Addressing IT Productivity Paradox in Hotel Industry; Evidence from India

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Abstract

This study attempts to explore the moderating role of Information Technology (IT) capability on the association between the investment on the information technology and the performance outcome of the hotels. An online survey has been utilized to identify the effect of three indicators of IT capability, according to the resource based theory, on the relationship between IT investment and performance in the hotel industry of India. Findings confirmed the phenomenon of "IT productivity paradox" in the hospitality industry of India. Results of hierarchical regression analysis showed that IT capability functions as a moderator which boosts the impacts of investing on information technology in hotel's outcome. A number of precious implications presented in the study, which will assist the tourism industry in relation with the hotels and accommodation sector.

***Keyword**: IT Infrastructure Resources, Human IT Resource, and IT enabled Intangible Resources, resource based theory*

Introduction

A few studies assessed the direct influence of information technology investment on the performance outcome in early 1990s and reported the term called "IT productivity paradoxes". Those paradoxes refer to the inverse results of investment in IT section of an organization that do not have any affiliation with the performance boost (Brynjolfsson, 1993). On the other hand scholars like Vandenbosch (1997) approved the significant and positive linkage between information technology investment and performance outcome within the firms. The lack of consensus among the experts referring to such findings raised the debates about this paradox, which impose researchers to go for its reasons. Liu et al (2008) noted that this relationship should

be investigated from a new perspective (dynamic capability view) that extracted from Resource Base Theory (RBT). They revealed a third variable that moderates the linkage between IT investment and performance.

The review of the related literature indicated that there is no information about the fact that how would invest on information technology may result in the creation of sustainable competitive advantages in the tourism sector. The existence of aforementioned gap exacerbates the needs of more exploration in this field. Thus, the current study is considered to be one of the leading studies which examines the impacts of investing on information technology and performance of the hotel, whilst IT capability moderate this linkage, which is supported by *Resource Based Theory*.

Furthermore, this study seeks to examine the moderating impact of information technology capability on the association between IT investment and hotel's performance in India.

Theoretical Background

In this study, Resource Based View was followed as the fundamental theoretical framework which importunes that the organizations and firms can benefit from competitive advantage by means of applying unique resources, the resources that are so valuable and very hard to imitate and difficult to substitution (Kozlenkova et al., 2014; Wernerfelt, 1984). In order to access a sustainable competitive advantage in the information system business, scholars have suggested dynamic capability view which extracted from resource based view. As Lee et al, (2008) discussed: It is so important for the firms to have specific capabilities and resources to be successful in the severe environmental competition. In this while the information technology capability of the firms which refers to their ability of assembling and integrating and deploying the resources related to information technology plays a critical role in achieving succession.

Literature Review

Scholars have proposed the resource based view to solve the contradictions of information technology productivity (Humphreys et al., 2014; Davis et al., 2014). As aforementioned literature, inimitability, non-substitutability, rareness and high volubility are key characteristics of resources that RBV is focus on that results in sustainable competitive advantage. Three types of resources have recognized as capability by Grant (1991) including personnel based resources,

intangible resources and tangible resources (1991). Researchers enumerate the tangible resources as humanistic resources and IT infrastructures and intangible resources as IT-enabled skills (e.g. synergy, orientation of customer, and knowledge wealth) and managerial and technical IT skills (Bharadwaj, 2000).

It is not a straightforward approach that purchasing IT infrastructures and implementing IT plans, would definitely result in a high level of performance. As Crook and his colleagues (2008) through the analysis of 125 studies, identified that acquiring a high level of performance depends on the consideration of a series of specific RBV criteria and independence of resources from potential appropriation. Since imitation and replication of IT resources lead to escalation of RBV's criteria observance, the role of IT resources in competition of organizations is inevitable which can act as a competitive advantage in turbulent business environment (Ross et al, 1996). Hence some researchers proposed the application of IT capability, because imitation and replication of organization's capability are ponderous (Bharadwaj, 2000). However, IT capability is sophisticated concept that has been employed in various fields and there are not a comprehensive census regarding its classification.

Various studies have considered Information System (IS) knowledge as well as its related skills as information technology capability that is categorized in three groups (technological group, business group and behavioral group). According to Lee et al (1995) the IS knowledge and its related skills are comprised of five segments: technological proficiency, managerial ingenuity, functionality of the business, interpersonal networks, and finally the management. In another study Feeny and Willcocks (1998) evolved a perspective of the IS functionality of 9 capabilities. While Heijden (2000) indicated just 3 of those capabilities which encompass the linkages of the information technology department with rest of the business, that emphasizes the description utilized for information technology capability in the current study. These three areas imply the IS/IT governance, which is the administrative linkage between the information technology managerial department and the business management. Bharadwaj et al (2000) mentioned that there are 30 IT capabilities which can be segmented into six fundamental segments: "IT business partnerships", "external IT linkages", "business IT strategic thinking", "IT business process integration", "IT management", and "IT infrastructure".

Resource based view is becoming a prevailing theory in this field respectively. It was 1996 when the term information technology for the first time was introduced by Ross et al. IT capability

based on Ross et al (1996) means the ability of controlling the related costs of the information technology, delivering the required equipments, and affecting the business goals through information technology accomplishments. They believed that IT by itself cannot guarantee the success of an organization and the organizations should have the capability of applying IT to the dynamic changes of the business environment (Ross et al., 1996).

It is believed that the development of IT capability is facilitated by means of three major assets:

Firstly the trained and qualified human resources of the organizations who can actively provide a suitable answer to the business environment needs.

Secondly the technological resources which refer to the IT infrastructures and complement the firm's information needs; and

Finally the related resources that are an influential information technology business linkage conducted by a proactive chief executive officers.

Conceptual model and hypothesis

The research model of this study was demonstrated in Figure 1. IT investment is independent variable and performance is dependent variable. IT capability is moderator of the connection between information technology investment and performance of hotel sector in India. In previous studies the size of hotels (fiver and four star hotels) had confounding impact on the linkage of IT investment and firm performance. Hence, in this study hotel size is considered as control variable.

Figure 1- Proposed research model

Control Variable: Hotel Size

This research tries to test the existence of IT productivity paradox in the hotel industry of India. Then, following hypothesis is proposed:

***Hypothesis 1*:** IT investment will not increase the performance of the hotels.

We hypothesized that dynamic capability, which emphasize on IT infrastructure resources, human IT resource, and IT enabled intangible resources, is able to increase performance of hotels:

***Hypothesis 2*:** IT capability will boost the level of performance.

According to previous research, application of dynamic capability, based on RBV, will address the problem of IT productivity paradox in the hotel industry. Then, it is hypothesized that:

***Hypothesis 3*:** IT capability will intensify the effect of IT investment on hotels' performance.

Research design

The data were collected from five and four star hotels in India. Contact information of 32 five star hotels and 168 four star hotels were obtained from classification list of hotel that was issued by Indian Ministry of Tourism.

An online survey has been conducted and link of the survey has been sent to e-mail of hotels. Afterward researchers contact with the hotels to track the procedure of submission of the questionnaires and also recommended to managers of IT departments to fill the questionnaires as well. Data obtained from the online survey, some powerful source of common method bias (e.g. social desirability) due to different medium is less than interview (Podsakoff et al., 2012). Since English is recognized as official language of India and there was no need for the back translation process of questionnaires (Parameswaran and Yaprak, 1987). Twenty five hotels answered to the questions completely and the response rate was around 18%. Quantitative research has been used as a research methodology. Hierarchical regression analysis has been tested based on Baron and Kenny guideline (1986). Reliability and validity of the measures were checked though Cronbach's alpha and confirmatory factor analysis.

Results

Measurement results showed there was no significant problem regarding the reliability, convergent and discriminate validity. According to the results, coefficient alpha for IT investment was 0.91 and for IT capability was 0.94 and hotel performance was 0.84. Then, all coefficient alpha met commonly accepted cut of alpha ($\alpha > 0.7$). Average value of factor loading among items of each construct was above 0.7 that approved convergent validity of the variables the study.

Regarding discriminate validity, no high correlation was reported among items from various constructs. Means, standard deviations and correlation of the variables showed in **Table 1**.

Table 1. Mean, standard deviation, correlation matrix, and internal consistency

Variables	1	2	3	4
1. Size	-			
2. IT Investment	-0.270	(0.91)		
3. IT Capability	-0.375	0.786**	(0.94)	
4. Performance	0.001	0.196	0.449*	(0.84)
Mean	1.32	3.01	3.36	4.08
Standard deviation	0.48	1.16	0.79	0.69

Note: ** Correlation is significant at the 0.01 level and * Correlation is significant at the 0.05 level (2-tailed)
IT investment, IT capability and performance were measured using a five-point scale that ranged from 1 to 5. Higher scores indicated much high and strongly agree and lower scores means much low and strongly disagree. Size of the hotel was coded as a binary variable (1: five star hotel 2: four star hotels). Cronbach's alpha is provided in parenthesis.

As shown in **Table 1**, Size of the hotel has no significant effect on performance of hotels (*r= 0.001, ns.*). IT capability and IT investment have a positive and significant relationship with IT investment (*r=0. 786, P< 0.01*) and also hotel's performance (*r=0. 45, p<0.05*).

To check the moderating role of information technology capability on the relationship of information technology investment and hotel performance, hierarchical regression analysis was conducted using SPSS. Results of hierarchical regression analysis have shown in **Table2**.

Table 2. Results of Hierarchical regression Analysis

Independent variables	Standardized regression weights (∃)			
	Dependent variable (Performance)			
	Step1	Step2	Step3	Step4
Size (Control variable)	0.02	0.06	0.22	0.21
IT investment (Independent variable)		0.18	-0.37	-2.79**
IT capability (Moderator)			0.80**	-0.50
IT investment* IT capability				3.51*
F	0.01	0.70	7.97**	6.11*
R^2	0.00	0.03	0.30	0.46
ΔR^2		0.03	0.27	0.16

Notes: *p > 0.05, **p > 0.01

As shown in **Table 2,** size of the hotels has not a statistical confounding effect on performance in whole steps. IT investment and performance has not any significant effect on hotels' performance. Meanwhile, IT capability entered the model as moderator, the linkage between IT investment and hotel's performance became negative, but not significant. Therefore **Hypothesis 1** is supported and "IT productivity paradox" is reported in the Indian hotels industry. This paradox intensifies when introduction of IT Investment (independent variable) and IT capability (Moderator) entered the model (β=-2.79, $P< 0.01$). There was significant linkage between IT investment and hotel's performance (β=0. 8, $P< 0.01$). Therefore, **Hypothesis 2** is supported. However, when the interaction of IT investment and IT capability entered the model, the effect of information technology capability and performance was not significant and interactions of the variables had a significant effect on performance (β=3. 51, $P< 0.5$). As aforementioned data, IT investment had non-significant and negative impact on performance (step 3). But its interaction with IT capability had a significant and positive effect on Indian hotel's performance. In addition, R^2 had an increment when the moderator and the interaction variables exceeded the model. Hence, **Hypothesis 3** was supported. Effect of the moderating effect of IT capability on the relationship between IT investment and performance depicted in Figure 1. IT productivity paradox had peered at a low level of IT capability. Whilst, increasing IT investment boosts

performance at a high level of capability feature of resources, namely IT infrastructure resources, human IT resource, and IT enabled intangible resources.

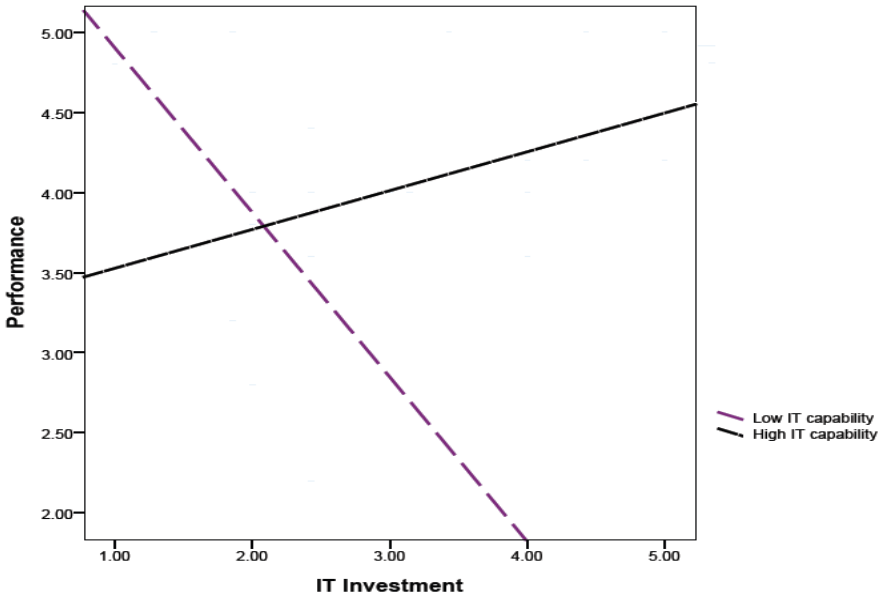

Figure 1. Moderating effect of IT capability

Conclusion and Discussion

The results of the study approved the existence of IT productivity paradox in the hotel industry of India. Such finding is reported by Brynjolfsson (1993) as well. This study tested the function of IT capability as a moderator of the linkage of IT investment and performance. In other words, considering the capability of resources not just is able to address the negative impact of IT investment on performance, but is to escalate the association positively. According to RBV, investment on special resources considering the dynamic capability view, results in high performance in the hotel industry of India. This finding is consonant with Liu et al (2008) and Bilgihan et al's (2011) studies. The size of the hotels has not significant impact on the relationship between IT Investment and hotel performance. That is not accordant to findings of Ham et al (2005) who reported the increase of hotel's performance by application of IT in three star hotels are more than four and five stars.

Measurement of predictor and criterion variables from one source, which obtained from hoteliers side, is one the limitation of the study that can be act as a potential source of common method bias (Podsakoff et al., 2012). However, results of Harmon's factor analysis revealed 32 percent of variance is explained by one extracted factor that proved there is not a serious threat about

common method bias (It is recommended for future studies to measure performance of hotels from archival financial statements). However, the distribution of this study was quick and economical, the probability of the sending and delivering a number of completed questionnaire decrees that can be considered as another limitation of this study.

Managers of the hotels should be aware that in which kind of IT resource are going to invest to achieve a high level of performance. Because if managers do not follow dynamic capability views of the resources, in spite of the investment on IT area, the performance of their hotels will decrease. More empirical researches are needed to investigate the samples of IT infrastructure resources, human IT resource, and IT enabled intangible resources in the future.

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