



8th Nordic Conference on Construction Economics and Organization

The changing role of the client in driving innovation for design-build projects: stakeholders' perspective

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Abstract

Clients undertake an important role in terms of both creating and promoting the right project conditions for realization of innovation, and understand and share the needs of both end-users and stakeholders. This study focuses on the changing role of the clients for the realization of innovation for design-build projects' delivery process and evaluates the initiatives of the clients of involving new strategies, best practices and innovative management approaches in this process. A survey of residential, office and commercial construction projects in Turkish real estate sector has been conducted among the project stakeholders: private clients, real estate developers, consultants, and contractors. The client's role in innovation value chain stages (idea generation-conversion of ideas-diffusion of solutions) and its contribution to innovation performance is discussed in a conceptual framework.

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Selection and/ peer-review under responsibility of Tampere University of Technology, Department of Civil Engineering

Keywords: client; design-build projects; innovation value chain; Turkish real estate sector

1. Introduction

The changing real estate landscape will have substantial implications for the real estate investment community (PWC, 2014). "Emerging Trends in Real Estate Europe 2014", an annual forecast published by PricewaterhouseCoopers (PWC) and Urban Land Institute (ULI), emphasizes "demographics" and "sustainability"

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this year, as well as “alternative developments” and “fast growing secondary locations” while underlining a “more positive” year and a “battle for prime assets” (PWC and ULI, 2014). Favourable geographical position, population growth and demographic advantage, increase in per capita income, urban renewal and development adequacy, mass capacity and power in the Turkish construction sector and easiness of doing business are all demand drivers of the real estate sector in Turkey. According to the enactment of the “Law of the Regeneration of the Areas under Disaster Risk”, buildings under risk are now being demolished and new structures with international standards are bringing out. On the other hand, restrictions for foreigners acquiring property in Turkey have been eased with the enactment of the “Reciprocity Law” in 2012 (GYODER, 2014). Within this process, clients undertake an important role in terms of both creating and promoting the right project conditions for realization of innovation, and understand and share the needs of both end-users and stakeholders. Clients are able to enhance innovation in construction in a number of ways. Clients can identify specific novel requirements to be supplied by developers, building product suppliers, and contractors; exert pressure on project stakeholders to improve buildings’ lifecycle performance, overall characteristics, and project flexibility to cope with unforeseen changes; and generally demand higher standards of work.

The purpose of this study is to focus on the role of clients for the realization of innovation for design-build projects’ delivery process and to evaluate the initiatives of clients of involving new strategies, best practices and innovative management approaches in this process. A survey of residential, office and commercial construction projects in Turkish real estate sector has been conducted among the project stakeholders: private clients, real estate developers, consultants, and contractors. Based on an evaluation of the findings, the client’s role in innovation value chain stages (idea generation-conversion of ideas-diffusion of solutions) and its contribution to innovation performance will be discussed in a conceptual framework.

2. The role of the client in driving innovation for design-build projects in Turkish real estate sector

2.1. Turkish real estate sector

Design-build project delivery method preferred by the clients has been steadily increasing in the Turkish real estate sector for more than 10 years, saving time and money for the clients, and providing the opportunity to achieve innovation in the delivered facility. Residential market is the main driver of Turkish real estate sector. Still holding a great deal of potential in the long term in parallel to the economic growth of the country, the market has developed significantly in recent years. Expected population growth, demographic structure, urbanization rate, changes in the lifestyles, and changes in migration indicators are the determining dynamics of the residential market in Turkey. The rapid increase in sale and rent prices in recent years attracts the attention of investors as well. The “Reciprocity Law” and the “Law of the Regeneration of Areas under Disaster Risk” which were put in force recently will lead the market to both local and foreign demand. Urban regeneration is one of the most important projects of the next decade, envisioning 6,5 million homes and 400 billion USD transaction volume. The office market in Turkey is mainly driven by Istanbul, developing on a regional basis. A substantial office supply has been delivered in the central business district of Istanbul during the last 10 years. Correspondingly, a significant office demand has been observed while vacancy rates are decreased and office rents are increased. In addition to Istanbul, Ankara and Izmir are likely to experience growth. Istanbul office market, particularly, offers significant opportunities which are revealed by major indicators, such as the potential growth of Turkish economy, the transformation possibility of industrial regions to service and trade regions during urban regeneration. The share of modern retail within retail market varies by years depending on economic growth, increase in personnel income, urbanization, and changes in lifestyles. According to the basic assumptions regarding economic and social development in Turkey, the increase in modern retail market share will continue to increase until 2023. All forecasts for the growth of retail expenditures and modern retail indicate that significant opportunities will continue to emerge in the retail market. The appetite of international retail chains for the market and the increase in the number of local retail chains are the main reasons behind the substantial development (GYODER, 2014).

2.2. Clients' role in the innovation process

A client is a person or organisation, who at a particular point in time, has the power to initiate and commission design and construction activity with the intention of improving the performance of an organisation's social or business objectives (CIB TG 58, 2005). The client participates in the project process and takes delivery of the completed facility, to oversee its commissioning and its acceptance by users and, ideally, to arrange for evaluations of performance in order to inform future projects (Brandon and Lu, 2008). In this study, the client is definitely the owner (investor).

Construction clients are able to stimulate innovation not only by determining building specifications and demanding higher building and process performance, but also by establishing and controlling the mechanisms that account for the extent of collaboration and communication of project participants (Blayse and Manley, 2004; Miozzo and Dewick, 2004; Hartman et al., 2006). The clients' role in the innovation process can be located along a continuum: a dominant role – where clients drive innovation; a balanced co-production role – where the project team and the client jointly drive innovation; and, a passive role – where the project team drive innovation.

The non-traditional procurement practices, and the introduction of value concepts in clients' appraisal and procurement of projects, are two ways in which leading clients have demonstrated innovative behaviour. Clients can insist on this issue, but to have real impact these changes require corresponding changes throughout the project team. By changing their modes of operation and the way they express their requirements, leading clients therefore have the power to cause consequential change in their attitudes and practices in their supply partners and in the final delivered output – this is undoubtedly a case of clients driving innovation (Brandon and Lu, 2008). As clients increase their expectations of the performance of their built facilities and face increasing cost and schedule constraints, the industry as a whole will need to develop more effective and efficient methods of delivering these assets. New pressures on long-term operating costs and environmental impacts will further drive the need for better designs and construction methods. Clients must acknowledge their pivotal responsibilities in establishing the context for their project teams to successfully develop and implement innovations to meet those needs (Slaughter and Cate, 2008).

2.3. Innovation Value Chain

Hansen and Birkinshaw (2007) presents innovation as a sequential, three-phase process that involves idea generation, idea development, and the diffusion of developed concepts that includes six critical tasks namely, internal sourcing, cross-unit sourcing, external sourcing, selection, development, and companywide spread of the idea. In their classification, the whole process is referred as the IVC. The first phase is to generate ideas that can happen inside a unit, across units in a company, or outside the firm; the second phase is to convert or select ideas for funding and developing those ideas into products or practices; and the third is to diffuse those products and practices. Ozorhon et al. (2010) proposes a framework that analyses the IVC through the investigation of components of the innovation process including the drivers, inputs, enablers, barriers, tools, and outcomes.

3. Research Hypotheses

Clients are no longer seen as the relatively passive actors in the project management process they once were and are now considered highly proactive in shaping not only the forms of delivery system that are used, but also the processes and outcomes that they produce (Briscoe et al., 2004). The creation and diffusion of innovation and 'best practice' amongst and within client organizations are highly social and political processes. Power and knowledge are closely interconnected and what constitutes 'innovation' and 'best practice' is constructed, reinforced and reproduced (and perhaps ultimately changed) through social interaction and joint practice (Bresnen, 2008). In construction, it is the client who chooses the process, procurement form and requirements, which to a large extent determines the boundaries for other actors in the sector. Certainly, it has been shown that the client can, by choosing appropriate procurement methods, provide incentives to other actors to be innovative and that, vice versa, innovation by other actors can prompt the client to change the procurement method (Briscoe et al., 2004; Widen et al., 2008).

Clients are increasingly demanding better performance from the project team in all of value creation dimensions. The construction industry is thus being challenged to bring about successful innovation to create new levels of value for the client. There is a challenge that the prevailing mantra that clients must drive innovation, and that clients should capture all the benefits of innovation. The challenge is for clients to adopt an appropriate role in innovation processes (Sexton et al., 2008). Clients, by creating the conditions and expectations for regularly returning to refresh the shared understanding of their aspirations, and steering the project against these, can orientate construction activities much more powerfully towards their ends (Barret, 2008). Clients can have a significant impact, both in relation to their own projects and, for some, as drivers to policy reform shaping the context within which others work. Given the complexity of innovations, the different types and modes of innovations and the nature and different types and categories of construction clients, it would be unwise to suggest that all clients play similar roles in different types of innovations, at different stages of innovation (Egbu, 2008).

A review of the literature indicates that there are significant positive relationships between “The role of the client in driving innovation”, “Innovation value chain stages” and “Key innovation variables”. Fig.1 illustrates how primary roles of client are linked to innovation value chain stages and key innovation variables. The relationship between the construct measures and the latent variables are identified to explain the theory underlying these relationships and to describe the directions of the relationships. This leads to the development of the following hypotheses:

- H1: The role of the client in driving innovation has significantly positive effect on innovation value chain stages
- H2: The role of the client in driving innovation has significantly positive effect on key innovation variables
- H3: There is a positive correlation between innovation value chain stages and key innovation variables.

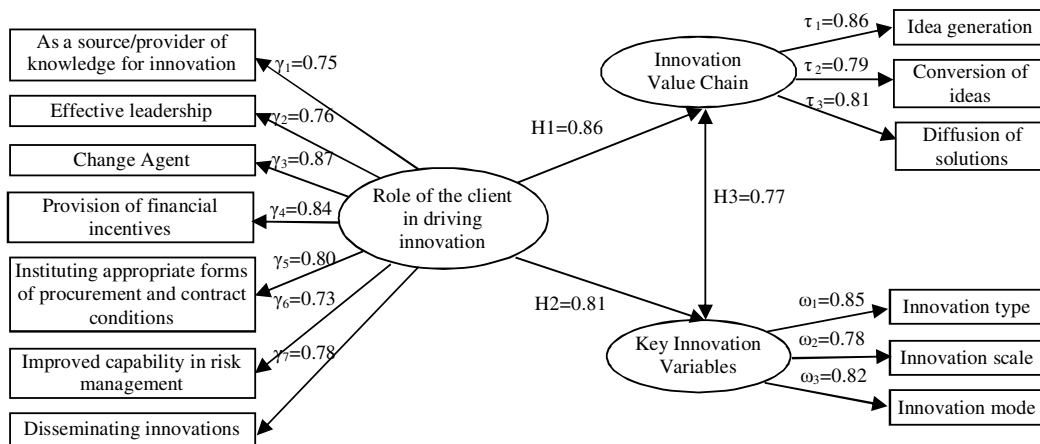


Fig.1 Hypothesized model.

4. Research Methodology

In this study, a conceptual framework for the analysis of the client's role in IVC stages and the impact of the primary roles which clients play on key innovation variables has been developed in driving innovation for design-build projects from stakeholders' perspective in Turkish real estate sector.

4.1. Sampling

The lists of stakeholders within the real estate sector operating locally were obtained from the public and private organizations in Istanbul, Ankara, Izmir, and Antalya. These are Housing Development Administration of Turkey (TOKI), Turkish Contractors Association (TCA), The Association of Real Estate Investment Companies (AREIC),

and Real Estate Investment Trusts (REIT). The sample includes relatively medium to large organizations.

4.2. Data Collection

The empirical data was collected through a questionnaire survey, which was administered to the organizations registered to TOKI, TCA, AREIC, and REIT. Only the largest cities Istanbul, Ankara, Izmir, and Antalya were targeted in the survey, as these regions constitute the most populated and where the construction field is most developed. During the survey, 167 public and private organizations operating within the industry were contacted and asked to participate in the study. They were then fully informed of the research objectives, that the research was a strictly scientific and confidential and that their anonymity was assured. A total of 121 different public and private organizations participated in the survey, and 121 completed questionnaires (one respondent from each firm) were received, giving a high response rate of 72%. The respondents were asked to rate the extent of their agreement with each statement based on a five point Likert scale of 1 (strongly disagree) to 5 (strongly agree). The respondents were project managers, project coordinators, consulting engineers, and construction managers. Out of 121, 38 of the respondents were project managers representing 31.40% of the sample, 31 of the respondents were project coordinators representing 25.61% of the total sample, 25 respondents were consulting engineers representing 20.66%, and the remaining 27 respondents were construction managers representing 22.31%. 19.00% of the stakeholders were from the TOKI within the public sector organization, 28.09% were from TCA, 29.75% from AREIC and 23.14% from REIT within private sector.

Project information (type and size of the project, parties involved), main reasons/drivers to innovate (end user, competition, performance requirements, technology, etc.), the client's role in innovation value chain stages (idea generation-conversion of ideas-diffusion of solutions), impact of the primary roles which clients play on key innovation variables (types of innovation, scale of innovation, mode/nature of innovation), and innovation inputs and outputs were the issues addressed during the interviews.

4.3. Measures

The role of the client in driving innovation was measured as a multidimensional construct in which seven key roles proposed by Egbu (2008) were considered as representative dimensions. Innovation value chain proposed by Hansen and Birkinshaw (2007) was measured by three different stages: idea Generation, conversion of ideas, and diffusion of solutions. Key innovation variables were measured by three contexts: innovation type, innovation scale, and innovation mode. The respondents from participating organizations provided numerical scoring expressing their opinions on the significance of each factor in determining the client's role in IVC stages and the impact of the primary roles which clients play on key innovation variables. These determinants perceived by respondents are believed to have systematic linkage among the primary roles which clients play in innovation as shown in the model and conceptual framework.

5. Analysis and Results

The analysis of structural equation model (SEM) establishes causal relationships among the latent variables and observed variables. Fig.1 illustrates the results of hypothesized model used in this work, which represent the standardized structural coefficients. The magnitude of the coefficients of the variables reflects their relative importance.

5.1. SEM analysis

The hypothesized model illustrated in Fig.1 presents the results of the relationships between the independent and dependent variables. The model illustrates the hypothesized relationships among the role of the client in driving innovation, innovation value chain, and key innovation variable. The sample (n=121) was used to test the

hypothesized relationships. The hypothesized model is tested using statistics indicating acceptable model fit and was demonstrated to have a significant chi-square statistic ($\chi^2 = 135.41$ with $df = 83$; $\rho < 0.01$).

5.2. Goodness-of-fit test

The results of Goodness of Fit Index (GFI), Adjusted Goodness of Fit Index (AGFI), Comparative Fit Index (CFI), Normed Fit index (NFI), and Non-Normed Fit Index (NNFI) exceed the threshold value of 0.90 and the hypothesized model revealed good fit. A ratio of model fit statistics based on degrees of freedom below 3 indicates adequate model fit ($\chi^2/df = 1.631$). Root Mean Square Error of Approximation (RMSEA) value reached an acceptable value of 0.066. Specifically, the GFI, CFI, AGFI, NFI, and NNFI values reached an acceptable value of 0.9 (0.920, 0.933, 0.919, 0.926 and 0.923, respectively). The hypothesized model in Fig.1 thus can be classified as closely fitting the data. Table 1 lists the results of the goodness-of fit measures for the hypothesized model.

Table 1. Parameter estimates for structural equations model

Hypothesized model	Parameter coefficient	t-value
<i>Construct relationship</i>		
H1: The role of the client in driving innovation → IVC stages	0.86***	5.41
H2: The role of the client in driving innovation → Key innovation variables	0.81***	5.12
H3: IVC stages ↔ Key innovation variables	0.77***	4.97
<i>Fit Indices: $\chi^2 = 135.41$, $df = 83$, $\chi^2 / df = 1.631$, GFI=0.920, CFI=0.933, AGFI=0.919, NFI=0.926, NNFI=0.923, RMSEA=0.066</i>		
<i>***$\rho < 0.01$.</i>		

5.3. Hypothesis test

To test Hypotheses 1 through 3, the hypothesized model was tested using LISREL 8.8, where the paths between the role of the client in driving innovation constructs and innovation value chain (H1), the role of the client in driving innovation constructs and key innovation variables (H2), innovation value chain and key innovation variables (H3) were estimated. The hypotheses regarding the relationships were tested based on the associated t-statistics. The role of the client in driving innovation constructs, all significantly and positively influenced ($\rho < 0.01$) the innovation value chain and key innovation variables respectively (H1= 0.86, t-value = 5.41, H2= 0.81, t-value = 5.12) Also there is a positive correlation between innovation value chain and key innovation variables with values (H3=0.77, t-value=4.97). Thus, Hypotheses 1-3 were supported. Table 1 lists the results of the parameter estimates of the hypothesized model. Considering the standardized parameter estimates, the results show that three hypothesized relationships were classified as significant. Table 2 lists the standardized structural coefficients of the variables, role of the client in driving innovation constructs, innovation value chain and key innovation variables, representing the magnitudes that reflect the relative importance of the relationships. “The role of the client in driving innovation-IVC stages” had the highest significance with a path coefficient of 0.86.

Table 2. Parameter and relationships

Construct	Variables	Parameter	Standardized structural coefficient
The role of the client in driving innovation	As a source/provider of knowledge for innovation	γ_1	0.75
	Effective leadership	γ_2	0.76
	Change agent	γ_3	0.87
	Provision of financial incentives	γ_4	0.84
	Instituting appropriate forms of procurement and contract conditions	γ_5	0.80
	Improved capability in risk management	γ_6	0.73
	Disseminating innovations	γ_7	0.78
Innovation Value Chain	Idea generation	τ_1	0.86
	Conversion of ideas	τ_2	0.79

Innovation Variables	Diffusion of Solutions	τ_3	0.81
	Innovation Type	ω_1	0.85
	Innovation Scale	ω_2	0.78
	Innovation Mode	ω_3	0.82

6. Discussion

Building on Egbu’s (2008) seven key roles of client in driving innovation, Hansen and Birkinshaw’ (2007) innovation value chain, and developed conceptual framework, this study examined how clients might have positive effect in driving innovation for design-build projects from stakeholders’ perspective in Turkish real estate sector.

The client’s role in innovation value chain stages and the impact of the primary roles which clients play on key innovation variables have been assessed in a conceptual framework as shown in Fig. 2. Through systems approach, inputs of innovation (needs, strategy, knowledge and information, finance, leadership, capabilities e.g. risk management, and R&D) supported by clients’ belief and value proposition on innovation, formed the outputs of innovation (improved image of firm, improved revenues and profits, market growth, customer satisfaction, cost reduction and value added, improvements in quality, increase in technical capability, increase in organizational effectiveness, intellectual capital). The client plays a particularly important and active role in the processes related to creativity and initial stage of innovation. The client has the ability to link innovation strategies to the broader organizational business strategy. The client brings together all stakeholders in the project organization and encourages supporting the idea of innovation. The client plays an active role in shaping project delivery system, processes and production output. The client demonstrates effective leadership in disseminating the innovation solutions. The client recognizes the importance of sustainability and tries to disseminate it over the entire project process.

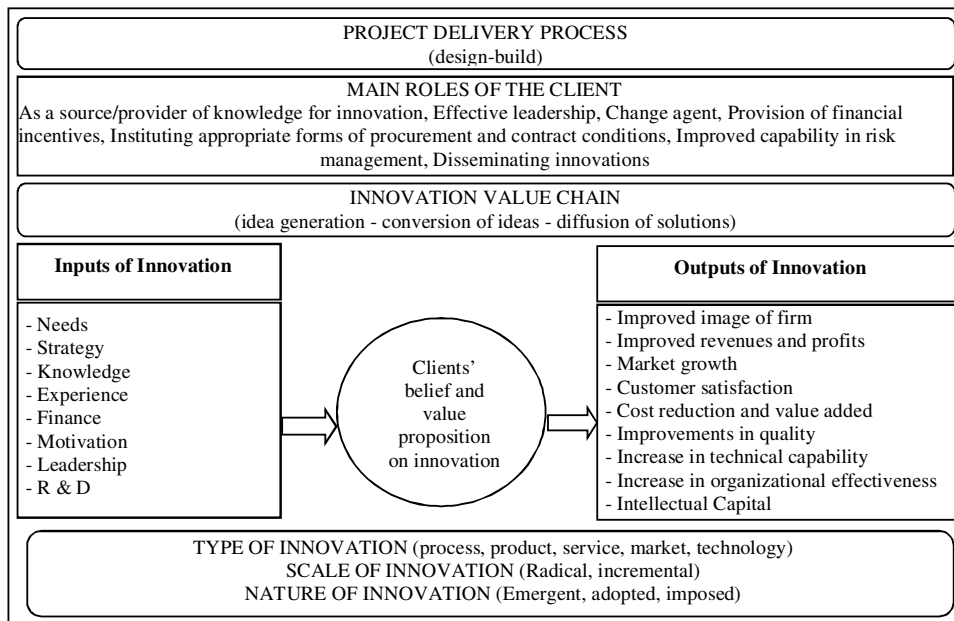


Fig.2 Conceptual framework for the role of client in driving innovation

The findings highlight that the client makes strategic decisions towards the realization of innovation within the framework of organizational culture as the driver of organizational change and supports project stakeholders during design, procurement and construction processes. The client creates the right conditions for the realization of the

innovation for project stakeholders in the project procurement process, leads to the completion of the project within the intended duration, quality and budget by providing all the necessary financial incentives. Innovation is communicated through certain channels over time, amongst the project stakeholders of a social system (network). An increase in interaction in a social network will increase the rate of diffusion of innovation. The client creates a social system which determines innovation by the nature and intensity of interactions, interconnectedness and synergies from a wide spectrum of agents which gravitate around a project setting. Client leadership is most effective in defining and realizing successful innovations. The client engagement of a highly motivated supply chain will create greater opportunities for discovering new products and services. The client plays a pro-active role in promoting and affecting a customer-oriented culture. The client intervenes to sustain the motivation of the supply chain towards achieving the desired targets. The findings prove that the client, for the realization of innovation in project procurement process, encourages the project stakeholders using his/her knowledge and resources, and led the stakeholders to adopt the innovation in design, procurement and construction processes. Clients have the capability in managing the uncertainty and risks associated with innovation (e.g. risks associated with design and buildability of construction projects, technological risks, financial risks, contractual and increased exposure to litigious claims, safety risks, risk of complete failure of the innovation). The findings reveal that the changing role of the client creates the new value for innovation in construction.

7. Conclusions

This paper presents a conceptual framework for the role of the client in driving innovation in Turkish real estate sector from stakeholders' perspective. For developing the conceptual framework, the role of clients for the realization of innovation in residential projects' delivery process through IVC stages and its contribution to innovation performance have been derived. The initiatives of clients of involving new strategies, best practices and innovative management approaches through systems approach, inputs and outputs of innovation have been evaluated. The increasing role of the client in projects within construction sector, clearly indicates that clients are not content to just successful closure of projects. It is clear that the client has the determining role in establishing the incidence and rate of innovation on its projects. It is the client that establishes and communicates the superordinate goals that bind the project team members together to develop and successfully implement innovative approaches. A limitation of the current study could be about the potential for generalization in Turkey and internationally as this research took place in particular developed cities of Turkey and any generalization at national or international level might represent a working hypothesis on the research topic. The research aims to shed light on future work which will examine a better understanding of the important role undertaken by clients and other stakeholders for the realization of innovation throughout the project life cycle in real estate sector.

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