18	0.19	0.15	0.19	0.12	0.12	0.12	0.16
a11	0.08	0.08	0.09	0.08	0.06	0.07	0.01	0.11	0.06	0.09	0.06	0.10	0.09	0.04	0.11	0.11	0.14	0.10	0.13	0.11	0.13	0.07	0.07	0.07	0.10
b1	0.11	0.12	0.11	0.15	0.07	0.11	0.12	0.17	0.11	0.15	0.10	0.13	0.13	0.08	0.17	0.17	0.18	0.17	0.19	0.16	0.18	0.12	0.12	0.12	0.15
b2	0.10	0.12	0.10	0.13	0.07	0.09	0.11	0.15	0.10	0.15	0.10	0.15	0.10	0.09	0.16	0.16	0.16	0.15	0.19	0.16	0.17	0.11	0.12	0.14	0.15
b3	0.06	0.08	0.06	0.10	0.04	0.06	0.08	0.11	0.06	0.10	0.08	0.11	0.11	0.05	0.10	0.11	0.12	0.12	0.14	0.12	0.11	0.08	0.11	0.11	0.12
b4	0.11	0.12	0.11	0.14	0.07	0.10	0.12	0.17	0.11	0.17	0.11	0.17	0.14	0.08	0.13	0.18	0.19	0.17	0.19	0.17	0.19	0.11	0.12	0.12	0.15
b5	0.13	0.13	0.11	0.15	0.07	0.10	0.12	0.18	0.11	0.17	0.11	0.17	0.14	0.08	0.18	0.14	0.20	0.18	0.20	0.18	0.19	0.12	0.13	0.13	0.16
b6	0.12	0.13	0.14	0.16	0.08	0.13	0.13	0.19	0.12	0.17	0.12	0.18	0.14	0.09	0.19	0.20	0.15	0.17	0.19	0.18	0.20	0.12	0.14	0.14	0.17
b7	0.13	0.14	0.12	0.16	0.08	0.12	0.14	0.19	0.12	0.18	0.12	0.19	0.15	0.11	0.19	0.20	0.20	0.15	0.21	0.19	0.20	0.13	0.16	0.16	0.19
b8	0.13	0.14	0.12	0.15	0.08	0.11	0.15	0.19	0.13	0.16	0.13	0.19	0.15	0.11	0.19	0.19	0.21	0.18	0.16	0.18	0.20	0.14	0.15	0.15	0.18
b9	0.11	0.13	0.11	0.17	0.08	0.11	0.13	0.18	0.11	0.15	0.11	0.18	0.15	0.10	0.18	0.19	0.19	0.18	0.19	0.13	0.19	0.12	0.14	0.15	0.17

b10	0.12	0.13	0.13	0.15	0.08	0.12	0.12	0.18	0.11	0.17	0.11	0.17	0.13	0.08	0.18	0.18	0.20	0.17	0.19	0.16	0.15	0.12	0.13	0.12	0.16
b11	0.08	0.08	0.07	0.11	0.05	0.07	0.09	0.12	0.07	0.11	0.06	0.13	0.09	0.05	0.12	0.13	0.13	0.12	0.14	0.11	0.13	0.06	0.09	0.09	0.11
c1	0.09	0.10	0.08	0.14	0.06	0.08	0.12	0.14	0.09	0.14	0.08	0.16	0.14	0.10	0.17	0.17	0.18	0.17	0.18	0.17	0.17	0.11	0.10	0.14	0.16
c2	0.10	0.11	0.08	0.15	0.06	0.10	0.12	0.16	0.10	0.14	0.09	0.18	0.15	0.11	0.17	0.18	0.19	0.18	0.19	0.17	0.18	0.12	0.15	0.10	0.17
c3	0.11	0.12	0.12	0.16	0.08	0.11	0.14	0.17	0.10	0.16	0.11	0.18	0.15	0.10	0.18	0.19	0.20	0.18	0.20	0.17	0.19	0.13	0.16	0.15	0.13

Table 11: Uneven Super Matrix

TC	a1	a2	a3	a4	a5	a6	a7	a8	a9	a10	a11	b1	b2	b3	b4	b5	b6	b7	b8	b9	b10	b11	c1	c2	c3
0.08	0.08	0.12	0.11	0.11	0.07	0.12	0.09	0.16	0.11	0.14	0.09	0.13	0.10	0.05	0.14	0.14	0.15	0.14	0.15	0.12	0.15	0.10	0.08	0.08	0.11
0.11	0.11	0.08	0.08	0.12	0.06	0.09	0.11	0.15	0.10	0.14	0.10	0.14	0.13	0.06	0.15	0.15	0.16	0.15	0.15	0.14	0.16	0.09	0.11	0.11	0.13
0.12	0.12	0.09	0.07	0.10	0.09	0.12	0.09	0.15	0.11	0.13	0.10	0.12	0.09	0.05	0.13	0.13	0.15	0.12	0.13	0.11	0.15	0.08	0.09	0.09	0.11
0.10	0.10	0.12	0.10	0.10	0.07	0.10	0.12	0.17	0.10	0.13	0.09	0.16	0.13	0.08	0.16	0.16	0.18	0.16	0.17	0.15	0.17	0.10	0.11	0.11	0.13
0.09	0.09	0.07	0.10	0.06	0.04	0.10	0.05	0.12	0.09	0.09	0.07	0.09	0.06	0.03	0.09	0.09	0.10	0.09	0.09	0.08	0.10	0.06	0.07	0.07	0.08
0.13	0.13	0.09	0.12	0.10	0.09	0.07	0.08	0.15	0.11	0.12	0.08	0.12	0.09	0.05	0.12	0.12	0.15	0.13	0.14	0.12	0.15	0.08	0.09	0.09	0.12
0.08	0.08	0.09	0.08	0.11	0.04	0.07	0.07	0.12	0.08	0.11	0.10	0.12	0.10	0.04	0.13	0.12	0.13	0.11	0.15	0.12	0.13	0.08	0.07	0.07	0.10
0.14	0.14	0.13	0.12	0.16	0.08	0.14	0.13	0.14	0.13	0.15	0.13	0.17	0.13	0.09	0.17	0.18	0.19	0.18	0.19	0.18	0.20	0.12	0.13	0.13	0.16
0.11	0.11	0.08	0.10	0.09	0.06	0.09	0.08	0.14	0.06	0.10	0.07	0.11	0.09	0.04	0.12	0.12	0.13	0.11	0.13	0.10	0.14	0.08	0.08	0.08	0.11
0.13	0.13	0.13	0.12	0.13	0.07	0.12	0.12	0.16	0.11	0.12	0.11	0.16	0.14	0.08	0.18	0.18	0.19	0.18	0.19	0.15	0.19	0.12	0.12	0.12	0.16
0.08	0.08	0.08	0.09	0.08	0.06	0.07	0.01	0.11	0.06	0.09	0.06	0.10	0.09	0.04	0.11	0.11	0.14	0.10	0.13	0.11	0.13	0.07	0.07	0.07	0.10
0.11	0.11	0.12	0.11	0.15	0.07	0.11	0.12	0.17	0.11	0.15	0.10	0.13	0.13	0.08	0.17	0.17	0.18	0.17	0.19	0.16	0.18	0.12	0.12	0.12	0.15
0.10	0.10	0.12	0.10	0.13	0.07	0.09	0.11	0.15	0.10	0.15	0.10	0.15	0.10	0.09	0.16	0.16	0.16	0.15	0.19	0.16	0.17	0.11	0.12	0.14	0.15
0.06	0.06	0.08	0.06	0.10	0.04	0.06	0.08	0.11	0.06	0.10	0.08	0.11	0.11	0.05	0.10	0.11	0.12	0.12	0.14	0.12	0.11	0.08	0.11	0.11	0.12
0.11	0.11	0.12	0.11	0.14	0.07	0.10	0.12	0.17	0.11	0.17	0.11	0.17	0.14	0.08	0.13	0.18	0.19	0.17	0.19	0.17	0.19	0.11	0.12	0.12	0.15
0.13	0.13	0.13	0.11	0.15	0.07	0.10	0.12	0.18	0.11	0.17	0.11	0.17	0.14	0.08	0.18	0.14	0.20	0.18	0.20	0.18	0.19	0.12	0.13	0.13	0.16
0.12	0.12	0.13	0.14	0.16	0.08	0.13	0.13	0.19	0.12	0.17	0.12	0.18	0.14	0.09	0.19	0.20	0.15	0.17	0.19	0.18	0.20	0.12	0.14	0.14	0.17
0.13	0.13	0.14	0.12	0.16	0.08	0.12	0.14	0.19	0.12	0.18	0.12	0.19	0.15	0.11	0.19	0.20	0.20	0.15	0.21	0.19	0.20	0.13	0.16	0.16	0.19
0.13	0.13	0.14	0.12	0.15	0.08	0.11	0.15	0.19	0.13	0.16	0.13	0.19	0.15	0.11	0.19	0.19	0.21	0.18	0.16	0.18	0.20	0.14	0.15	0.15	0.18
0.11	0.11	0.13	0.11	0.17	0.08	0.11	0.13	0.18	0.11	0.15	0.11	0.18	0.15	0.10	0.18	0.19	0.19	0.18	0.19	0.13	0.19	0.12	0.14	0.15	0.17

0.12	0.12	0.13	0.13	0.15	0.08	0.12	0.12	0.18	0.11	0.17	0.11	0.17	0.13	0.08	0.18	0.18	0.20	0.17	0.19	0.16	0.15	0.12	0.13	0.12	0.16
0.08	0.08	0.08	0.07	0.11	0.05	0.07	0.09	0.12	0.07	0.11	0.06	0.13	0.09	0.05	0.12	0.13	0.13	0.12	0.14	0.11	0.13	0.06	0.09	0.09	0.11
0.09	0.09	0.10	0.08	0.14	0.06	0.08	0.12	0.14	0.09	0.14	0.08	0.16	0.14	0.10	0.17	0.17	0.18	0.17	0.18	0.17	0.17	0.11	0.10	0.14	0.16
0.10	0.10	0.11	0.08	0.15	0.06	0.10	0.12	0.16	0.10	0.14	0.09	0.18	0.15	0.11	0.17	0.18	0.19	0.18	0.19	0.17	0.18	0.12	0.15	0.10	0.17
0.11	0.11	0.12	0.12	0.16	0.08	0.11	0.14	0.17	0.10	0.16	0.11	0.18	0.15	0.10	0.18	0.19	0.20	0.18	0.20	0.17	0.19	0.13	0.16	0.15	0.13

Table 12: Weighted Super Matrix

Criteria	a1	a2	a3	a4	a5	a6	a7	a8	a9	a10	a11	b1	b2	b3	b4	b5	b6	b7	b8	b9	b10	b11	c1	c2	c3
TC	0.08	0.12	0.11	0.11	0.07	0.12	0.09	0.16	0.11	0.14	0.09	0.13	0.10	0.05	0.14	0.14	0.15	0.14	0.15	0.12	0.15	0.10	0.08	0.08	0.11
a1	0.08	0.12	0.11	0.11	0.07	0.12	0.09	0.16	0.11	0.14	0.09	0.13	0.10	0.05	0.14	0.14	0.15	0.14	0.15	0.12	0.15	0.10	0.08	0.08	0.11
a2	0.11	0.08	0.08	0.12	0.06	0.09	0.11	0.15	0.10	0.14	0.10	0.14	0.13	0.06	0.15	0.15	0.16	0.15	0.15	0.14	0.16	0.09	0.11	0.11	0.13
a3	0.12	0.09	0.07	0.10	0.09	0.12	0.09	0.15	0.11	0.13	0.10	0.12	0.09	0.05	0.13	0.13	0.15	0.12	0.13	0.11	0.15	0.08	0.09	0.09	0.11
a4	0.10	0.12	0.10	0.10	0.07	0.10	0.12	0.17	0.10	0.13	0.09	0.16	0.13	0.08	0.16	0.16	0.18	0.16	0.17	0.15	0.17	0.10	0.11	0.11	0.13
a5	0.09	0.07	0.10	0.06	0.04	0.10	0.05	0.12	0.09	0.09	0.07	0.09	0.06	0.03	0.09	0.09	0.10	0.09	0.09	0.08	0.10	0.06	0.07	0.07	0.08
a6	0.13	0.09	0.12	0.10	0.09	0.07	0.08	0.15	0.11	0.12	0.08	0.12	0.09	0.05	0.12	0.12	0.15	0.13	0.14	0.12	0.15	0.08	0.09	0.09	0.12
a7	0.08	0.09	0.08	0.11	0.04	0.07	0.07	0.12	0.08	0.11	0.10	0.12	0.10	0.04	0.13	0.12	0.13	0.11	0.15	0.12	0.13	0.08	0.07	0.07	0.10
a8	0.14	0.13	0.12	0.16	0.08	0.14	0.13	0.14	0.13	0.15	0.13	0.17	0.13	0.09	0.17	0.18	0.19	0.18	0.19	0.18	0.20	0.12	0.13	0.13	0.16
a9	0.11	0.08	0.10	0.09	0.06	0.09	0.08	0.14	0.06	0.10	0.07	0.11	0.09	0.04	0.12	0.12	0.13	0.11	0.13	0.10	0.14	0.08	0.08	0.08	0.11
a10	0.13	0.13	0.12	0.13	0.07	0.12	0.12	0.16	0.11	0.12	0.11	0.16	0.14	0.08	0.18	0.18	0.19	0.18	0.19	0.15	0.19	0.12	0.12	0.12	0.16
a11	0.08	0.08	0.09	0.08	0.06	0.07	0.01	0.11	0.06	0.09	0.06	0.10	0.09	0.04	0.11	0.11	0.14	0.10	0.13	0.11	0.13	0.07	0.07	0.07	0.10
b1	0.11	0.12	0.11	0.15	0.07	0.11	0.12	0.17	0.11	0.15	0.10	0.13	0.13	0.08	0.17	0.17	0.18	0.17	0.19	0.16	0.18	0.12	0.12	0.12	0.15
b2	0.10	0.12	0.10	0.13	0.07	0.09	0.11	0.15	0.10	0.15	0.10	0.15	0.10	0.09	0.16	0.16	0.16	0.15	0.19	0.16	0.17	0.11	0.12	0.14	0.15
b3	0.06	0.08	0.06	0.10	0.04	0.06	0.08	0.11	0.06	0.10	0.08	0.11	0.11	0.05	0.10	0.11	0.12	0.12	0.14	0.12	0.11	0.08	0.11	0.11	0.12
b4	0.11	0.12	0.11	0.14	0.07	0.10	0.12	0.17	0.11	0.17	0.11	0.17	0.14	0.08	0.13	0.18	0.19	0.17	0.19	0.17	0.19	0.11	0.12	0.12	0.15
b5	0.13	0.13	0.11	0.15	0.07	0.10	0.12	0.18	0.11	0.17	0.11	0.17	0.14	0.08	0.18	0.14	0.20	0.18	0.20	0.18	0.19	0.12	0.13	0.13	0.16
b6	0.12	0.13	0.14	0.16	0.08	0.13	0.13	0.19	0.12	0.17	0.12	0.18	0.14	0.09	0.19	0.20	0.15	0.17	0.19	0.18	0.20	0.12	0.14	0.14	0.17
b7	0.13	0.14	0.12	0.16	0.08	0.12	0.14	0.19	0.12	0.18	0.12	0.19	0.15	0.11	0.19	0.20	0.20	0.15	0.21	0.19	0.20	0.13	0.16	0.16	0.19
b8	0.13	0.14	0.12	0.15	0.08	0.11	0.15	0.19	0.13	0.16	0.13	0.19	0.15	0.11	0.19	0.19	0.21	0.18	0.16	0.18	0.20	0.14	0.15	0.15	0.18
b9	0.11	0.13	0.11	0.17	0.08	0.11	0.13	0.18	0.11	0.15	0.11	0.18	0.15	0.10	0.18	0.19	0.19	0.18	0.19	0.13	0.19	0.12	0.14	0.15	0.17
b10	0.12	0.13	0.13	0.15	0.08	0.12	0.12	0.18	0.11	0.17	0.11	0.17	0.13	0.08	0.18	0.18	0.20	0.17	0.19	0.16	0.15	0.12	0.13	0.12	0.16
b11	0.08	0.08	0.07	0.11	0.05	0.07	0.09	0.12	0.07	0.11	0.06	0.13	0.09	0.05	0.12	0.13	0.13	0.12	0.14	0.11	0.13	0.06	0.09	0.09	0.11
c1	0.09	0.10	0.08	0.14	0.06	0.08	0.12	0.14	0.09	0.14	0.08	0.16	0.14	0.10	0.17	0.17	0.18	0.17	0.18	0.17	0.17	0.11	0.10	0.14	0.16
c2	0.10	0.11	0.08	0.15	0.06	0.10	0.12	0.16	0.10	0.14	0.09	0.18	0.15	0.11	0.17	0.18	0.19	0.18	0.19	0.17	0.18	0.12	0.15	0.10	0.17
c3	0.11	0.12	0.12	0.16	0.08	0.11	0.14	0.17	0.10	0.16	0.11	0.18	0.15	0.10	0.18	0.19	0.20	0.18	0.20	0.17	0.19	0.13	0.16	0.15	0.13

Table 13: Weight and dimensions of human capital using DANP method

Component level	**Component size**	**Component**		**Dimensions level**	**Dimensions size**	**Dimensions**	
19	0.02506	obligation	a1	3	0/289247	Personality characteristics	A
17	0.026035	To be motivated	a2				
20	0.024	Ethical	a3				
14	0.03163	Futurism	a4				
25	0.015875	Honesty	a5				
22	0.023298	Secrecy	a6				
16	0.026992	Riskability	a7				
9	0.037028	Pay attention to the interests of the organization	a8				
21	0.023422	Legitimacy	a9				
13	0.033121	teamwork spirit	a10				
23	0.022786	Tolerance	a11				
11	0.03657	Strategic thinking	b1	1	0/381271	Competence	B
15	0.029872	creativity and innovation	b2				
24	0.01915	Work talent	b3				

8	0.037397	High flexibility	b4				
7	0.038304	fast response	b5				
5	0.040722	Interact with the external environment (customers and competitors)	b6				
10	0.03696	Knowledge sharing and knowledge application	b7				
4	0.040998	Ability to make decisions and solve problems	b8				
12	0.035914	Update and use new organizational technologies	b9				
6	0.04011	Establish effective communication and interaction	b10				
18	0.025273	Systematic thinking	b11				
2	0.103184	public knowledge	C1	2	0.329482	Job knowledge	C
3	0.102666	Professional knowledge	C2				
1	0.123632	Job experiences	C3				

6. Conclusion

The main purpose of the research is to present the model of intellectual capital in law of Marine Agile Project-Oriented Organizations and prioritize factors using the dump method. The study consists of three components and twenty-five indicators that can be used as a basis for human capital in agile project-based organizations. The results showed that the dimension of job knowledge is influential and the dimensions of competence and personality traits are influential. In terms of personality traits, the components (commitment, motivation, morality, foresight, honesty, confidentiality, teamwork spirit) are influential and the components (risk-taking, attention to the interests of the organization, tolerance, legalism) are influential. In terms of competence, the components (updating and using new organizational technologies, knowledge sharing and application, work talent, creativity and innovation) are effective and the components (strategic thinking, high flexibility, fast response, interaction with the external environment (Customers and competitors), decision-making and problem-solving ability, systemic thinking, effective communication and interaction) are effective. In terms of job knowledge, the component of specialized knowledge is influential and the components (general knowledge, job experience) are influential. According to the final weight of the dimensions and components, their ranking was done. Competence is the most important dimension, followed by job knowledge and personality traits. Also, in the components of the research model, the components of job experience, general knowledge and specialized knowledge have the first, second and third ranks, respectively. The components of decision-making and problem-solving ability, interaction with the external environment (customers and competitors), communication and effective interactions have the fourth, fifth and sixth ranks, respectively. The components of rapid response, high flexibility and attention to the interests of the organization are ranked seventh, eighth and ninth, respectively. Components of knowledge sharing and its application, strategic thinking, updating and using new organizational technologies, teamwork spirit, foresight, creativity and innovation, risk-taking, motivation, systemic thinking, commitment, core ethics, legalism, Secrecy, tolerance, talent, honesty are ranked tenth to twenty-fifth, respectively.

Challenges and solutions of human capital in agile project-based organizations

It takes a lot of time and money to get the right human capital with the goals of an organization, so you need to have a special and strategic view of human capital. The most important challenge is the lack of proper understanding of human capital in Marine Agile Project-Oriented Organizations, because thought has been underestimated. According to the results of this study, as the next components of competence such as work talent, creativity and innovation, decision-making ability and problem solving, etc., people are valued. The next components of personality traits such as secrecy and legality, etc. are also very important. Therefore, in order to change the attitude of the senior management of the organization, it is necessary to train the managers and plan to hold training courses for the managers.

One of the organizational is to know the performance status of employees, and to achieve this, it is necessary to establish a performance appraisal system. Therefore, due to the low component of motivation in human capital, it is necessary to pay more attention to employee motivation in this system.

Some experts are reluctant to join the organization or are motivated to stay or people who have just entered the organization and need special expertise, after being trained in that particular course, if they are not motivated enough to continue working together, they are no longer willing to cooperate and go out of the

organization. Therefore, the weakness of the necessary attractions and motivational systems and mechanisms for the use of specialized personnel and the maintenance of specialized human capital is one of the problems of human capital. By designing motivational systems and mechanisms such as increasing salaries and benefits, rewards, rewards, providing ideas and opportunities, the possibility of career advancement based on people's abilities and competencies, the possibility of participating in organizational decisions that can cause It creates a sense of belonging to the organization, maintains a high level of human capital satisfaction, and strives to maintain it. Considering that the component of job knowledge has a favorable situation in the organization, solutions have been proposed for the survival and growth of the expertise and expertise of the employees. One of the factors influencing the survival and growth of the company is the expertise and expertise of employees, and to achieve this, a history of service in the current job is essential, so it is necessary to use employees with a high service record in related jobs. Another factor affecting the growth and survival of the company is in-service training of employees, and to meet this issue, training needs assessment is essential. Therefore, in order to increase the level of learning, it is necessary to use a new and more effective needs assessment method. Employee in-service training is also an important factor, and the use of reputable suppliers and training centers is essential to achieve this. It is necessary to periodically evaluate suppliers and use educational technology and modern equipment and technologies in the field of education.

The development of information systems is another change and for this development, the necessary hardware and software platform must be provided and the functional processes must be provided. Also, due to the importance and necessity of communication in recent years, this will increase organizational interactions.

If effective communication and interaction in the organization increases, outsourcing projects can be done by defeating smaller projects. It is also important for the organization and interaction of individuals and organizations in the organization, both on and off the Internet.

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