FORMULATING AN OPTIMIZED NETWORK MODEL FOR EFFECTIVE CONSTRCTION MANAGEMENT

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ABSTRACT

An attempt is made to understand the interplay of participants. By applying the social network analysis to construction project allows to understand the actual internal structure of an organization and the management structure. The project establishes order management, technical consultation, safety network, interpersonal social network. The key factors for effective management in a construction project can be detected by the degree, Eigen vector, centrality, and geodesic distances.

Key words: Social network analysis, Network model.

INTRODUCTION

The classic elements of a successful construction project are Time, Cost, and Quality. However the central figures in a construction project are human participants. .The concept of social network analysis (SNA) was first introduced in 1930's. Recently, the social network analysis methodology is receiving attention within the engineering and construction field.

Research methodology

Objective

The aim of the paper would be to propose a social network models in construction industry to enhance its team performance and analyze the information transfer flow between the construction participants.

Project methodology

It involves Questionnaire survey conducted to the participants of the organization, which is then converted into numerical terms by SNA analysis tool. Network is framed

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according to the data's and then finally the factors of SNA are analyzed. The methodology carried out throughout the project is categorized by the following Fig. 1 project methodology.
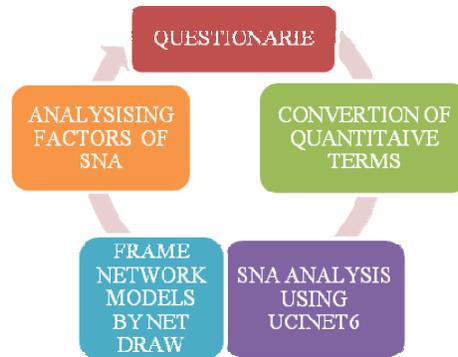

Fig. 1: Project methodology

Analysis techniques

The most significant tool is UCINET6 developed by Lin Freeman and Martin Everett. The visual representation of a network helps us to easily understand the internal structure of a network by NET DRAW.

Data collection

The collected survey list is listed in the following Table 1 Survey distribution list.

Table 1: Survey distribution list

Affiliation	No. of questionnaires received
General Manager	2
Deputy General Manager	4
Resident Engineer	3
Manager	3
Quantity Surveyor	1
Assistant Engineer	9
Senior Engineer	4

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Affiliation	No. of questionnaires received
Project Engineer	8
Site Engineer	4
Sub Ordinator	2
Supervisior	2
Assistant Manager	4
Surveyor	2
Site Incharge	2

RESULTS AND DISCUSSION

Order management network

Order management network is a goal oriented network, in which all the construction participants of the project together towards the goal of the project. The order management network model generated is as follows in Fig. 2 order management network model.

Centrality measure

In measuring the centrality, the project manager and senior manager have the greatest out degree of 6 and in degree of 9 and might be regarded as most influential actor. The supervisor has high in degree score of 7 compared to all other actors in an organization. On the average of, the actors have a degree of 3.2, which is quite less, given that there are 14 actors. The range of in degree centralization is slightly larger (47.929%) than that of out degree.
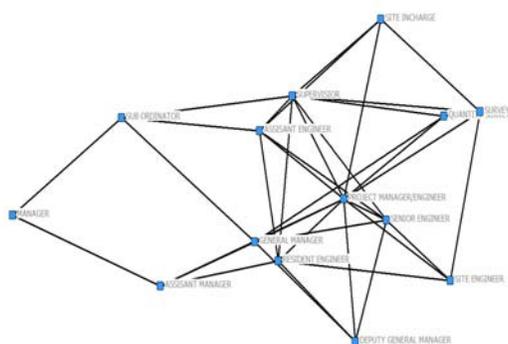

Fig. 2: Order management network

Eigen value and Eigen vector

The Eigen value and Eigen vector of network, it finds the most central actor in the terms of global. Higher score indicate that the actors are more central and vice versa

Table 2: Centrality measure

Participants	Out degree	In degree
Project manager	6	9
Senior engineer	6	0
Quantity surveyor	4	0
Resident engineer	4	2
Assisant engineer	4	3
Assisant manager	4	1
Site incharge	3	4
Sub ordinator	3	1
Surveyor	3	4
Deputy general manager	2	3
Site engineer	2	4
Supervisior	2	7
General manager	1	5
Manager	1	2

Geodesic distance

Supervisor the higher score of 35, which is considered as the strong link. The project manager and the senior manager have the higher score of 66.028 & 42.668 respectively.

Technical consultation network

The Fig. 3 Technical consultation network implies that the network has four fragments having four higher score participants such as technical team, client and contractors, site in charge and finally assistant engineer.
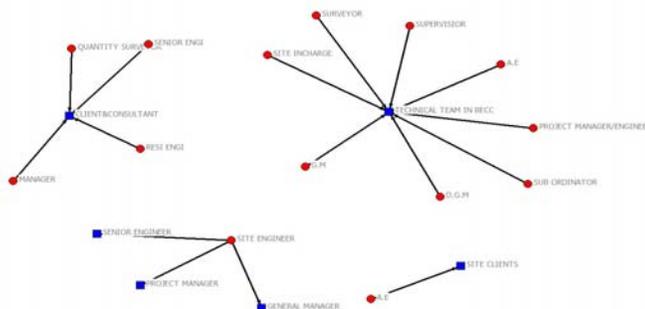
Fig. 3: Technical consultation network model

Inter personal network

The network model generated is as follows in Fig. 4 inter personal network model. The most influenced actor is project manager/engineer according to the network model.

Fig. 4: Inter personal network model

Safety communication network

Average distance = 1.077, Distance-based cohesion = 0.962 (range 0 to 1; larger values indicate greater cohesiveness). Hereby the network denotes that it has a good safety communication in an organization. Fig. 5 indicates the safety communication network.

Fig. 5: Safety communication network model

CONCLUSION

The results attained are not strongly conclusive in terms of high performance teams. Most construction project management systems are established before the project commencement. It is a factual idea of making the best use of non-official networks such as technical consultation network, inter personal network and safety communication network that can improve the management in many aspects and sole their issues.

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