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Examination of Organizational Boundary, Culture and Conflict in Development of Collaboration Strategy

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Abstract

Increasing complexity of construction projects on top of the loss of performance caused by rigid and impermeable boundaries between organizations, professions, and processes in construction industry, calls for more attention to inter-organizational collaboration. This study takes benefit of the social theory of organizational boundaries, organizational culture and conflict to examine additional factors that may be related to the improvement of collaboration. Using SEM analyses to process the respondent data and calculate the statistical analyses, it is found that three factor out of five, a geographical boundary spanning pattern, organizational culture and conflict are perceived to have significant correlation to the performance of collaboration and may be advocated to the development plan of collaboration strategy in the construction industry.

INTRODUCTION

The increasing complexity of social problems [1] and growing competition for scarce resources and increased pressure [2] calls for collaboration of organizations to suggestively, deliver service in an easier, faster, efficient and more effective way [3]. The possibility of problem is assured to increase following the number of organization involved in the process of service deliverance.

Large number of people contained inside various interdependent organizations have always been the case of modern construction projects. In the industry, mostly a project intensive business model, organizations carrying its own set of skills and interests gather temporarily to work together to achieve shared goals under predefined budget and timeframe [4]. These many different organizations makes construction project performance dependent upon efficient management of inter-organizational collaboration that requires focusing on interdependencies that link the various project stakeholders together rather than on one the actions of one single organization [5].

In regard of the social problem perspective and to add to already a difficult task of managing collaboration of various interdependent organizations, construction projects itself also becoming increasingly complex [6].

THEORETICAL REVIEW

Organizational Boundary

In social process context, organization is then redefined as community of practice where groups of individuals share a concern, or a passion, for what they do and they continuously learn as they interact [11]. The inside of a community is contained within boundaries and peripheries, where boundaries refer to discontinuities and lines of distinction that separate one community to the other and peripheries represent continuities and connections [11]. In boundary encounters, such as boundary spanning—an inter organizational multi professional management—activities, members of different communities can create an arena for mutual engagement and it is when such encounters become established forms of interaction between communities that new practices are likely to emerge [11].

Following the community of practice approach, and linking it to complex and constantly changing day-to-day construction project practice, it is the boundary encounters such as the boundary spanning activities that enable continuity [11]. It is the building of relationships, interconnections and interdependencies that supports sense making and facilitate mutual understanding of a complex context [12].

This practice-based perspective enables an understanding of how practices in organizations develop. For example, as engineers engage in their professional practice, a boundary emerges between them and the field of practice occupied by, for example, specialists in production. It is when organizations engage in relating practices of these fields, that they pursue boundary spanning [13].

The concept of boundaries of a community of practice was studied before from a collaborative practices found within a case project of building construction in Sweden. Karrbom [20], in the exploratory study of the project's dynamic practice, examined some boundary actions or boundary spanning activities that may help span the boundaries of various organizations/companies or stakeholders involved in the project to improve communication, sense making and trust and breaking down traditional rigid boundaries between organizations, professions and phases. These boundary spanning activities may include: early inspirational study visits together with the tenant, collaborative workshop meetings facilitated by the collaboration consultant, regular design meetings, a two-day kick-off at a conference center with invited lectures from academia, the project intranet and the IT-based objectified 3D-model, the changing of responsibilities of subcontractors, the forming of focus groups to identify and solve problems, and the sharing of spaces at the project office.

The activities are then organized into three boundary spanning patterns and were deemed to be of vital importance for efficient collaboration, they are geographical boundary spanning, professional boundary spanning and stakeholder boundary

spanning [20]. These three types of boundary spanning form together what could be proposed as a new typology of boundary spanning for efficient collaboration in construction projects Management of efficient collaboration in construction projects thus includes facilitating shared spaces, multi-professional focus teams and collaborative tools and infrastructures [20].

These patterns proved to be among the promotor to an improved collaboration practices in the traditional design-bid-build delivery method of the particular case study project, but may yield different result if applied to multiple design build projects. Authors therefore, intends to put these factors to the test, to see how it would correlate to collaboration success in a design build environment.

Organizational Culture

As the social glue that holds members in an organization together which expresses the social ideals, values and beliefs that members of an organization come to share [14], it is advocated through many studies that a relevant organizational culture could bring a powerful positive effect on individual and organizational performance [15]. The performance improvement, in one of the study, found to be correlated to the level of collaboration within the organization [16].

Nir [16] done a research that examined the linkages between organizational culture, trust, knowledge sharing, collaboration and performance through empirical study utilizing questionnaires and surveys. The research yields important result, mapping how positive organizational culture affect the level of trust and knowledge sharing. Higher level of trust and knowledge sharing then proven statistically perceived to be improving the level of collaboration. This result means organizational culture, in addition to boundary spanning, would also shape how collaboration perform within the organization through the altering of the level of trust and knowledge sharing.

Among three constructs of organizational culture hypothesized by Nir [16] to be positively related to trust and knowledge sharing, one construct in particular suggested may help improve collaboration due to the highest relevancy to knowledge sharing, it is the teamwork culture.

Conflict

Considering the adversarial relationships between parties and the reluctances to work with people of divergent views and different disciplines, the construction industry is always under constant risk of conflict [21]. It start with perceived incompatibilities or discrepant views that evolve into behavioral reactions [22]. These reactions may cause a number of negative outcomes, such as decreased individual satisfaction, reduced creativity and risk taking, and decreased team performance [23]. In an integrated design build project, conflict and diversity, such as cultural, background or discipline diversity, are often linked [24] and may affect negatively on team performance because of the difficulties of reaching consensus [25]

Consensus decision making for example, as suggested by Vaaland and Hakansson [26] is crucial in a complex project. This context is due to at least two reasons. First, activity structure and links between activities cannot be altered without interfering with other activities performed by other actors. Second, a great number of such decisions require mutual perceptions. Hence, one can argue that different perceptions or diversity of views on how do deal with interdependent activities may increase the risk of conflict [27]. Previous research has shown that certain cultures may be predisposed to higher levels of conflict, while others attenuate it [28]. This suggests a causal chain where culture may impacts conflict.

Collaboration Measures

In a complex project, the degree of cooperation between the buying and selling parties is extremely important for several reasons. Firstly, because of the technological complexity; secondly, because of the strong activity interdependencies; thirdly, because of the large number of internal and external third parties directly or indirectly involved; and finally, because of time pressure. The importance of cooperation has during recent years led to the introduction of new strategic and managerial concepts (i.e., integrated project teams and project alliances) aimed at enhancing cooperation [26]

Collaboration in another study is found to be correlated to knowledge sharing. Dave and Koskela [17] maintain that a highly effective way of capturing tacit knowledge is through collaboration between employees. This relationships may show that a high level of collaboration can be indicated by the level of knowledge sharing within the organization.

The study goes further to analyze factors that may contribute to formulate collaboration. One of them is the emergence of innovation. Lahdenpera [18] found evidence in the literature that innovation in construction required both closer integration and improved collaboration. Additionally, Greenwood and Wu [19] identified creativity and innovation as being a positive attribute that results from collaborative working.

It can be concluded that collaboration may be affected by the degree of trust, knowledge sharing, and communication. As mean to measure or evaluate the success of collaboration, one may assess it from the level of innovation and creativity.

METHODOLOGY

Data collection was conducted twice via questionnaires. The first data collection was conducted as mean to collect expert's judgement on the construct and indicators extracted from the literature. The second one was collected as main data involving 127 of 200 distributed samples from both building and infrastructure projects that uses design build project delivery method. The data is concluded in Table 1. The questionnaire is designed on a Linkert 5 point scale, ranging from 1 for 'strongly disagree' to 5 for 'strongly agree'.

Table 1. Sample details

No.	Item	Option	Frequency	Percentage (%)
1	Position	Manager head of division Senior staff, Coordinator Engineer, Staff	25 19 83	19,69 14,96 63,35
2	Work Experience	5 years 5-10 years 10-15 years >15 years	83 33 2 9	63,35 25,98 1,57 7,09
3	Education level	Bachelor Degree Master Degree	108 19	85,04 14,96

RESULT AND DISCUSSION

To be a properly usable variable or construct, the model should pass some tests, namely the validity and reliability tests, which requires Loading Factor (LF) value of at least 0.5 and Composite Reliability (CR) value of 0.7. The Loading Factor of each indicators can be seen in Table 2a and 2b.

Table 2a. Loading Factor

Measure	Loading Factor
Geographical boundary	
My company provide temporary joint office location to have better cooperation level within the working team	0.953
My company provide shared social space to promote relationship, communication and trust among the working team	0.951
Stakeholder boundary	
My company arrange an early and continuous joint study for project team together with tenants	0.861
My company encourage all stakeholders to take responsibility of main project completion	0.888
My company form a middle management team to bridge collaboration between owner and contractor	0.906
My company apply a flexible and dynamic organization structure to cope with project uncertainties	0.878
Professional boundary	
My company routinely arrange a focus group consisting of inter-professional experts to share ideas and solve arising problems.	0.881
My company require its employee to make use of collaboration tools	0.834
Organizational culture	
My company contains characteristics in stability	0.630
My company contains characteristics of rules orientation.	0.648
My company emphasize on safety.	0.692
My company emphasizes on quality.	0.743
My company contains characteristics of fairness	0.829
My company contains characteristics of showing respect for others.	0.802
My company contains characteristics of giving employees support	0.864
My company emphasizes on result orientation	0.794
My company contains characteristics of steadiness.	0.897
My company contains characteristics of self reflection	0.778
My company contains characteristics of low conflicts.	0.723
My company emphasizes on team orientation	0.794
My company contains characteristics of collaboration	0.840
My company emphasizes on action orientation. 0.58	0.576
My company contains characteristics of achievement orientation.	0.614

Organizational culture variable was at first consisted of 17 indicators. Then 2 of which needed to be eliminated due to the underqualified loading factor value of 0.488 and 0.430 (under 0.5 threshold). This would ensure the quality and accuracy of related variable.

Although the variable of Professional boundary have underqualified Cronbach's Alpha value, CR value is still deemed enough to represent the consistency of internal indicators. All 5 latent variables have passed the reliability test with CR above the 0.7 threshold.

Table 2-b. Loading Factor (continued)

Measure	Loading Factor
Conflict	
Late start-up of certain activities caused problems for succeeding activities.	0.594
The information flow was delayed when claimed problems were relayed to responsible unit.	0.780
Interfaces between disciplines and between the actors involved were unclear	0.785
Drawings were not adjusted and sharpened for related purposes.	0.775
Activities were performed without updating information systems.	0.783
Design and construction errors caused effects of malfunction and overlapping installation	0.652
Operational errors included requirements for rework due to lack of compliance with procedures and good practices.	0.711
Weak communication between disciplines and divisions	0.779
Cultural and linguistic differences imposed stress on cooperation	0.718
Communication hindered by formal obstacles or willingness to circumvent.	0.608
Lack of physical capacity support and poor material management	0.815
Tools for interdisciplinary check were missing or inaccessible.	0.753
Incompatibility between data systems caused data duplication.	0.786
Lack of skills to understand and/or carry out aspects of the task.	0.839
Capacity was sometimes too low with too few people allocated to the task.	0.821
Managers did not possess sufficient decision making power in order to solve the problems	0.702
Collaboration success	
I know my team member well	0.853
I trust my team member and know that they are reliable	0.828
I am able to set good communication flow with my team member	0.836
I am motivated to give contribution to help solve problems	0.880
I have solid working relation with my team member	0.863
I am allowed enough space to be flexible when handling dynamic situations of project	0.848
I am motivated to give innovative ideas or solution to process or problems	0.808
I feel high amount of knowledge sharing activities in problem solving meetings	0.795

Table 3. Path Coefficient and t value

Variable	Comp. Reliability	Cronbach's A	AVE	Path Coefficient	T stat
Geographical boundary	0.951	0.897	0.906	0.192	2.038
Stakeholder boundary	0.934	0.906	0.780	-0.106	0.738
Professional boundary	0.848	0.642	0.736	-0.031	0.385
Organizational culture	0.951	0.944	0.569	0.382	3.249
Conflict	0.952	0.946	0.569	0.374	3.283
Collaboration success	0.950	0.940	0.569	-	-

Judging from the t-values and path coefficient (see table 3), the analysis can be concluded that the variable Professional boundary and Stakeholder boundary both have the least significant correlation and may have no effect to the improvement of collaboration ($t < 1.96$).

On the other hand, the variable Conflict and Organizational Culture is found to give the most significant correlation to how collaboration may perform ($t = 3.283$ and $t = 3.249$ respectively) followed by Geographic Boundary ($t = 2.038$). The SEM model can be seen in Figure 1.

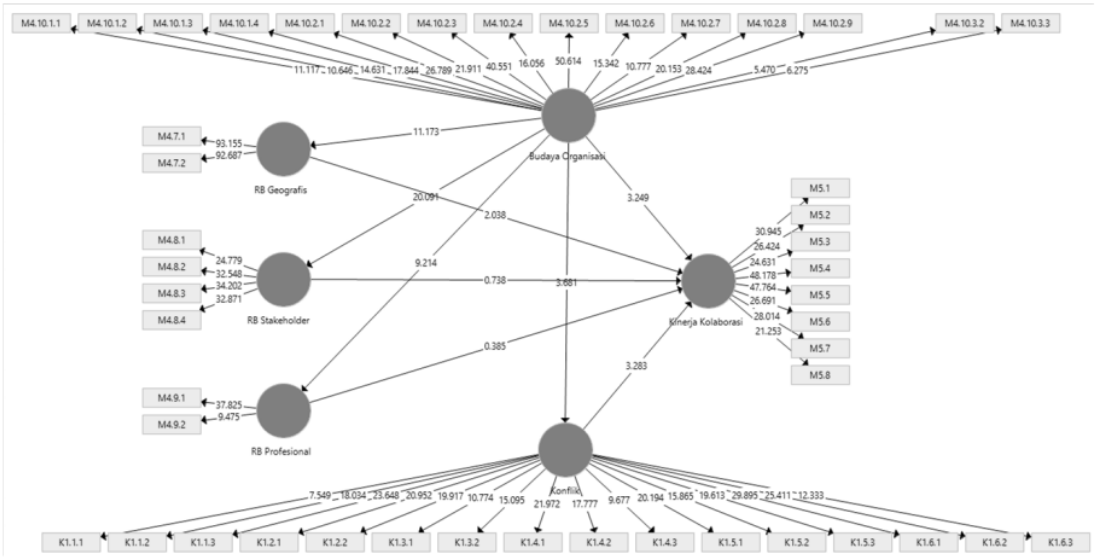

Figure 1. Model SEMPLS

CONCLUSION

Most of the variables that has been previously studied and had proven to be the driving factors of collaboration, is consistent with the result of this research. The proposed explanations of this result are:

a. The low significance of Stakeholder boundary may be due to unrecognized, uncommon, relatively new role in the management structure as boundary organization and acts as manager of collaboration. This role hence, may be perceived by respondents as unimportant factor for collaboration.

b. Another low t-value is both the item 'focus group' and 'collaboration tools' as an indicator to Professional boundary. This may also happen because it's uncommon or rarely done to have interdisciplinary meeting regularly in the early phase of the project where an architect sits on the same table as finance officer and an engineer with supply chain manager here in local construction industry.

c. Geographical boundary variable result is desirable in this research and consistent with literature study. The co-location office and shared social space, in theory, shall be rewarding toward the growth of collaboration among the project team. The bond of relationship, as building block of collaboration, may form effectively in a situation where informal communication and experience exchange is facilitated.

d. Organizational Culture factor may greatly affect performance of collaboration because of the role that culture play as the value or norms shared across the organization members and how it may alter their behavioral patterns towards collaborative working thus providing base value for collaborative culture adoption over time.

e. As one of the negative factor to have potentially disrupt cooperation, the result of Conflict having significant correlation to collaboration performance is expected and understandable.

Through this study, some of the factors formulated previously, most significantly the Organizational Culture, Conflict and Geographical boundary, are proven to give impacts to the improvement of collaboration. These factors should be put in consideration in the future and may be suggested as part of the factor to be included in the development plan of a collaboration strategy.

The limitation this paper has is the reality that design-build delivery method is still relatively new in the state the Authors reside. It certainly succeeded in improving some projects performance, but also failed in some other areas. There are still some higher priority problems regarding regulation and

experience to solve first to be able to fully implement the method and benefit from performance improvement. The research accuracy, therefore, may only reflect the current state of implementation of the design-build method in the country.

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