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Measuring the Effect of Project Management on Construction Outputs: A New Approach Using the DEMATEL Method

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Abstract

Construction project management is project life Every part of the cycle, from concept to completion Includes directing and organizing. It is a thorough process and it is timely and aimed at delivering projects under budget contains A The project life cycle is the process through which a project progresses in a sequence of phases. It includes initiation, planning, Includes activation, and closure. Learn more. The project life cycle is the process through which a project progresses in a sequence of phases. Methodology for improving business processes BPM tools to shape the approach is used. Errors, Incompetence and By reducing miscommunication Business with the objective of improving corporate performance Model, implement and automate workflows They are used to Also known as traditional project management, this is a preferred approach often used in the construction industry. On-time, within budget, and financial or legal To complete the project successfully without problems Effective construction project by maximizing opportunity Management benefits owners. Planning and managing a project involves many elements that cannot be covered in one essay. However, they can be grouped under three main categories: product, people and process. Phases of Project Management There are six distinct project phases. These phases are project initiation and strategy development, project design and planning, implementation and testing, project initiation and training, support initiation and project completion. In which test to conclude from analysis and Evaluation Laboratory (DEMATEL) of complex system components A cause-and-effect chain is considered correct One of the best to identify. It values relationships Interdependence between factors and identification through visual structural modeling Important to see. Alternative: Development of project charter, knowledge integration, process Coordinating, staffing coordination, and distribution Chain integration. Evaluation Preference: Development of project charter, knowledge integration, process Coordinating, staffing coordination, and distribution Chain integration. The result it is seen that Staff integration is got the first rank where as is the Process integration is having the lowest rank.

Keywords: Development of project charter, knowledge integration, process Coordinating, staffing coordination, Project Management.

Introduction

The An objective approach to each individual structure A dilemma arises when considering uniqueness Eliminates problems, and for customer organizations Primary to the critical and contemporary BPM discipline Instantly on key criteria that matter Pays attention. BPM's precision in project performance Assessment of influence. [1] Validity of measures for structure and Structural equation to analyze reliability modeling (SEM) was used. Important contribution of This survey of construction practitioners Proposed measures for consolidation For implementation, high success rates From integration strategies to experience It is also a guide to benefit. [2] importance of components has made the strategies to be adopted while managing construction projects even more important. Based on the findings of this study, integration Management Project management is positive in performance And it's clear that it has a strong impact. [3] First, Construction deals with a physical manifestation, for this Construction "rework", is usually already built and Includes demolition. The result is rework Greater in construction efficiency than "transformation". Perceived impact, and time and Under resource constraints, construction managers have their By changing the design and specifications They tend to avoid reworking complex tasks. [4] Within such a changing industry environment, engineering and Construction accuracy, facility reliability and cost efficiency of the project as expressed by performance Project managers increasingly for technical content will be responsible. Project managers also face [5] In matching project managers to construction projects There are two common problems. First, a plan Manager for a specific construction project Considerations in selecting and fitting It is difficult to come up with a list of all the factors. [6] Managing a large project is a lot of complexity Plotting factors and their interactions, Organizing and Controlling Includes. These PM factors are equally important Concurrent monitoring when deemed necessary is a difficult task. General about the CSFs of a project Without understanding, managing a project and Almost impossible to control [7]. Inputs and outputs of ISO 21500 processes Do not describe, and stages of a project not specified; It is in construction projects Any management, including those used also increases the self-awareness of the organization. input, output, These include levels, tools, and techniques Flexibility is routine processes Other additional components commonly used in conversion Allow you to connect. [8] Accordingly, based on the pattern of information flows Reasons for change in construction plans Project management in

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construction for analysis A key aspect is change management. This article is To simulate the process, construction Detailed information on changes that may occur during the process A functional shift to generating information Presents a forecasting system. [9] Many ASPs are currently only building their products Perfect for the problems faced by project management Solutions are aimed at marketing purposes only Although it claims to have PM-ASP in a construction project Promote successful development and use Although few studies have been conducted to identify the factors, They are all still very basic. anecdotal evidence provided by individual case studies or success stories using personal interview techniques. In the trade press [10] Communication in the context of managing a construction project and Effectiveness of communication. Additionally, appropriate information on IT performance due to a lack of technical performance measurement the paper focuses only on the evaluation phase. Especially for structural, construction projects are designed. [11] Oil and Gas, Roads and Highways, and residential construction projects. Construction project they are considered in the process of selecting a manager These managers determine all criteria that were asked. [12] To guide practice and construction project outcomes The relationship between them should be further clarified. Therefore, project managers and project stakeholders Management knowledge influenced the final construction plan decisions. [13] Discussions about BIM is widespread in the industry, but a big one The problem is how BIM works in real-time Investigate being able to speak with a construction project Failed. RFID, with its real-time information visibility and With traceability, BIM, and real The interface between the project can be linked.[14] At various Phases of the construction project, from inception to completion As far as handing over construction, many interests are Affected both positively and negatively. The representatives of interests are called project partners are mentioned.[15] It has linear and non-linear cost-period relationships Strong cost optimization capability to handle provides Construction mentioned in the literature Cost optimization of projects is CPM or CPM Only such project models. Such models, Various constructions like highway construction Projects cannot be accurately modeled. [16]

Materials and Methods

Barriers to effective implementation of Green Lean already exist were identified from the literature same DM model of situational relationships between constraints in time were investigated with the help of method. Green in production Barriers to adopting lean practices are literature were identified through the study.[11] A DEMODEL-fuzzy TOPSIS by The attitude. Will affect medical tourism in Malaysia the authors discussed the factors, To examine the influencing relationships between factors Dematerial method is used and factors Fuzzy TOPSIES to determine importance ranking used [12] One of the solution methods used in the work is DEMATEL The primary advantage of this method is that it is compromised An implicit cause-and-effect model Add relationship. DEMATEL is its components a system or between several available alternatives A useful tool for exploring structure and relationships is proper. [13]. Establishing a rating structural model, conjoint factor analysis, and DEMATEL method for determining the weights of the criteria introduced. In real valuation problems, Complex valuation It is difficult to calculate the exact value of the method. However, Makes a complex assessment environment much easier Can be divided into criteria or sub-systems [14]. According to surveys and oral expert interviews, company quality and two key of financial skills and debt Criteria are identified. Method and Using DEMATEL to analyze causal relationships, Severity of sub-indexes of each scale and Performance is determined, and supplier Estimation is inherently imprecise. by MATLAB software. [15]. A hybrid method with two phases, Expert Judges, a standard interpretation method and one including DEMATEL Size grid awareness and general applicability Used to express character. Of the smart city and evaluate its dimensions by DEMATEL.[16] Interdependence of the five key criteria DEMATEL is used to identify. External Organizational Environment and sustainability are the cause but the plan And the results of project management results In the final stage of Fuzzy DEMATEL, the key parameter relationship is Of influence between graphs and scales Depicts the flow. it. [17]. To establish internal biases and their intensity, the fuzzy DEMATEL method proposed. In Network Architecture, Delphi External biases or nominal grouping by technique Techniques include brainstorming and other suitable methods Decision makers can decide. So on. [18]. DEMATEL-Entropy-TODIM to rank alternative sites the method is also used. DEMATEL times, entropi Weight method and TODIM method are different MCDM although widely used for problems, for us As far as known, all these three decision methods are LSWF are integrated and used for research. [19]. Because A clear scale to evaluate CoQ models and No accounting standard, the COQ model of the cost structure Conclusion Quality managers or quality data collectors is left to judgment. Therefore, the group DEMATEL and integrated MCDM combining ANP methods We proposed the model to measure expert opinions It is also to solve the problem of choosing the optimal CoQ model. [20] Causality between the components of a system and DEMATEL technique in analyzing the effect relationships will be useful.Methodology examines contextual interactions between factors under investigation to further address complex issues in the system under investigation [22]. Internal dependencies refer For interactions of components in the system, external dependencies Are derived from the external environment. Interconnect For dependencies, between components in a system Consider the relationships within and their impact on each other with, we use the DEMATEL method. [23]. Technological Innovation in Indian Real Estate Industry And to measure human resource invention skills an attempt to fill the literature gap using [24].

Analysis and Dissection

Project Management in Construction show the Development of project charter it is seen that Supply chain integration&Staff integration the highest value for Process integration is showing the lowest value. Knowledge integration it is seen that Process integration is showing the highest value for Supply chain integrationis showing the lowest value. Process integrationit is seen that Knowledge integrationis showing the highest value for Staff integration is showing the lowest value. Staff integrationit is seen that the Supply chain integration is showing the highest value for Supply chain integrationis

showing the lowest value.Supply chain integrationit is seen that the Supply chain integrationis showing the highest value for Knowledge integrationis showing the lowest value.Table 1 shows that DEMATEL Decision making trail and evaluation laboratory in Alternative: Development of project charter, knowledge integration, process Coordinating, staffing coordination, and distribution Chain integration.Evaluation Preference:Development of project charter, knowledge integration, process Coordinating, staffing coordination, and distribution Chain integration.

TABLE 1. Project Management in Construction

	Development of project charter	Knowledge integration	Process integration	Staff integration	Supply chain integration	Sum
Development of project charter	0	3	4	1	2	10
Knowledge integration	5	0	7	3	1	16
Process integration	2	5	0	2	5	14
Staff integration	6	2	1	0	8	17
Supply chain integration	6	1	2	5	0	14

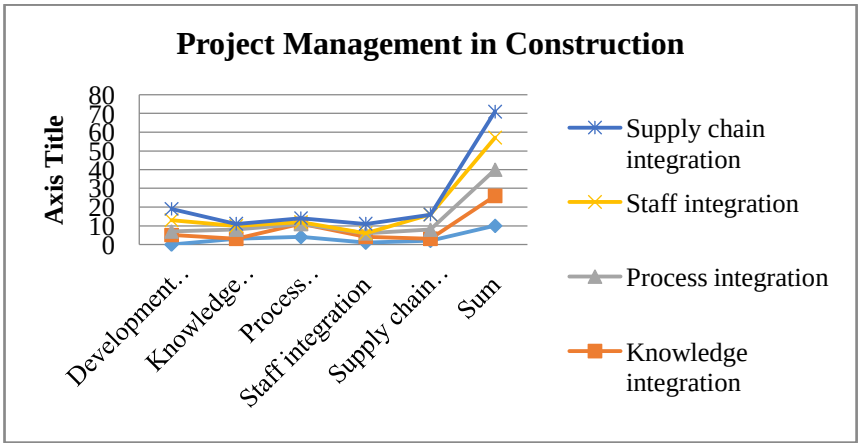

FIGURE 1. Project Management in Construction

Alternative: Development of project charter, knowledge integration, process Coordinating, staffing coordination, and distribution Chain integration.Evaluation Preference:Development of project charter, knowledge integration, process Coordinating, staffing coordination, and distribution Chain integration.

TABLE 2. Normalisation of direct relation matrix

	Development of project charter	Knowledge integration	Process integration	Staff integration	Supply chain integration
Development of project charter	0	0.272727273	0.36363636	0.090909091	0.181818182
Knowledge integration	0.454545455	0	0.63636364	0.272727273	0.090909091
Process integration	0.181818182	0.454545455	0	0.181818182	0.454545455
Staff integration	0.545454545	0.181818182	0.09090909	0	0.727272727
Supply chain integration	0.545454545	0.090909091	0.18181818	0.454545455	0

Table 2 shows that the Normalizing of direct relation matrix in Development of project charter, knowledge integration, process Coordinating, staffing coordination, and distribution Chain integration.The diagonal value of all the data set is zero.

TABLE 3. Calculate the total relation matrix

	Development of project charter	Knowledge integration	Process integration	Staff integration	Supply chain integration
Development of project charter	0	0.272727273	0.363636364	0.090909	0.181818182
Knowledge integration	0.45454545	0	0.636363636	0.272727	0.090909091
Process integration	0.18181818	0.454545455	0	0.181818	0.454545455
Staff integration	0.54545455	0.181818182	0.090909091	0	0.727272727
Supply chain integration	0.54545455	0.090909091	0.181818182	0.454545	0

Table 3Shows the Calculate the total relation matrix in Development of project charter, knowledge integration, process Coordinating, staffing coordination, and distribution Chain integration.

TABLE 4.I

I				
1	0	0	0	0
0	1	0	0	0
0	0	1	0	0
0	0	0	1	0
0	0	0	0	1

Table 4Shows theT= Y(I-Y)-1, I= Identity matrix in Development of project charter, knowledge integration, process Coordinating, staffing coordination, and distribution Chain integration. Is the common Value.

TABLE 5.Y

Y				
0	0.272727	0.363636	0.090909	0.181818
0.454545	0	0.636364	0.272727	0.090909
0.181818	0.454545	0	0.181818	0.454545
0.545455	0.181818	0.090909	0	0.727273
0.545455	0.090909	0.181818	0.454545	0

Table 5Shows the Y Value in Development of project charter, knowledge integration, process Coordinating, staffing coordination, and distribution Chain integration.Is the Calculate the total relation matrix Value and Y Value is the same value.

TABLE 6. I-Y

I-Y				
1	-0.27273	-0.36364	-0.09091	-0.18182
-0.45455	1	-0.63636	-0.27273	-0.09091
-0.18182	-0.45455	1	-0.18182	-0.45455
-0.54545	-0.18182	-0.09091	1	-0.72727
-0.54545	-0.09091	-0.18182	-0.45455	1

Table 6Shows the I-Y Value Development of project charter, knowledge integration, process Coordinating, staffing coordination, and distribution Chain integration.Table 4 T= Y(I-Y)-1, I= Identity matrix and table 5 Y Value Subtraction Value.

TABLE 7. (I-Y)-1

(I-Y)-1				
-0.19456	-0.540126716	-0.6316	-0.67032	-0.85907
-1.40898	-0.06969377	-0.87988	-0.90854	-1.32321
-1.38516	-0.725976769	-0.22796	-0.83197	-1.02653
-1.25739	-1.027983105	-1.29079	-0.0634	-0.9549
-1.0576	-0.900211193	-1.05267	-0.62831	-0.20957

Table 7 shows the (I-Y)-1Value Development of project charter, knowledge integration, process Coordinating, staffing coordination, and distribution Chain integration. Table 6 shown the Minverse Value.

TABLE 8. Total Relation matrix (T)

Total Relation matrix (T)				
-1.19456	-0.54013	-0.6316	-0.67032	-0.85907
-1.40898	-1.06969	-0.87988	-0.90854	-1.32321
-1.38516	-0.72598	-1.22796	-0.83197	-1.02653
-1.25739	-1.02798	-1.29079	-1.0634	-0.9549
-1.0576	-0.90021	-1.05267	-0.62831	-1.20957

Table 8 shows that the total relation matrix the direct relation matrix is multiplied with the inverse of the value that the direct relation matrix is subtracted from the identity matrix.

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TABLE 9. Ri& Ci

	Ri	Ci
Development of project charter	-3.89568	-6.3037
Knowledge integration	-5.5903	-4.26399
Process integration	-5.1976	-5.08289
Staff integration	-5.59446	-4.10253
Supply chain integration	-4.84835	-5.37328

Table 9 shows the Ri, Ci Value in Development of project charter, knowledge integration, process Coordinating, staffing coordination, and distribution Chain integration.

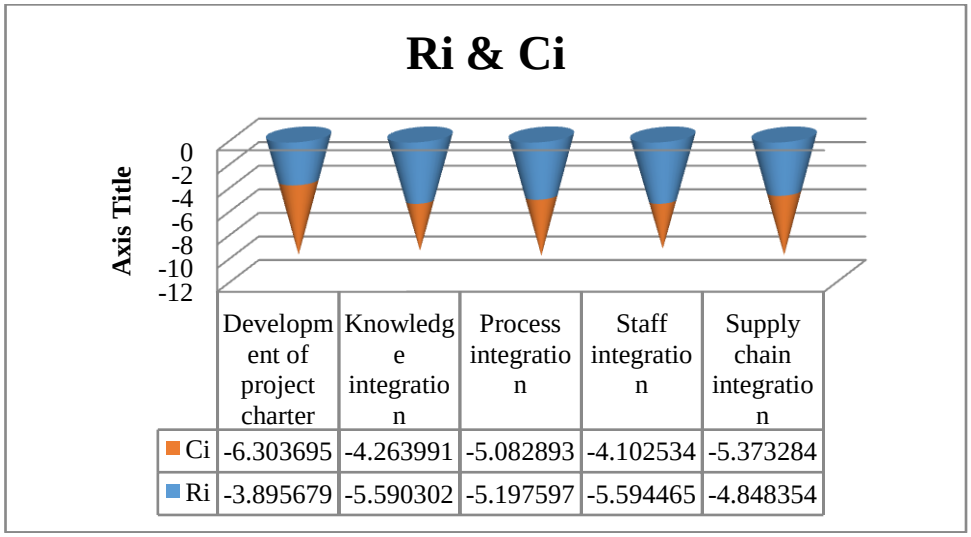

FIGURE 2. Ri& Ci

Table 9 shows the Ri, Ci Value in Development of project charter, knowledge integration, process Coordinating, staffing coordination, and distribution Chain integration.

TABLE 10.RI+Ci&Ri-Ci & Rank &Identity

	Ri+Ci	Ri-Ci	Rank	Identity
Development of project charter	-10.1994	2.408017	3	cause
Knowledge integration	-9.85429	-1.32631	2	effect
Process integration	-10.2805	-0.1147	5	effect
Staff integration	-9.697	-1.49193	1	effect
Supply chain integration	-10.2216	0.52493	4	cause

Table 10 shows the Calculation of Ri+Ci and Ri-Ci to Get the Cause and Effect. the final result of this paper the Development of project charter is in 3rdrank cause, Knowledge integration is in 2ndrank effect, Process integration is in 5th rank effect, Staff integration is in 1st rank effect and Supply chain integrationis in 3rd rank cause. The final result is done by using the DEMATEL method.

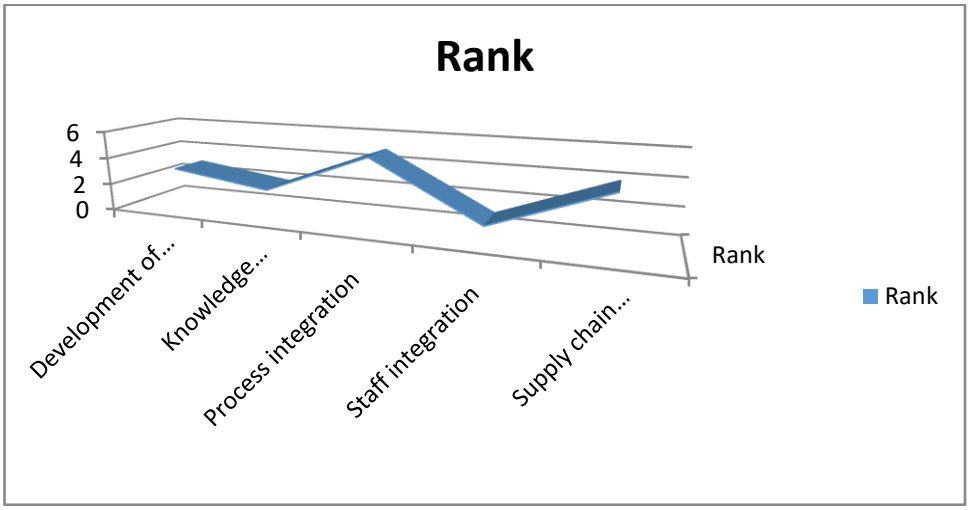

FIGURE 3. Rank

Figure 3. shows the graphical representation the final result of this paper theDevelopment of project charter is in 3rdrank, Knowledge integration is in 2ndrank, Process integration is in 5th rank, Staff integration is in 1st rank and Supply chain integrationis in 3rd rank.

TABLE 11.T matrix

T matrix				
-1.19456	-0.54013	-0.6316	-0.67032	-0.85907
-1.40898	-1.06969	-0.87988	-0.90854	-1.32321
-1.38516	-0.72598	-1.22796	-0.83197	-1.02653
-1.25739	-1.02798	-1.29079	-1.0634	-0.9549
-1.0576	-0.90021	-1.05267	-0.62831	-1.20957

Table 11shows the T Matrix Value calculate the average of the matrix and its threshold value (alpha)= Alpha -- 1.00505596620908If the T matrix value is greater than threshold value then bold it.

Conclusion

The result it is seen that Staff integration is got the first rank where as is the Process integrationis having the lowest rank. First, Construction deals with a physical manifestation, for this Construction "rework", is usually already built and Includes demolition. The result is reworking Greater in construction efficiency than "transformation". Perceived impact, and time and under resource constraints, construction managers have their by changing the design and specifications they tend to avoid reworking complex tasks. Within such a changing industry environment, engineering and Construction accuracy, facility reliability and cost efficiency of the project as expressed by performance Project managers increasingly for technical content will be responsible. Project managers also face Accordingly, based on the pattern of information flows Reasons for change in construction plans Project management in construction for analysis A key aspect is change management. This article is To simulate the process, construction Detailed information on changes that may occur during the process A functional shift to generating information Presents a forecasting system. A hybrid method with two phases, Expert Judges, a standard interpretation method and one including DEMATEL Size grid awareness and general applicability Used to express character. Of the smart city and evaluate its dimensions by DEMATEL. Interdependence of the five key criteria DEMATEL is used to identify. External Organizational Environment and sustainability are the cause but the plan and the results of project management results In the final stage of Fuzzy DEMATEL, the key parameter relationship is Of influence between graphs and scales Depicts the flow. it.

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