THE DRIVERS AND IMPEDIMENTS OF INNOVATION ORIENTATIONS AMONGST CONSTRUCTION COMPANIES IN MALAYSIA: AN EXPLORATORY STUDY

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Abstract- With the construction industry's poor performance and lack of innovation, arguments have begun to focus on the orientation with regard to innovation, which refers to the creation and adoption of innovative practices. Innovation creation and innovation adoption vary in characteristics; particularly the factors that drive or inhibit these innovations. Thus, the present study explores and determines the factors that can affect innovation orientation in the context of the construction industry in Malaysia. A total of 9 award-winning construction companies in Malaysia participated in the interview survey. The findings indicate that there are 3 impediments and 2 drivers to innovation. Immature technical knowledge, negative perceptions, and the unrealistic demands inhibit the creation and adoption of innovation. On the other hand, dynamic top management/leadership drives innovation creation and government support drive innovation adoption. Theoretically, the findings add to the body of knowledge on the drivers/impediments with regard to innovation orientation. In practical terms, the findings suggest several actions to comprehend the impediments to innovation. These include 1) changes to mind-set, 2) embarking on technical training and R&D, 3) being conscious of rapid changing market trends, and 4) collaboration between private and public sectors.

Keywords- Innovation creation, Innovation adoption, Driver, Impediment, Construction industry

I. INTRODUCTION

An innovative construction industry implies a well-developed country [1]. Ironically, the construction industry is widely known as a low performing industry [2]-[3], particularly in terms of innovation [4]-[5]. The fall in the value of Malaysia's currency and those of crude oil prices has worsened the country's economic structure; up to a certain extent, Malaysia's Budget 2015 is reviewed to comprehend the effects [6]. The fragility of the construction industry in Malaysia is well-documented during the economic recession in 1997 and 2007 [3], [7]. Innovation safeguards a sustainable rate of growth and economic performance [1], [8]. While the industry remains less innovative, the orientation of innovation - known as the creation and adoption of innovation - began to raise concerns [2], [4], [9] given the great challenges of innovation [10]. These orientations are distinctive [11], yet most studies assume that creation is identical to the adoption of innovation [2]. In fact, the factors that affect innovation in the construction industry are established in previous studies such as leadership, culture/climate, and organization characteristics (e.g., [4], [12]-[13]). However, most of the previous studies made no distinction when incorporating these potential factors into the measurement of innovation effort. These Thus, innovation creation is in line with "new to market" products, whilst innovation adoption features added-value and highly familiar products [16]. Innovation creation entails risky decisions [17] and greater financial flows and time [18]-[19], provided for the characteristics of "new to market" and the creation of novelty. Innovation adoption gains conclusions raise doubts as to the value of the present findings in response to the complexity of innovation [14] and the construction industry [4]. Thus, the present study explores and determines the specific factors that drive/inhibit the creation and adoption of an innovation, in the context of the construction industry. This study is deemed relevant given that Malaysia is aiming to be recognized as an Innovative Nation by 2020 and that this date is closing fast. The findings offer uncommon insights into Malaysian construction companies and public authorities, which in turn increases understanding on the part of the stakeholders, in the effort to strategize future policy in response to innovation.

II. THEORETICAL BACKGROUND

2.1 Innovation orientation

Whether an innovation originates within the organization, or is adopted from external sources, differentiates the orientations of innovation in the construction industry [4]. Innovation creation recognizes novelty/change that is new to the market/industry; whereas innovation adoption recognizes novelty/change that is new to its adopting party [9]. Subsequently, innovation creation usually creates novelty [15]. Innovation adoption focuses on the imitative efforts [11].

advantages through the introduction of highly similar and widely accepted innovative products which, in turn, reduce uncertainty and market ignorance [11], [20].

With these differences, recent innovation-related studies in the Malaysian construction industry reveal that innovation creation is dominant in design

companies [21]; whereas non-design companies tend to focus on adopting innovation [2]. These agreements further suggest that the distinction in terms of innovation orientations in the construction industry should receive attention.

2.2 Factors affecting innovation

Previous studies have highlighted the factors that can potentially hinder innovation in the construction industry, including inflexible government regulations (1), short-term co-operation projects [22], and a lack of collaboration between different companies [22]–[23]. Ibrahim et al. [3] pointed out that the conservativeness of the construction industry in Malaysia remains an obstacle that slows the development of the industry. In particular, the variations amongst the different stakeholders in the construction industry worsen the possibility of innovative efforts [24].

To be specific, the potential drivers/impediments to innovation can be grouped into those that are controllable (internal) and non-controllable (external) by the organization [25]. For instance, Runhaar et al. [26] revealed that high innovation costs, lack of change, knowledge incompetency in response to the state of the market and technology, constitute the internal barriers to innovation; whilst the external barriers consist of poor support from public authorities, immature infrastructure, unrealistic demands and a lack of public knowledge in response to the importance of sustainability. The internal drivers comprise a decentralized organizational culture, leadership support, and supportive mechanisms such as time, financial allocation, and information technology (e.g., [10], [27]-[28]). The external factors such as government support and external collaboration are vital for sustainability and innovativeness in the construction industry (e.g., [3], [13], [22], [30]).

While the literature with regard to the factors affecting innovation have been established, questions remain given that the construction industry is still recognized as having low performance and being poor in terms of innovation, particularly in developing countries. Ibrahim et al. [3] commented that most of the research failed to capture or portray the exact phenomenon in the construction industry. Thus, there is an urgent need to determine the factors that bother construction practitioners in response to the need to innovate, particularly when innovation orientation is concerned.

III. METHODOLOGY

An interview survey was employed in an effort to explicitly retrieve first-hand information straight from industry personnel, given that the present study is exploratory in nature [29]-[30]. An interview guide was developed containing semi-structured and open-ended questions. A pre-test was carried out to rule out flaws and confusing questions. A sample frame was identified through the shortlist of Asia Property Awards [31] and PAM Awards [32]. These awards were given in recognition of innovative and excellent performance. Amongst these companies, only nine accepted the interview survey. The interviews where then transcribed and coded to form composite themes. A similar approach has been used in previous studies (e.g., [30])

IV. FINDINGS AND DISCUSSION

Accordingly, these companies can be categorized into non-design (4 property developers, P1-P4) and design (5 architectural firms, A5-A9) construction companies. All the respondents were the decisions maker within the organization, with the job position ranging from managers to owners. With a minimum of 9 years and up to 42 years of work experience, the interviewees were considered to be experienced and competent. Table 1 summarizes the respondent's background.

Table 1: Respondents' background

Type of firm	Job position	Working experiences
D1	Project manager	9 years
D2	Executive director	15 years
D3	Co-founder	24 years
D4	Project manager	25 years
A5	Principal	30 years
A6	Design architect	27 years
A7	Principal	18 years
A8	Principal	18 years
A9	Principal	42 years

*PD=property developer, AF=architectural firm

The findings indicate that the property developers (non-design companies) focused on the adoption of innovation, whereas the architectural firms (design companies) focused on the creation of innovation. This pattern was in line with previous studies that indicate that innovation adoption is dominant in non-design construction companies (e.g., [2]), whereas design-oriented companies favor innovation creation (e.g., [21], [33]). Subsequently, the findings reveal five factors that affect innovation orientation. The impediments are the existence of immature technical knowledge, negative perceptions, and unrealistic demands. A dynamic top management/leadership and government support are the drivers. The following section discusses the factors affecting innovation orientation as agreed by the interviewees.

4.1 Immature Technical Knowledge

Most of the interviewees highlighted the technical difficulties resulting from the adoption and implementation of new construction methods and materials. For instance, a co-founder of a property developing company mentioned: "…our staffs are lack of knowledge and inexperience as this situation

delays approval and decision making. The immature specifications of green technology increase the tendency of miscommunication and misleading" (P3). A lack of technical knowledge is a severe hindrance. As Ball [34] warns, there is no assurance of success in adopting an innovation. Subsequently, immature technical knowledge is not uncommon in the context of a developing country such as Malaysia, and such an impediment was highlighted in [3]. Therefore, despite the importance of technology and knowledge diffusion, immature technical advancement can discourage innovation in the construction industry.

4.2 Negative Perceptions

A positive perception is a pivotal determinant of a successful innovation [22], [27]. However, despite agreement on this point, the interviews revealed that a negative perception can be a severe hindrance in terms of the adoption and creation of innovation. For instance, research and development (R&D) is important to innovation [9], [33] and this notion is commonly agreed in the 21st Century. Nonetheless, a principal architect with 18 years' work experience mentioned: "I don't want to embark on R&D because most of my staffs are architectural background" (A7). Another architect also commented: "There is no need for R&D. There are so many R&D centre throughout the world, why waste your time forming your own R&D" (A9). Ironically, all the interviewees indicated the R&D was not a concern to the company or with regard to the innovation. In turn, the advantages of R&D were ignored without being put into practice due to a negative perception. Therefore, Kamal & Flanagan [30] asserted that mind-set determines the success and failure of a decision in the context of construction companies.

4.3 Dynamic Top Management/Leadership

Amongst the interviewees, those from architectural firms highlighted the crucial role of management skill/leadership in motivating the creation of innovation. Interestingly, the interviews portrayed two opposing styles of leadership, but recognized each as driver towards innovation. For instance, a principal architect mentioned: "I always target to emphasis on design, that's when junior architects proposed some new ideas, we always welcome. We will try to make it works rather than just ideas" (A7). Conversely, another veteran architect with 30 years of work experience expressed: "While I am the main person that behind the creation, that's mean no design coming out from this office without me knowing" (A5). The interviews revealed that both centralization and freedom of management/leadership styles drive the creation of new ideas. Freedom is widely agreed as a determinant that triggers innovation (e.g., [27]-[28]). However, centralization remained questionable in term of whether or not such management/leadership also drives innovation. Eventually, a group of authors suggest that indeed centralization also predicts innovation (e.g., [11]). The rationale is that centralization can trigger knowledge and learning, which in turn encourages innovation [35]. Thus, the dynamism of management/leadership and it place between centralization and freedom, is pivotal to innovation [36].

4.4 Unrealistic Demands

In response to the non-controllable factor, all the interviewees raised concerns with regard to the unrealistic demands. The interviews indicated the demand for innovative products/designs such as smart-homes, and green buildings, remained uncertain. In particular, public awareness and common knowledge with regard to innovation are poor. In fact, both the creation and adoption of innovation possessed certain degrees of uncertainty and risks. For instance, a property developer revealed that the implementation of advanced technologies in their previous housing project was less popular amongst middle and low income clients as it was not their main concerns at all. In response to the creation of novelty, the architects in the present study blamed the clients for being ignorant when it came to learning and understanding the motive for being innovative.

4.5 Government Support

Despite rigid procedures imposed by the public authorities which are recognized as impediments to innovation (e.g., [1]), all the interviewees agreed that support from government is crucial if innovation is to succeed. This result is in line with previous studies that suggest that government bodies are the driver to innovation in the context of construction industry (e.g., [3], [13], [22], [30]). Interviewees suggest that the government should educate and improve the public in terms of the awareness of the importance of innovation and sustainability for the future of the construction industry. Thus, the non-controllable factor, which refers to government support, is indeed a driver, in comparison to the unrealistic demands.

CONCLUSION

The present study revealed 3 impediments to innovation (i.e., an immature technical knowledge, a negative perception, and the unrealistic demands), and a driver to innovation creation (i.e., dynamic top management/leadership) and innovation adoption (i.e., government support) respectively. This study adds to the body knowledge with regard to the drivers and impediments associated with innovation orientations in the context of the construction industry, which is argued by Yusof et al. [2], Damanpour & Wischnevsky [9] and Runhaar et al. [26]. As an exploratory study, the findings provide an initial startup for future academics to overcome the factors that inhibit innovation. Immature technical

knowledge, negative perceptions, and dynamic top management/leaderships are controllable by companies. Government support and unrealistic demands are considered to be non-controllable by the companies. Such categorization is in line to [26].

In practice, several efforts can be made by construction companies such as 1) change mind-sets to overcome the negative perception against something that has not been done previously [30], [27], 2) rather than blaming, construction companies should take the initiative to train or improve unskilled workers. This also proves the importance of having R&D despite overly great reliance on third parties (e.g., [3], [33]), and 3) management should monitor the rapidly changing market and determine market demand, because it is inappropriate to blame the nature of the market for being uncertain/unpromising. In addition, a tighter collaboration between public authorities and construction companies is urgent, given the previous study which suggested that the government's efforts have somehow failed to comprehend the exact circumstances in the construction industry [30]. Furthermore, a broader collaboration between construction companies incorporating different professions is deemed necessary to ensure successful innovation [22]. Such collaboration is of prime importance when it comes to ensuring the innovativeness of the construction industry and the sustainable growth of a country.

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