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Research Article

Agility Factors' Analyses Framework in Project-Oriented Organizations through a Sustainability Approach in Large Projects Case Study: Isfahan Municipality

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In recent years, the project management concept is coupled with sustainable development. In terms of profitability and adapting to environmental changes, generating value for the customer and responding to market needs is a challenging issue. To gain profit and success, a project should adhere to agility factors. With respect to the importance of project execution success, corresponding to the sustainability dimensions and by developing agility parameters, this study provides a framework for clustering and analyzing "large projects" based on agility factors in project-oriented organizations through a sustainability approach and by applying Quality Function Deployment. To this end, critical factors of project success and then agility factors of the project-oriented organizations have been identified. Thereafter, the importance of these two major components has been measured by executive managers in Isfahan Municipality and academic experts. Afterward, the agility factors' weights have been calculated based on extracted sustainability factors' weights, which have been gained according to the project's critical success factors and by applying quality function deployment. By determining the agility factors' clusters in the project-oriented organizations and calculating their importance weights, the first cluster that contains project communication management, organizational culture, and contracts management gains the maximum weight of importance.

1. Introduction

In today's business world, in many projects, considering the very high level of uncertainty in all aspects of the activities, priorities, and latencies, activity connections, and also resources correlation, applying the traditional techniques and instruments in project planning is a hard task. In such cases, mere project planning improvement would not yield satisfactory output. For any type of project, an agile model can promote quality and productivity in a specific time and resource framework [1]. The purpose of organizational agility (OA) as a major contributive dynamic ability is for realizing the environmental changes and respond effectively and efficiently to the changes therein. Being engulfed with environmental, highly dynamic, complex, and uncertain changes, organizations face serious threats as to their survival in a highly competitive market. Such business atmosphere being equipped with mechanisms which allow the organizations to respond appropriately to the identified changes will directly be connected with better performance in order to taking the new opportunities and resources in a competitive world. Thus, agility is a concern for the survival and success of the organization [2]. Applying the principles of agility to the project as an interim organization is a necessity to deal with environmental uncertainties. Agility is mostly concentrated on the project implementation phase. This approach focuses on the accuracy of planning with respect to the details of planning, better risk management, and more customer affair on its agenda [3].

Innovative and sophisticated technologies have introduced dramatic changes in industrial products and social services [4]. Project management is obligated to manage both the simple and complex activities through modern approaches that are more efficient than the traditional approaches. A project manager seeks to complete the project within time, cost, and resources framework and by generating value for the client [5]. The project management system faces serious and expanding challenges as to value generation response to changes and profitability in business environment. To overcome this challenge, the project needs performance agility. In this century, achieving sustainable development is a blanket and essential challenge for all organizations. Sustainability is a concept on which the researchers and entrepreneurs concern in order to improve and integrate it with the field of project management at different social and business levels [6]. Sustainability is defined as an innate potential through which the long-term, resource-related risks, fluctuations in energy costs, debts, product costs, and pollution are reduced and the waste management is improved. The equilibrium among economic development, supervising environmental issues, and social justice is another definition of sustainability [7], provided that the importance weights of all three fields of economy, environmental conformity, and social balance are considered as equal [8]. The objectives of promoting economic growth, social health, and rational natural resource utilization cannot be actualized without considering the effects of the mentioned components. As to organizational success, sustainability would provide balance and harmony among these three components. This concept is named *triple bottom lines* (TBL) and offers different values and perspectives to measure the success of organizations in the three areas of economics, society and the environment. The three main components of sustainability are population, world, and profits. Profit is directly related to economics, population contains society and the organizational environment, and the other component modifies the environmental consequences. The first component consists of the economic environment, and the second is the environmental effects caused by the organization's activities [9]. The increase in the projects' success depends on the managers' improvement in approaches towards the project objectives. Rational decisions drawn by management are highly contributive in project management and the outcomes therein [10]. For this purpose, project management, the core operations of a business, is not separated from sustainability concept [11]; consequently, the field of project management requires project managers to be fully responsible in project sustainability (Silvius and Brink, 2012). The products, services, technologies, projects, and organizations each on its own constitute a sustainable system. According to the project complexity, to deliver the project results subject to sustainability conditions, the necessary instruments and techniques must be properly coordinated [12].

Dynamism in today's economy requires projects that would introduce major changes in people's daily conducts. Due to the current global crisis and gradual resource depletion, as we go forward, project managers are obligated to develop new and innovative perspectives on sustainability and devise measures to achieve the appropriate levels therein. As to time, the nature of the project is periodic and to status is discrete, while the nature of sustainability is unified. To achieve sustainable development, the project activities must follow economically transparent, socially acceptable, and environmentally safe pattern [13]. Project managers often try to improve the issues related to measurement, success, and factors influencing the project performance and seek to improve them [13]. In project management perspective, the critical success factors consist of features, circumstances, and variables, the effect of which on project success are oriented towards sustainability [14].

A brief review of the related literature, in the context of modern business, would reveal the importance of agility, as a key approach as to adapting to the changes in the business world, responding to the customer and generating value therein, in project-oriented organization. Expanding sustainability, that is, observing its principles with respect to resource utility, which should correspond with the credible sources of project management, is essential. Depending on the features, a large project is a type of project that typically has a longer duration (it might be run for more than six months), larger teams of staffs (include more than 25–30 members and even may require the support staff), greater budget and resource allocation, and more tasks complexity, including many tasks having to be done concurrently. A project-oriented organization that manages and executes large projects can be a complex network with high rate of interactions. Hence, the complexity of such systems leads the organization to be agile while they are following the sustainability principles and manages the projects on the basis of critical success factors of project management.

In this study, a framework is proposed for analyzing agility factors in project-oriented organizations with a sustainability approach in big projects by applying quality function deployment (QFD). Identifying agility factors in project-oriented organizations based on the main project success and sustainability factors is a major step in evaluating the project, based on the agility and sustainability approach, which in turn would promote adaptation to the changes in business environment and customer demands. Determining the factors' weight and their clustering in determining the important clusters, which would contribute in planning and goal setting, is essential. This can be accomplished by applying the principles of agility and sustainability components.

This article is organized as follows: the literature is reviewed in Section 2; the project management is explained in Section 3; agility in project-oriented organization is introduced in Section 3.2; the sustainability is discussed in Section 3.3; QFD is applied in Section 3.4; clustering is analyzed in Section 3.5; the research method is detailed in Section 4, the framework is implemented in the subject organization in Section 5, and the article is concluded in Section 6.

2. Literature Review

To review the research literature, the connected researches have been found based on the keywords and the journals

with the related issues. The select studies run on the main factors of project success are tabulated in Table 1, the select studies run on sustainability are tabulated in Table 2, and the select studies run on organizational agility are tabulated in Table 3.

What is deduced from reviewing the related articles is that in today's competitive and changing business world, customer satisfaction is accredited to the organization credibility, quality and speed in response, and agility in project performance. Project-oriented organizations are fully aware of the need to incorporate agility dimensions in project management if adaptation to changes in the environment and response-specified time, cost, and resources are sought. Organizations are obligated to assess the resource planning and the effects of a project as to its economics and profitability, with respect to social dimension next to its effects in environmental sense to correspond with sustainability. The different aspects of organization and management approaches as to resource allocation and planning for project control, resource protection, environmental effects, economic performance, and social effects of the project are subject to direct effect of sustainability.

Identifying the agility indices and dimensions in project-oriented organizations, based on accurate infrastructure according to the critical success factors of project and the dimensions of sustainability in three areas of economic, social and environmental therein, has been somewhat neglected. In this context, while evaluating the project based on the mentioned factors, the project manager should strengthen the weak indices and generate value, respond to the customer and meet his/her satisfaction, if achieving sustainability, profitability, credibility and social prestige and effects are sought. This in turn would allow successful performance to assure environmental and social sustainability. In all these efforts, though the project was delivered successfully, still the agility aspect is missing in the run studies.

3. Theoretical Background

3.1. Project Management. A project consists of human and nonhuman resources, in a temporary organizational framework with the objective to accomplish a specific task [5]. Organizations, today, perceive a project as a manner of organizing tasks. In most industrial, commercial, and governmental organizations, project management is perceived as an instrument to accomplish objectives [30]. The project assists the organization to define and select a set of activities that would generate positive results therein. This phenomenon can be applied in economic, marketing, or technical areas. The project manager is obligated to manage the project through a set of instruments and methods without disturbing the regular routine operations of the organization. Project management activities consist of defining task requirements, planning and scheduling task implementation, allocation progress, monitoring, and keep project planning online. As to project delivery, the responsibility of the project manager is to have met all budget and desired operational and quality standards [31]. Project management can be considered as a temporary effort in separate fields of activities with a specific beginning and end time. Given the existing global economic status, projects must be managed and controlled in a periodical manner. Time, cost, and objective achievement level are considered as the indices of success or failure for organizations that should be supported per project beginning from the structure to the budget. Supervision and control in the implementation phase are also necessities [16]. Project management as an effective controlling instrument is expressed in multiactivity endeavors [32].

3.2. Agility in Project-Oriented Organizations. Today, organizations face varying, dynamic, complex, and uncertain circumstances in these highly competitive markets that pose a threat to organizations [2]. The innovative and sophisticated technologies have introduced dramatic changes in industrial products and social services [3]. Business and management models are essential to support Industry adoption and foster sustainable value creation and competitiveness [4]. The need for an efficient management strategy is evident [32]. Organizational agility enables an organization to understand the environmental changes and provide an appropriate response as to adapting it as a management mechanism [2]. In a sense, these environmental features are the challenges confronting project management [33]. The principles of project management based on traditional techniques are based on regular planning and control practices. Developing an integrated network, consisting of customers, suppliers, supervisors, authorities, and political institutions and competitors is a proper manner of responding to environmental changes, something impossible in traditional project management format.

3.3. Sustainability in Project-Oriented Organizations. The ongoing major changes at global scale have made sustainable development an important strategic measure. Sustainable development seeks to protect, develop, and balance economic, social, and environmental objectives to the available resources to assure the comfort and convenience of the generations to come. The correlation between these objectives and resources is high and important. Today, next to economic values, countries must consider the social benefits and environmental consequences as well. Climate change threatens the future significantly to a certain extent. The natural resources are depleting recklessly, that is, accessing them will be difficult if not impossible for the next generation [34]. Nowadays, organizations define their activities and business as projects and seek to improve their success. Drawing managerial decisions are contributive in project management and its outcomes [10]. Sustainable development addresses humanity's aspiration for a better life while observing the limitations imposed by nature [35]. Dynamism in today's global economy is based on the available projects with the objective to make major changes in people's lives. The current global crisis and extending resource depletion force project managers to develop innovative perspectives on sustainability and assure its continuity. The nature of any project is temporary and discrete, accomplishable through different techniques and methods. Sustainability is not an isolated concept, and it is achieved by

Table 1: Review on the related literature of critical success factors.

Row	Authors	Year	Objective	Method and tools	Description
1	Ahmadabadi, and Heravi [15]	2019	Assessing the CSF in state/private sector joint ventures, the national highways	RLS	All operations at all stages are supervised, and the project is evaluated against critical situations as to its success
2	De melo moura [16]	2016	Identifying the main factors as to support information system's projects	—	PMCSFS are contributive in optimum performance in information systems
3	Orouji [17]	2016	A review run on articles on PMCSFS	—	Assessing the articles published from 1978 to 2015 as to their CSF vs. failure in 6-sigma projects
4	Costantino et al [18]	2015	Selecting the projects for forming a portfolio by applying ANN according to CSF	DSS ANN	To design, develop, and test the decision-making support systems for predicting project functionality and applying ANN to form CSF groups according to risk rate
5	Alias et al 2014 [19]	2014	Determining the CSFs in project management in a comprehensive framework	Statistical tests	The connection rate between CSF and project functionality is measured and a comprehensive method consisting of project management, methods, human factor, external issues, and project-related features are presented
6	Abdulrahman et al [5]	2014	Determining the essential features in project success and the techniques that lead to project management success	—	Project management theory, project systems, and the CSFs are addressed
7	Thi and swierczek [20]	2010	Measuring project success based on CSFs in project management and run case studies in Vietnam	Regression analysis	Completing the project life cycle that is directly related to positive relations and success. In the project execution, the external consistency affects and organization support is compensated for
8	Naoum et al [19]	2004	Identifying the critical and noncritical factors affecting the project success in big construction projects	—	A management led by project and execution management

applying project activities run in continuous and transparent economic, social, and environmental context [13]. To deliver a project yield subject to sustainability, the required instruments and techniques should be in accordance with the complexity of the project [36]. Sustainability theme is involved in the integration of the three aspects: economic, social, and environmental aspects, which extends in project management and project delivery, followed by enhancing the project system and the management therein [37].

3.4. Quality Function Deployment. Quality function deployment is one of the qualitative tools contributive in providing services and producing products that would meet consumers' requirements. As one of the new methods in engineering, quality function deployment begins from running studies on market and identifying consumer services while identifying users' demands and seeks to apply them in the design process. The basic insight of this method is to convert the qualitative features into technical features, production processes, and requirements, by applying four matrices, in which the house of quality is the most important part. This matrix has a number of numerical inputs, which after the qualitative identification of the features, statistical methods will be applied to calculate the relative importance of the features on the basis of the consumers' opinions and experienced people ideas [38]. Hence, QFD promotes the systematic translation of customer needs and requirements into design requirements and evaluates alternatives and their impacts [39].

3.5. Clustering. Clustering and classification are among the most efficient methods in data analysis. Extracting the patterns through grouping individuals and variables is one of the main objectives consisting of many methods and patterns applicable in different scientific fields because human beings when encountering complex issues instinctively seek to compare and divide the given data as different groups. These methods are applied in different scientific fields like medicine, biology, management, planning, data mining, information discovery, and new structure in speech and images and environmental and natural sciences [40, 41].

Massive data, next to being beneficial for organizations and individuals, are problematic when it comes to their analysis. Data mining techniques is a solution in extracting beneficial information and correlations therein. Clustering, with its different methods, is one of the powerful instruments to forces these analyses. Identifying clusters or areas with dense population in a multidimensional data set through different techniques and algorithms is one of the

Table 2: Review on the related literature of sustainability factors.

Row	Authors	Year	Objective	Method and tools	Description
1	Mavi, and Standing [21]	2018	Introducing project management's CSFs in the five project, project management, organization external environment, and sustainability	Fuzzy DEMATE L-ANP	By applying fuzzy DEMATEL organization and sustainability environment are recognized as the causes, and project management is recognized as the effect and ANP is also applied for weighing the subcriterion
2	Dobrovolskienė, and Tamošiūnienė [22]	2016	Measuring construction industry projects sustainability in Lithuania	MCDM	The case study results show that from industrial experts' point of view, 15 indicators are more important than the whole
3	Martens and Carvalho [23]	2017	Assessing key factors in project management in all its dimensions	Factorial exploration analysis	Results show that innovative and sustainable business model, stockholders management, economy and competitive management, and finally, environmental policies and resources storage are paramount factors
4	Daneshpour [24]	2015	Assessing the management and the aspects of combining project management and sustainability	—	Organizations' awareness to know the value of sustainability and to achieve sustainability dimensions in practice
5	Amiril et al [25]	2014	Evaluating sustainability factors and project performance in transportation infrastructure	—	Sustainability factors and project performance can be fit in environmental, economic, resource utility, and project management categories
6	Silvius and schipper [26]	2014	Assessing sustainability as one of the project management competencies and analyzing the gaps therein among the present project managers	—	By identifying this gap, procedures are proposed to minimize it in addition to introduce new measures and standards in this context as to organization sustainability

Table 3: Review on the related literature of agility factors in project-oriented organizations.

Row	Authors	Publication year	Objective	Method and instrument	Description
1	Pocter et al [27]	2019	Providing a pattern for competition scram network in agile project management	—	Integrating agility methods and principles in multidisciplinary cooperation require high flexibility and training patterns through implementation
2	Fernandez and Fernandez [28]	2018	A review run on articles focused on agile project management and project success therein	—	The traditional and modern project management steps are compared in this context. It is found that APM is effective in project success
3	Chen et al [29]	2018	Assessing the agility and sustainability concepts as contradicting or complementary concepts	—	Generating value for customer and adopt it with the environments changes next to seeking sustainability in both the contexts

major issues in multidimensional data analysis. Finding the proper clustering algorithm or/and the most optimal clusters, in a reasonable time, is one of the major challenges in this field [42].

Clustering consists of grouping similar samples into one data mass. The essential point here is data distribution into different K groups with similar data and the same for the dissimilar. This difference is defined based on distance measurement criteria. Compared to grouping, clustering is an unsupervised grouping process, where the groups are not predefined. Clustering is an indirect data mining operation [42].

In most data mining methods, like the decision trees and neural networks, the process begins with an educational set through which it is sought to devise a model that would make the data in segments and then predicts the appropriate set for a new data. On the contrary, in the clustering, there exist no initial group and the variables are not divided into two independent and dependent groups. In clustering, the focus is on groups of objects that are similar, which when

discovered, their behaviors can be identified better, indicating better decision making [43].

In hierarchical clustering, clusters are expressed as a tree named dendrogram. These algorithms can be in up-down divider or bottom-up adder format, where, the divider must specify which two clusters are divided into two parts and how is this done, while in the additive, the algorithm begins from one cluster and then, the two clusters merge to obtain a make a throughout cluster [44].

4. Methodology

Project success depends on the delivery of the service and product, creating value for the customer while adapting to the changing world of modern business. Next to the economic approach, the sustainable development that covers the project revenue and profitability, attention must be directed on environmental consequences, resource protection, and the project performance in the social dimension. In this study, a framework is provided for analyzing the agility factors in project-oriented with respect to sustainability approach in large QFD projects. Then, the proposed method is solved as a case study as a sample for large projects. The applied algorithm and description of the phases is illustrated in Figure 1.

The research method is explained separately for each phase as follows:

Phase 1: identifying the key factors of success in project management, sustainability, and agility in project-oriented organizations

This phase is accomplished in three steps to identify project management critical success factors, agility factors in project-oriented organizations, and sustainability factors.

Step 1: a review made on the research literature to identify project management critical success factors.
In this step, project management critical success factors are identified through reviewing the research literature, and then, final indices are selected by interviewing the experts.
Step 2: a review made on the research literature to identify agility factors in project orientation organizations.
In this step, agility factors in project-oriented organizations are identified through reviewing the research literature, and then, final indices are selected by interviewing the experts.

Step 3: a review on the research literature to identify sustainability factors.
In this step, sustainability factors are identified through reviewing the research literature, and then, final indices are selected by interviewing the experts.

Phase 2: measuring the critical success factors in project management, sustainability, and agility in project-oriented organizations

In this phase, project management critical success factors' weights, agility factors' weight, and sustainability factors' weight are determined based on experts' point of view.

Step 4: measuring the indices in each approach from the experts' perspective, through academic experts' perspective.

(1) Project management critical success factors' weight determination: each factor's weight is determined based on project management and academic experts' point of view and using the questionnaire that is prepared based on Likert scale.
(2) Agility factors' in weight determination: each factor's weight is determined based on project management and academic experts' point of view and using the questionnaire that is prepared based on Likert scale.
(3) Sustainability factors' weight determination: each factor's weight is determined based on project management and academic experts' point of view and using the questionnaire that is prepared based on Likert scale.

Step 5: measuring the indices in each approach from the experts' perspective, based on the organizational experts' perspective.

(1) Determining the importance weight of critical success factors in project management field: the weight of each factor is determined based on Isfahan Municipality project management staffs' point of view and using questionnaire that is applied Likert scale.
(2) Determining the importance weight of agility factors in project-oriented organizations: the weight of each factor is determined based on Isfahan Municipality project management staffs' point of view and using questionnaire that is applied Likert scale.

Phase 3: calculating the agility weight factors in project-oriented organizations based on the critical success factors in project management with a sustainability approach in projects by applying two-stage QFD

Step 6: calculating the sustainability factors' weights based on critical success factors in project management applying QFD
For this purpose, the house of quality matrix is applied to determine the relative importance of sustainability factors based on project management critical success factors of project management. To this end, as Table 4 shows that QFD matrix is formed to rank sustainability factors based on the project management critical success factors and to signify the relative weight of sustainability factors.
Step 7: calculating the agility factors' weight in project-oriented organizations based on balanced sustainability factors by applying QFD

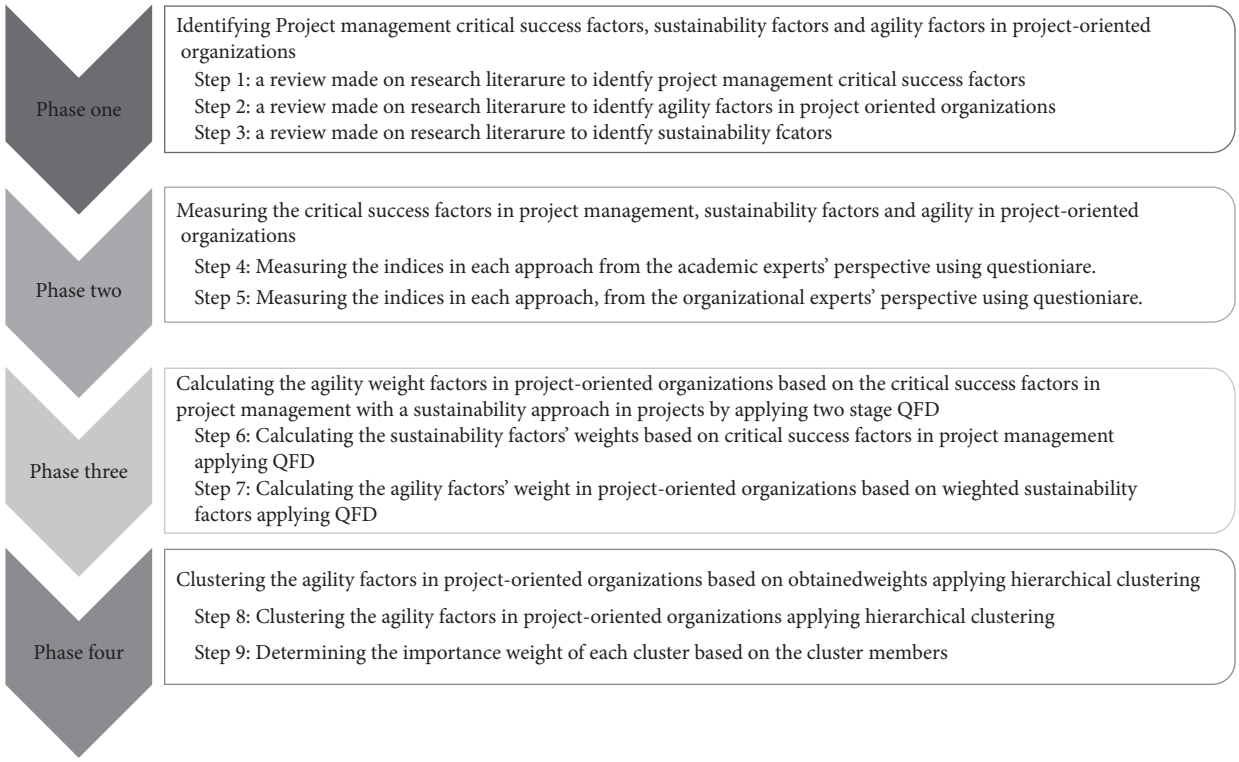

Figure 1: Research method.

Table 4: QFD matrix: PM CSFs-Sustainability factors.

Critical success factors	Sustainability factors	
	Critical success indices weight	Sustainability factors
Project management critical success factors	S_{11}. . . S 1n	C 1
	.	.
	.	.
	.	.
	S n1. . . S nn	C n
Weighted summation of the sustainability factors according to project management critical success factors		S c1. . . S cn

For this purpose, the house of quality matrix is applied to determine the relative importance of agility factors in project-oriented organizations based on sustainability factors. To this end, as Table 5 shows, QFD matrix is formed to rank sustainability factors based on the project management critical success factors and to signify the relative weight of sustainability factors.

Phase 4: clustering the agility factors in project-oriented organizations based on obtained weights applying hierarchical clustering

In this phase, agility factors in project-oriented organizations are clustered applying a hierarchical clustering model and based on importance weights that have been gained in second and third phase.

Step 8: clustering the agility factors in project-oriented organizations based on weight indices obtained by applying hierarchical clustering

In this step, the importance value of each cluster is determined according to the clustering results that have been gained in the previous step and based on the factor members' importance weight of each cluster.

Step 9: determining the importance of the agility factors clusters in project management based on the member factors of each cluster.

In this step, the importance of each cluster is determined based on the factors that are counted as a cluster member in the previous step and then the most important cluster is signified.

5. Implementation of the Proposed Framework in Large Projects of Isfahan Megacity Municipality

This research has been done with the aim of clustering and analyzing large projects based on agility factors in project-

Table 5: QFD matrix: PM CSFs-Sustainability factors.

Sustainability indices	Agility indices	
	Sustainability factors weight	Agility factors
Sustainability factors	A 11. . . A 1n	C 1
	.	.
	.	.
	.	.
	A n1. . . A nn	C n
Weighted summation of the agility indices weight according to sustainability indices		A s1. . . A sn

oriented organizations and considering the sustainability attitude and applying the Quality Function Deployment. The study has been done in the period of 2018–2019 and in the city of Isfahan as a spatial range. The proposed framework has been applied in Isfahan Municipality and for the large projects.

Phase 5: identifying the key factors of project management success, sustainability, and agility in project-oriented organizations.

Step 1: reviewing the related literature and identifying the project management critical success factors

By reviewing the literature and interviewing academic experts and project management, the main factors of success in project management are identified, and the final indices are determined according to the experts' opinions (Table 6).

Step 2: reviewing the literature and identifying the agility factors in project-oriented organizations

By reviewing the related literature and interviewing academic experts and project management, agility factors in project-oriented organizations are identified, and the final indices are determined based on the opinion of experts (Table 7).

Step 3: reviewing the related literature and identifying the sustainability factors

By reviewing the research literature and interviewing academic experts and project management, the factors of sustainability are identified and the final indices are extracted according to the opinion of experts (Table 8).

Phase 6: measuring the importance of project management critical success factors, sustainability factors, and agility factors in project-oriented organizations

Step 4: this measuring consist of three approaches where a questionnaire based on project management and academic experts' opinions is devised as the instrument.

(1) Determining the project management critical success factors' importance weight in project management: through the devised questionnaire based on the Likert scale (1 to 5, that is, a low importance to high importance), which has been distributed among 13 project managers and university professors in this field with 7 years of experience and published scientific articles.

(2) Determining the importance weight and agility factors in project-oriented organizations: the same procedure above is followed.

Step 5: measuring the importance weight of factors in all three approaches through the devised questionnaire based on project management experts' viewpoint in the field of opinions in Isfahan Municipality.

(1) Determining the importance weights of the project management critical success factors: it has been determined based on the project management staff viewpoints and through the questionnaire with Likert scale (1 to 5, that is, low importance to 5 high importance), which has been distributed among 52 staff members.

(2) Determining the importance weight of agility factors in project-oriented organizations: based on the project staff point of view and through a questionnaire with Likert scale (1 to 5, that is, a low importance to 5 high importance), which has been distributed among the employees in this field, including 52 staff. Table 9 shows the geometric mean of agility factors' weights in project-orient organizations.

Phase 7: calculating agility factors' weights in project-oriented organizations based on project management success and sustainability approach

In this phase, the agility factors' weights are calculated based on the extracted weights of sustainability factors according to the project management critical success factors, and then, agility factors' weights are calculated based on sustainability factors' weights applying QFD.

Step 6: calculating the sustainability factors' weights based on project management critical success factors by applying QFD

For this purpose, the house of quality matrix is applied to determine the relative importance of sustainability factors based on project management critical success factors. The house of quality matrix is configured to rank sustainability factors based on project management critical success factors and to determine the relative weight of sustainability factors, which are detailed in Table 10.

Step 7: calculating the agility factors' weights in relation to sustainability factors' weights in project-oriented organizations by applying QFD

The house of quality matrix is configured to rank agility factors based on stability factors and determining the relative agility weights' indices in project-oriented organizations, which are shown in Table 11. For matrix columns, agility factors are also considered in project-oriented organizations. The QFD matrix designed by the experts is completed, and its geometric mean is inserted in the matrix cells. By multiplying the stability factors' weights in each one of the columns and normalizing the

Table 6: Critical success factors of project management.

Row	Indices	The critical success factors in project management
1	Project management related	Leading and managing the project team
2		Applying innovative management techniques and innovative ideas [44]
3		Applying the project management standard [45]
4		Exercising strong project management leadership [46, 47]
5		Project management responsibility and commitment [14, 19, 31]
6		Senior and executive management support [14, 19, 31, 35]
7	Project team-related	Employing experienced experts in the project management team [42, 46, 48]
8		Ability to perform team work [31]
9		The expertise and skillfulness of the project management team [44, 46, 48]
10		Appropriate reward and penalty systems [14, 19]
11		Self-learning teams [44]
12		Confidence and consent among team members
13	Project-related	Project objectives access level
14		Safety first
15		Determining the requirements at the beginnings of the project and provide the details for each phase
16	Consumer-related	Customer participation level [20, 48]
17		Consumer satisfaction [44]
18		Ability to conduct soft management for the beneficiaries in controversies and competitions therein [20, 48]
19	Quality-related	Supervision and control of the project [14, 20, 48]
20		Transparent planned objectives and strategies [16, 44]
21		Contract articles' actualization rate [19, 44]
22		Accomplishing the agreed quality [44]
23	Time management	Orderly discourse with the beneficiaries during the project [45]
24		Conducting regular meetings between project management and the staff [44]
25		On-time project delivery management [19, 48]
26	Cost management	Proper management of the project physical resources [44, 46]
27		Project conformity level with the designated budget [18, 48]
28		Elimination of unnecessary in project phase planning

Table 7: Agility factors in project-oriented organizations [43].

Row	Field	Index
1	Communications management project	Horizontal communications vs. hierarchical
2		Communicational coherency rate in the project
3		Strong and orderly project staff communication
4		Providing the grounds for consultant communication with the beneficiaries
5		Access to valuable data on time
6	Organizational culture	Access to classified database
7		Sharing knowledge and information in the project
8		Allowing project managers and staff to draw decisions
9		Organizational perspective of the project management
10		Decentralized decision making
11	Project management	Project management transparency
12		Accurate management method execution
13		Accurate management method execution level
14		Applying new management method
15		Applying proper project management
16		Leadership through brisk managers
17	Project scheduling and control	Project structure to project requirements' ratio
18		Accurate short-term planning
19		Proper scheduling with respect to accessible resources
20		Accurate predictions of project requirements
21		Simulations execution of activities
22		Project schedule modification
23		Provisional modification upon need

Table 7: Continued.

Row	Field	Index
24		Project risk management
25		Accurate perception of project format
26		Project budget estimation
27	Project speed	Estimating project requirements in the shortest time
28		Rapid decision drawing
29		Rapid response to the client and the beneficiaries
30		Providing training in the shortest time possible
31		Implementing the simple and practical rules
32		Eliminating organization bureaucracy
33	Flexibility	Workforce flexibility
34		Adaptive management
35		Managing essential changes in the project
36		Rapid response to environmental changes in the project
37	Responsiveness	Effective response to client's inquiries
38		Rapid response to customer requests
39		Considering clients' expectations in the contract
40	Contract management	General and specific contract conditions' transparency
41		Selecting proper contract style
42		Selecting contractor with proper criteria
43	Contractor management	Reading the contractor records
44		Evaluating the contractor records
45		Establishing proper communication among contractor, consultant and client
46		Awareness of new technologies
47	Technology	Providing the proper hardware
48		Applying the proper software
49		Data security level
50		Data management
51		Provide coherent information system
52		Information electronic transaction
53		Providing the means for project agility
54		Providing motivation in the respectful teams
55	IT in project and human resources	Providing team work
56		On-time salary payment
57		Secure employee satisfaction
58		Employing skilled staff
59		Employing multifunctional staff
60		Prioritizing continuous training of the team members
61		Promoting team objective orientation
62		Proper task assignment
63		Respecting customers' ideas
64	Focus on consumer	Beneficiaries involvement in contract negotiations
65		Customer interests' consideration

Table 8: Stability features of each dimension.

Row	Dimension	Stability features of each dimension
1		Available sufficient sustainable financial sources [24, 49, 50]
2		Savings in costs and proper manpower use [22]
3		Proper resource and local facilities application in the project [51]
4		Improving socioeconomic status [51, 52]
5		Increasing efficiency and manipulation [52]
6	Economic	Reducing project time
7		Reducing indirect costs (annual operational costs and maintenance costs) [22]
8		Promoting infrastructure quality [53]
9		Savings in energy consumption [24, 52]
10		The project's economic efficiency [24, 47, 49–51]
11		Project sustainable revenues [24, 49, 50, 52, 54]
12		Reducing construction and facilities installation costs [22]

Table 8: Continued.

Row	Dimension	Stability features of each dimension
13	Social	Providing job for the local manpower [52]
14		The importance of the sociopolitical nature of the project [49]
15		Promoting business ethics and prevent corruption [50, 53, 55]
16		Improving social health [22, 49, 52]
17		Supporting social security [49]
18		Accepting the social nature of project [54]
19		Contributing to justice in social setting [24, 50]
20		Consumer cooperation rate [52]
21		Private sector investment rate [25]
22		Consumer requirements meeting [52]
23		Finished goods/service safety rate [50, 51]
24		Reducing and managing the environmental reduction [49]
25		Adopting project with the local climatic conditions [52]
26		Renewal resources efficiency rate [52]
27		Preventing water, air, social and noise pollution [24, 25]
28	Environmental	Improving environmental hygiene [25, 52]
29		Reducing nonrenewable resource consumption [25, 52]
30		Following green provision [22, 24, 51]
31		Applying new environment friendly technologies and products [24]
32		Being aware of environmental effects of the project [22, 49]
33		Industrial management and ability to run recyclable industry [24, 25, 50]

Table 9: Geometric mean of agility factors' weights in project-orient organizations.

Every agility feature in project-oriented organization	Weight	
	Experts	Municipality staff
Project communication management	4.023	3.926
Organizational culture	3.782	3.908
Project management	4.002	3.953
Project scheduling and control	4.016	4.052
Project speed	3.984	4.089
Flexibility	3.939	3.943
Response	3.712	3.940
Coherent management	3.847	3.995
Contractor/supplier management	3.996	4.005
Technology	4.198	3.807
IT in project	3.974	4.045
Project human resources	4.075	4.099

results, the agility factors in the project-oriented organizations are obtained.

Phase 8: clustering of agility factors in project-oriented organizations based on weighted factors obtained from three weighting attitudes

In this phase, the agility factors in project-oriented organizations are clustered based on the weights obtained from the second phase, according to the project management and academic experts' opinions and the weight obtained from the third phase by solving the QFD matrices. Table 12 shows the weights of agility factors based on the three considered attitudes.

Based on the weights obtained in the second phase and the results and the weights obtained from the third phase by solving QFD matrices, the analysis details for agility factors in project-oriented organizations are tabulated in Table 12.

Phase 9: clustering the agility factors in project-oriented organizations based on weight indices obtained from three weight approaches

In this phase, the agility factors in project-oriented organizations are clustered based on the weights obtained from the second phase based as to the project managements' point of views and academic experts and the weight obtained from the third phase by solving

Table 10: Calculating the weight of sustainability factors based on project management critical success factors.

Environmental sustainability												Social sustainability										Economic sustainability										Factors weight	PM CSFs
33	32	31	30	29	28	27	26	25	24	23	22	21	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1		
1.59	2.38	3.605	3.075	2.865	1.65	2.235	1.865	2.33	3.015	2.555	3.035	3.345	3.53	2.83	3.415	1.53	1.875	2.86	2.11	2.65	3.42	4.265	4.6	3.35	2.85	3.16	4.775	4.6	4.08	2.66	4.55	3.7	**0.040**	1
2.18	1.015	2.19	1.375	2.065	1.61	2.66	2.37	1.28	2.52	3.035	3.06	2.36	2.645	1.58	3.355	2.125	2.635	2.14	1.105	2.575	3.46	3.96	4.075	2.94	2.1	2.69	3.71	4.54	3.44	3.36	4.225	2.36	**0.035**	2
1.735	3.155	3.695	3.045	2.46	2.23	2.265	2.64	2.655	3.565	3.3	3.59	1.91	2.735	2.36	2.925	3.585	3.36	3.19	2.765	2.3	2.53	2.865	2.73	4.005	2.875	1.875	4.21	4.07	2.95	1.715	2.2	1.88	**0.039**	3
2.485	2.715	3.145	3.14	2.53	2.04	2.815	2.06	2.525	2.915	2.08	2.875	2.08	3.2	3.555	2.355	3.05	2.4	2.76	2.09	2.13	3.315	4.01	3.73	2.935	3.315	3.2	4.5	4.6	3.61	3.355	3.66	3.4	**0.032**	4
3	2.81	3.22	3.71	1.88	2.555	2.03	1.635	209.5	2.615	2.965	3.56	2.56	2.66	2.865	3.805	3.18	2.4	3.59	3.025	2.59	3.87	3.95	4.35	2.96	3.115	2.96	4.215	4.08	3.58	2.845	3.06	2.71	**0.039**	5
3.735	3.09	3.71	4.23	1.365	2.615	1.71	1.865	2.115	2.225	2.815	3.37	2.91	3.09	2.8	3.535	2.38	2.21	0.59	2.605	2.125	3.71	4.3	4.05	3.125	2.925	2.61	4.325	4.365	3.1	3.08	2.875	3.405	**0.037**	6
2.85	3.685	3.365	3.165	2.2	1.03	2.605	1.705	1.09	2.735	1.865	2.215	1.235	1.72	1.63	2.36	2.93	2.225	2.915	2.15	3.08	3.36	3.905	3.915	2.355	2.23	3.365	3.825	3.85	1.56	1.66	4.15	4.215	**0.029**	7
1.63	2.16	2.655	3.21	2.675	2.09	2.715	1.865	1.21	2.125	2.7	2.405	1.51	3.315	1.07	1.85	2.08	1.415	1.93	1.055	2.94	2.96	3.125	2.675	2.065	1.715	1.98	3.33	3.58	3.09	2.385	3.56	2.06	**0.028**	8
2.15	3.09	2.665	3.815	3.03	2.61	3.375	3.09	1.725	3.86	2.33	2.375	2.69	1.72	2.37	2.905	3.08	2.07	3.38	1.55	2.63	3.08	3.56	4.025	2.13	2.09	3.5005	4.58	4.625	2.88	3.065	4.6	3.355	**0.037**	9
1.865	2.745	1.855	2.655	2.68	3.09	2.875	2.09	1.055	1.56	1.365	1.43	2.38	2.62	2.08	2.09	2.56	1.7	1.07	1.64	1.585	2.18	2.595	3.035	2.38	1.555	3.1	3.64	4.25	2.45	2.305	2.56	3.88	**0.038**	10
1.125	1.715	1.68	1.14	1.085	1.14	1.865	2.46	1.525	2.14	1.8	1.13	3.265	3.075	2.75	2.555	1.875	2.125	2.125	1.365	1.125	2.03	3.59	3.215	1.96	1.45	2.57	3.56	3.8	2.14	1.735	3.615	2.215	**0.036**	11
1.51	1.465	2.09	3.26	1.59	1.655	3.375	2.14	1.38	1.855	2.065	2.85	3.205	3.205	2.16	2.69	1.705	3.15	3.35	1.205	2.135	2.63	3.125	2.75	1.715	1.815	3.155	3.845	4.55	3.53	2.75	3.035	2.53	**0.036**	12
1.415	2.065	1.71	1.865	1.465	1.12	2.53	1.875	1.415	2.19	1.365	2.135	2.06	2.54	1.365	2.215	2.07	1.58	1.46	1.4	2.46	2.16	3.965	3.35	3.075	1.705	2.09	1.7	4.2	2.06	2.04	1.7	3.35	**0.038**	13
2.985	1.96	2.38	1.625	2.38	2.14	3.13	1.23	2.075	3.08	3.885	1.715	1.955	2.08	1.39	1.465	1.72	1.555	1.095	1.725	2.27	2.7	3.8	4.4	2.585	1.265	2.255	2.31	4.5	3.39	1.58	2.065	3.71	**0.034**	14
1.125	1.435	1.865	3.16	2.08	1.87	2.04	1.255	1.73	1.835	3.4	3.22	2.875	3.83	2.375	2.8	3.865	3.09	3.23	2.75	2.64	2.555	3.355	3.695	3.08	2.81	3.06	3.54	4.2	2.54	1.81	2.23	2.635	**0.036**	15
2.8	3.7	2.73	3.25	2.38	2.685	3.375	2.25	1.16	3.105	1.865	3.71	3.875	2.7	2.245	2.405	3.145	2.375	2.65	2.105	3.075	3.08	2.96	3.365	2.95	1.905	2.59	3.06	4.58	3.8	3.415	3.1	2.17	**0.037**	16
1.85	3.115	2.66	3.865	2.06	1.63	2.09	1.59	1.23	1.34	2.205	3.31	2.375	2.18	2.57	3.41	3.56	2.59	1.64	1.375	2.55	3.1	3.155	3.1	2.9	1.215	1.95	2.96	4.455	2.375	2.455	2.375	2.56	**0.036**	17
1.335	1.73	2.115	2.55	2.13	1.06	2.46	1.865	1.39	1.405	1.08	3.96	4.06	3.09	2.235	2.125	2.815	1.64	2.46	1.6	2.09	2.55	2.625	2.655	2.35	1.9	2.375	2.65	3.57	1.705	2.07	2.4	3.23	**0.035**	18
1.13	1.89	2.885	2.36	3.11	2.09	3.39	2.245	1.78	1.705	1.08	3.15	2.6	2.08	2.57	2.63	2.46	1.64	1.59	2.08	2.275	3.825	4.075	3.925	2.81	2.57	3.8	4.905	3.95	3.45	3.535	3.875	3.375	**0.035**	19
2.78	3.33	3.56	3.39	3.09	3.06	3.72	3.76	3.135	3.61	1.6	3.21	3.875	3.6	2.375	2.215	1.88	2.66	2.64	2.06	3.075	3.585	3.55	3.45	2.375	2.875	3.08	3.58	4	3.375	2.13	2.575	2.305	**0.037**	20
1.63	1.12	1.09	1.745	1.62	2.44	1.94	1.755	1.03	1.215	2.21	2.395	2.61	2.2	3.1	2.875	2.825	1.82	1.365	1.465	2.08	2.2	3.05	3.11	2.46	2.11	1.6	2.725	3.08	1.51	1.67	2.35	2.71	**0.036**	21
2.08	3.275	1.64	3.865	2.125	1.08	1.195	1.375	1.87	1.89	2.06	2.96	4.105	3.15	3.6	1.8	2.38	2.58	3.075	1.63	2.36	2.13	3.91	3.815	3.08	2.57	3.36	2.06	4.7	2.58	3.035	3.05	4.415	**0.031**	22
2.57	1.875	1.145	2.655	83.5	1.58	1.59	1.71	2.03	2.135	2.555	2.545	3.4	3.03	1.335	2.83	3.365	2.21	2.64	1.56	2.58	2.215	2.95	3.06	2.875	2.405	2.91	3.25	3.725	2.375	2.06	2.35	2.4	**0.039**	23
2.09	2.74	1.59	2.695	1.86	2.12	1.43	1.365	1.195	1.625	2.8	1.7	1.375	1.325	1.7	2.705	2.08	1.645	1.865	1.125	2.06	1.56	2.56	2.7	1.555	1.75	2.025	3.05	3.365	1.815	2.625	2.35	2.3	**0.037**	24
1.63	3.115	1.875	1.73	1.385	1.035	1.24	1.495	1.14	2.125	2.11	3.25	2.855	2.865	1.465	1.53	1.09	1.865	1.56	1.08	2.14	2.14	3.08	3.365	1.96	2.165	2.08	3.365	3.54	2.405	1.72	1.6	3.72	**0.029**	25
1.125	1.38	1.34	3.19	1.23	2.375	1.095	1.885	1.37	3.215	1.87	3.815	2.965	3.03	2.71	2.365	2.605	2.85	2.415	3.08	2.625	2.57	3.58	3.875	2.95	2.215	3.255	2.52	4.205	3.265	2.655	3.445	4.055	**0.037**	26
1.63	1.56	2.13	3.875	2.38	1.09	2.36	2.01	1.08	1.425	2.46	3.035	3.365	2.54	1.98	2.405	1.34	1.615	3.105	2.06	3.06	3.13	3.61	3.75	2.125	2.85	3.405	3.06	3.965	3.805	2.38	2.95	2.75	**0.038**	27
1.375	1.13	1.865	2.12	1.625	1.185	1.635	2.08	1.04	1.375	1.815	2.645	1.88	1.8	2.65	3.2	3.315	3.36	1.045	1.66	2.44	2.36	2.865	3.355	3.25	2.75	3.065	3.74	4.58	2.655	1.7	3.225	2.21	**0.037**	28
0.021	0.024	0.025	0.030	0.055	0.020	0.024	0.021	0.102	0.024	0.024	0.029	0.028	0.028	0.024	0.027	0.026	0.023	0.024	0.019	0.025	0.029	0.036	0.036	0.028	0.024	0.029	0.036	0.043	0.030	0.025	0.031	0.031	Agility factors' weights	

Table 11: Calculating the weight of agility factors in project-oriented organizations in relation to sustainability factors' weights applying QFD.

Agility factors in project-oriented organizations														Sustainability factors
13	12	11	10	9	8	7	6	5	4	3	2	1	Factors weight	
2.070	2.125	2.625	4.560	3.590	4.200	3.560	3.800	4.125	4.020	4.465	2.750	3.000	**0.031**	1
3.400	4.375	3.090	4.465	3.635	3.125	4.100	3.160	3.965	4.590	4.410	3.915	2.580	**0.031**	2
3.135	3.930	3.125	2.375	2.625	2.865	3.365	2.860	3.725	3.590	4.200	3.215	3.365	**0.025**	3
3.310	3.460	2.215	2.570	2.625	2.640	2.125	2.300	1.570	2.625	4.160	3.580	3.085	**0.030**	4
2.660	3.070	3.450	3.950	3.165	3.540	4.000	2.715	3.800	4.640	4.210	3.215	3.625	**0.043**	5
2.460	3.350	3.275	4.060	3.615	4.125	3.610	3.115	4.060	4.210	4.110	2.125	3.540	**0.036**	6
2.570	2.625	3.835	4.125	3.360	3.635	3.625	2.360	3.440	3.625	3.965	2.875	3.390	**0.029**	7
2.060	2.580	1.610	3.815	3.060	2.440	1.375	2.570	1.510	3.075	4.625	3.610	2.850	**0.024**	8
2.160	2.625	2.375	4.475	1.640	2.660	2.590	2.080	2.610	3.000	4.055	2.580	3.580	**0.028**	9
2.570	2.365	3.580	3.500	2.375	3.250	2.590	2.160	2.365	3.610	4.140	2.865	2.360	**0.036**	10
3.085	2.125	2.885	2.625	3.580	2.875	2.000	2.600	1.875	3.570	4.090	3.840	3.385	**0.036**	11
2.030	2.570	2.125	4.060	2.070	2.140	2.625	2.965	2.525	3.580	4.125	2.610	2.165	**0.029**	12
2.375	3.110	1.815	1.950	3.165	3.100	1.875	2.100	1.125	2.590	4.000	2.950	3.880	**0.025**	13
1.100	3.075	3.250	2.500	3.060	2.510	1.900	1.900	1.140	2.975	2.360	2.125	3.350	**0.019**	14
1.415	4.080	2.450	2.125	3.850	2.340	1.800	2.200	1.615	3.865	4.080	3.885	2.730	**0.024**	15
3.115	4.600	3.150	1.640	3.100	2.900	4.200	3.000	2.195	4.105	3.800	4.125	3.575	**0.023**	16
2.340	4.200	2.800	1.560	3.160	4.365	3.600	2.555	1.580	3.300	2.665	4.210	2.700	**0.026**	17
3.265	2.580	3.530	2.375	2.940	3.365	3.760	2.375	1.860	4.080	4.410	3.750	3.405	**0.027**	18
2.440	3.365	3.865	2.065	3.080	4.400	3.950	1.900	1.465	2.840	3.125	3.085	2.355	**0.024**	19
4.165	4.625	4.160	1.530	1.915	1.300	2.855	3.095	2.030	2.950	3.275	3.815	4.165	**0.028**	20
3.350	3.925	3.625	1.865	4.605	3.830	3.310	3.100	2.530	2.850	2.865	4.080	4.025	**0.028**	21
4.150	2.625	2.365	3.550	2.580	3.570	2.650	2.350	1.600	3.055	3.910	2.960	2.565	**0.029**	22
4.500	4.150	3.950	4.100	2.460	3.100	2.375	3.075	2.190	3.200	2.735	3.840	3.140	**0.024**	23
3.250	3.410	3.400	3.805	3.065	2.400	1.300	2.070	1.365	3.000	2.925	4.150	2.815	**0.024**	24
3.090	2.090	3.725	3.175	1.645	2.850	2.055	3.375	1.575	2.750	3.250	2.210	1.850	**0.102**	25
2.355	3.375	3.365	4.025	2.725	2.360	1.375	2.080	1.640	2.355	2.665	3.825	2.460	**0.021**	26
2.460	3.665	2.570	3.960	3.365	1.950	1.225	2.060	1.660	1.955	2.360	3.375	1.805	**0.024**	27
2.885	3.960	2.175	3.580	2.960	2.220	1.500	2.225	1.375	2.085	2.460	3.965	2.875	**0.020**	28
2.140	1.850	2.135	4.350	3.035	1.805	1.975	2.125	1.815	3.400	3.035	4.590	2.965	**0.055**	29
2.625	4.275	3.825	2.950	3.725	3.385	2.080	2.425	1.955	2.955	3.350	4.625	3.105	**0.030**	30
3.165	2.640	3.620	4.265	3.115	2.225	2.500	1.900	2.000	3.100	3.580	3.905	3.580	**0.025**	31
2.465	2.480	3.440	3.075	2.960	3.810	2.000	2.210	1.700	2.655	3.365	3.400	3.750	**0.024**	32
2.040	3.365	2.965	4.090	3.515	3.115	1.875	1.850	1.660	2.500	2.095	3.780	2.350	**0.021**	33
2.764	3.075	3.081	3.297	2.916	2.979	2.608	2.591	2.205	3.270	3.575	3.366	2.967		
0.071	**0.079**	**0.080**	**0.085**	**0.075**	**0.077**	**0.067**	**0.067**	**0.057**	**0.085**	**0.092**	**0.087**	**0.077**	**Agility factors' weight**	

Table 12: Importance weights of the agility factors' in project-oriented organizations through the three attitudes.

Agility in project-oriented organizations	Agility weight importance (average)	Agility weight importance (experts)	Agility weight importance (municipality staff)	Agility weight importance (sustainability approach)
Project communication management	0.0733	0.0768	0.0764	0.0769
Project culture	0.0750	0.0751	0.0760	0.0739
Project management	0.0864	0.1074	0.0769	0.0782
Project scheduling	0.0830	0.0926	0.0788	0.0785
Project speed	0.0757	0.070	0.0795	0.0799
Flexibility	0.0739	0.0683	0.0767	0.077
Response	0.0736	0.0716	0.0766	0.0726
Coherent management	0.1658	0.0780	0.0777	0.0725
Contractor's management	0.0762	0.0726	0.0779	0.0781
Technology	0.0820	0.0908	0.074	0.0821
Project IT	0.0749	0.0686	0.0787	0.0777
Human resources	0.0756	0.0708	0.0797	0.0793
Focusing on consumer	0.0678	0.0619	0.0712	0.0708

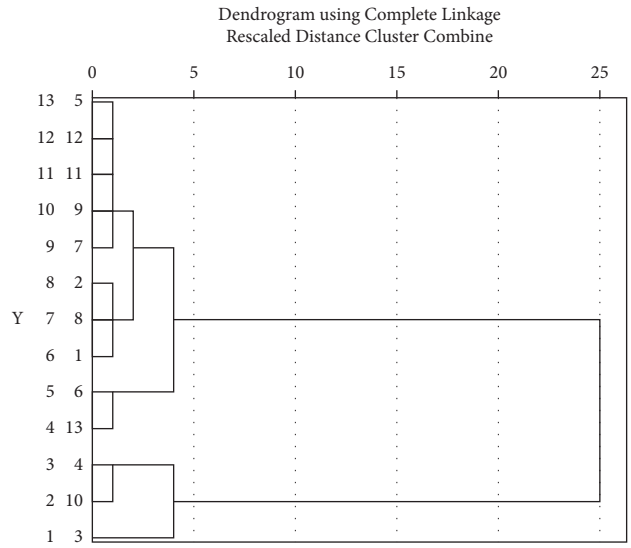

Figure 2: Dendrogram from hierarchical clustering.

Table 13: Results of clustering and the manner of agility factors placement.

Cluster #	Agility in project-oriented organizations	Factor #
1	Project communication management	1
1	Project culture	2
2	Project management	3
3	Project scheduling	4
4	Project speed	5
5	Flexibility	6
4	Response	7
1	Coherent management	8
4	Contractor's management	9
3	Technology	10
4	Project IT	11
4	Human resources	12
5	Focusing on consumer	13

Table 14: The agility clusters' importance in project-oriented organizations.

	Cluster 1	Cluster 2	Cluster 3	Cluster 4	Cluster 5
Clusters' members	(1) Communication management in project (2) Organizational culture (3) Contracts management	(1) Project management	(1) Project scheduling and control (2) Responsiveness (3) Contractors management (4) IT IN PROJECT (5) Human resources	(1) Project speed	(1) Flexibility (2) Focus on consumers
Cluster's importance weight	0.0987	0.0864	0.0825	0.0753	0.0708

QFD matrices, and therefore, they clustered through a hierarchical model.

Step 8: clustering the agility factors in project-oriented organizations based on weight indices obtained from the three approaches

At this stage, the agility factors are clustered through the hierarchical clustering method. The yield dendrogram is shown in Figure 2. Accordingly, considering the similarity coefficient is ˃95%, agility factors in project-oriented organizations are located in five

clusters, and the clustering details therein are tabulated in Table 13.

Step 9: determining the importance of the agility factors' clusters in project management based on the member factor of each cluster.

In this step, based on both the results of the previous step and the weight of clusters' factors, the importance of each cluster is determined, and each cluster's rank is determined according to their importance value. As observed in Table 13, after determining the average importance weight of the agility factors' in project-oriented organizations, for the agility factors that they are members of clusters, the weighted mean of each factor is calculated to obtain the importance weight of cluster. The cluster with the highest weight is placed at the top of the clusters' importance (Table 14).

As observed in this table, clusters one, two, and three are ranked in the first to third as to their importance, respectively.

6. Conclusion

To manage and execute a project, in project-oriented organizations, concentrating on the required infrastructures and providing the project management critical success factors, together in addition of considering the importance of environmental resources and social effects of the project and also the profitability and economic aspect which puts the organization in line with appropriate development, as to form a successful project management at macro and microlevels is of essence. By doing so, a big step is taken towards accountability and customer satisfaction due to project implementation, by considering sustainability indices. Therefore, a framework is introduced for clustering and analysis of big projects based on agility factors in project-oriented organizations with a sustainability approach, by applying quality functionality development tool. The proposed framework has been implemented and solved in Isfahan Metropolitan Municipality. For this purpose, in phase one, first, the project management critical success factors and, next, the agility factors and in project-oriented organizations and sustainability factors are identified. In phase two, the importance of the project management critical success factors and, next, agility factors in project-oriented organizations are measured from the perspective of large project managers in Isfahan Municipality and university experts. In phase three, the weights of agility factors in project-oriented organizations are calculated based on the weighted factors of sustainability according to the critical success factors in the large projects by applying quality function deployment. In phase four, the agility factors in project-oriented organizations are clustered based on the previously obtained weights. Next to guiding project managers to focus on the major success factors in project management and providing sustainability factors as to the big projects' and activities' impact on the field of environmental resources, social resources, and economic aspects, through focusing on agility factors, they can obtain the desired customer satisfaction level, timely delivery, and desired quality as the major concerns. As observed in Table 14, the first cluster, which includes project communication management, organizational culture, and contract management, is the most important at (0.0987) weight rate. Because these weights are based on sustainability and project management critical success factors, focusing on the important cluster is highly contributive in organizations' success in project management next to the principles of sustainable development and establishing the principles of agility.

7. Research Constraints

The measures taken in this study, despite the accuracy of the presented framework and application of the applied factors, can be improved by removing any of the constraints therein. Depending on the subject organization, the projects and conditions, addition, elimination, and replacing the applied factors can be contributive in closer insight therein. The findings are implemented on Isfahan Municipality's big projects. To be focused on the paramount cluster helps the organization to be successful in project management in line with setting the principles of the sustainable development and by stablising the principles of the organizational agility in project-oriented organizations.

8. Suggestions for Future Studies

Assessing the sensitivity analysis of indices and the effect on the clusters' ordering can lead to different and accurate results in the performance of the organization. Moreover, evaluating the performance of projects through the evaluation and performance analysis methods, subject to each approach in addition to the presence of combined approaches, can be effective in improving efficiency. The effect of each one of these approaches on project cost, time, and quality must be considered in project performance assessment.

Data Availability

The research data are available within the article (Tables and Figures) in detail.

Conflicts of Interest

The authors declare that they have no conflicts of interest.

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