

THE EFFECTS OF LEARNING ORIENTATION ON IMPLEMENTATION OF INBOUND OPEN INNOVATION IN LOW & MEDIUM–LOW TECHNOLOGY FIRMS

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Abstract

Despite the increasing attention to the open innovation, the effect of strategic capabilities as antecedents to implementation of open innovation in ‘low and medium–low technology’ (LMT) firms in technologically less advanced countries is largely unexplored. This paper strives to fill this gap by investigating the effect of learning orientation on implementation of inbound open innovation. Particularly, effect of commitment to learn, shared vision and open mindedness are considered. Building on the resourced based view, the study theoretically speculates a positive causation from learning orientation to inbound open innovation. Also, the moderating effect of market potential as an external environment component is assessed. Findings from the cross-sectional survey from 272 LMT firms in Sri Lanka reveals that both commitment to learn and open mindedness has positive effect though shared vision has no effect on inbound open innovation. Also, the moderating effect of the market potential is dissimilar. This paper extends the present knowledge by insisting the importance of capabilities particularly, learning capability on implementing open innovation. Findings of this study provide a practical insight into how components of learning capability, and contextual factors influence on implementing inbound open innovation. Finally, this paper points the limitations and further research opportunities.

Keywords: Open innovation, Learning orientation, Low–and medium–low technology firms, Market orientation

INTRODUCTION

In the later part of the twentieth century, the process of innovation began to change due to several factors and that caused to bring novelty to the management of innovation (Chesbrough, 2006b; Viskari, Salmi, & Tokkeli, 2007; Dahlander & Gann, 2010). During twentieth century, though the closed innovation was a valuable strategic asset and formidable entry barrier to competitors, the underpinnings of it were eroded gradually (Chesbrough, 2003; Tseng, 2009). The closed innovation believed that firms need to have a strict control over the innovation process but, its new paradigm, open innovation believes that “firms can and should use external

ideas as well as internal ideas, and internal and external paths to market, as the firms look to advance their technology” (Chesbrough, 2006b, p. xxiv). Today, open innovation is considered as a fad and it has positive effect on firm performance (Chesbrough, 2006c; Hung & Chiang, 2010; Rass, Dumbach, Danzinger, Bullinger, & Moeslein, 2013; Ahn, Mortara, & Minshall, 2013). Also, open innovation has become a major trend in innovation research and practice (Fu, 2012), and a valuable strategic option (Tuff & Jonash, 2009).

Open innovation uses purposive inflows of knowledge to enable firms to acquire new knowledge and competencies. Also, it uses purposive outflow of knowledge to commercialize the technology enabling firms to seek out different paths to market. These two aspects are called inbound and outbound open innovation respectively, and outline two approaches to open innovation. Firms complement their internal knowledge by closely working with the external knowledge sources and thereby generate value. External knowledge sources are either other organizations or individuals that are not employed by the particular firm (Dahlander & Gann, 2010). Firms are open in inbound open innovation to the extent to which firms employ external search strategies for knowledge sources (Laursen & Salter, 2006).

Except a few studies (i.e. Robertson, Smith, & von Tunzelmann, 2009; Santamaría, Nieto, & Barge-Gil, 2009; Deegahawature, 2014b), the open innovation studies on LMT firms are scarce (Hirsch-Kreinsen, Jacobson, Laestadius, & Smith, 2005; Heidenreich, 2009; Santamaría et al., 2009). Also, a large number of studies covers technologically advanced and developed nations (Karo & Kattel, 2010), and some studies are done in emerging economies (i.e. Li & Kozhikode, 2009; Lee, Park, Yoon, & Park, 2010; Kafouros & Forsana, 2012). Yet, technologically less advanced countries have been largely neglected in open innovation studies, except a few studies (i.e. Deegahawature, 2014a; 2014b). On the other hand, the competitiveness of a firm is determined by not only encountered opportunities but also resources. The resource based view insists the importance of mustering tangible and intangible resources for competitiveness. Assets and capabilities are the two types of resources. Distinctive capabilities are integral to achieve competitive advantages (Barney, 1991; Zhou, Yim, & Tse, 2005). Also, capabilities determine the level of innovation of firms (Zhou et al., 2005). An important such capability is learning orientation which consists with commitment to learn, shared vision and open mindedness (Sinkula, Baker, & Noordewier, 1997). Though the effect of learning orientation on innovation has been investigated (i.e. Baker & Sinkula, 1999; Calantone, Cavusgil, & Zhao, 2002; Zhou et al., 2005), yet there is no clear understanding about its effect on open innovation.

Therefore, this study aims to fill this gap by investigating the effect of learning orientation on implementation of inbound open innovation by LMT firms in technologically less advanced countries. The learning orientation is considered at its component level. Also, the firms experiencing attractive target market have higher potential for new products' sales and share

(Song & Parry, 1997) and that results with a higher level of learning. Thus, the moderating effect of market potential is assessed in this study. This study is original and contributes to the present knowledge in several ways. Firstly, it fills the scant literature on open innovation in the context of LMT firms and technologically less advanced countries. Secondly, it adds to the present literature on role of capability in open innovation by examining the effect of learning orientation. Finally, the influence of environment conditions will be explained by evaluating the effect of market potential. The rest of this paper is organized as follows. The next section reviews the relevant literature on open innovation, learning orientation and market potential, and develops study hypotheses. The research methodology adapted in this study is presented in the following section. The fourth section reports and discusses the analysis and results of the empirical study, whereas final section outlines the discussion, conclusions, and directions for future studies.

LITERATURE REVIEW

Invention becomes innovation once it is applied in commercial ends. Innovation is an essential component at various levels such as national-level, firms-level and group-level. It helps firm for the success in present challenging business environment (Bigliardi, Dormio, & Galati, 2012) by ensuring competitiveness (Edwards, Battisti, McClendon Jnr, Denyer, & Neely, 2005; Smith, Busi, Ball, & Meer, 2008; Essmann & Preez, 2009), and finally delivering the value to the stakeholders (Kolk & Püumann, 2008). Innovations is defined as “the implementation of a new or significantly improved product (good or service), or a process, a new marketing method, or a new organizational method in business practices, workplace organization or external relations” (OECD, 2005, p. 46). As mentioned earlier, factors such as mobility of knowledge workers, growing presence of private venture capitals, knowledgeable customers and suppliers, and new ways to collaborate and coordinate scientific knowledge across geographical boundaries due to new technologies etc. erode the underpins of closed innovation in later twentieth century, and caused to emerge the new innovation management paradigm, open innovation (Chesbrough, 2006a; Chesbrough, 2006b; Dahlander & Gann, 2010). There are many industries that have already adapted open innovation, and some are on their way towards open innovation thus, a clear trend towards open innovation in many industries is witnessed (Chesbrough, 2006b; Lichtenthaler, 2008). Though many firms have already taken specific open innovation initiatives (Lichtenthaler, 2011), there are some exemptions where some industries still stick with closed innovation, i.e. nuclear reactors, mainframe computers, military industries (Chesbrough, 2006b; Gassmann, 2006) due to the nature of the technology used in those industries.

The open innovation is about use of external relations for knowledge creation and commercialization. The fundamental difference between open innovation and its earlier paradigm is that the way the firms search for knowledge and commercialize knowledge. These

two aspects highlights two ways, a firm can implement open innovation. First, the extent of search for knowledge indicates the implementation of inbound open innovation whereas extent of commercializing knowledge via external paths to market indicates implementation of outbound open innovation strategy.

There are various sources of external knowledge. Proposing a method to assess the external knowledge search, Laursen & Salter (2006) introduce search breadth and depth as two components of external knowledge search strategy, and search breadth and depth together determine a firm's openness in inbound open innovation. "The number of external sources or search channels that firms rely upon in their innovative activities" is defined as the external search breadth, and search depth is defined as "the extent to which firms draw deeply from the different external sources or search channels" (Laursen & Salter 2006, p. 134). Thus, the verity of sources or search channels determines the breadth, whereas the intensity of using each source or search channel determines the depth. Discussing in the similar vein, Yun & Mohan (2007) and Ebersberger, Bloch, Herstad, & Velde (2012) also adapt the concepts of breadth and depth but, by extending the concept, they introduce seven dimensions of openness which include sourcing breadth, sourcing depth, search breadth, search depth, protection breadth, collaboration breadth, and collaboration depth. Also, Laursen & Salter (2006) identify seventeen sources of external knowledge and categorized them into four categories namely: market, institutional, other and specialized. The market sources include suppliers, clients, competitors, consultants, commercial laboratories/ research and development (R&D) enterprises, and institutional sources include universities and other higher educational institutions, government research centers, other public sector (i.e. business links, government offices), and private research institutes. Other sources include professional conferences and meetings, trade association, technical/ trade press and computer data bases, fairs and exhibitions, and finally, specialized sources include technical standards, health and safety standards and regulations, and environmental standards and regulations. Discussing in a similar vein, Keupp & Gassmann (2009) identify fourteen sources under three categories namely: other firms, institutions and consulting, and specialized information.

Resource based view insists the effect of both assets and capabilities on performance. Strategic orientation as a capability determines the innovation performance (Barney, 1991; Matsuno & Mentzer, 2000; Kumar, Boesso, Favotto, & Menini, 2012). Strategic orientation is a set of principles that directs and influences the activities of a firm that generates the behavior intended to ensure viability and performance (Hakala, 2011; Hakala & Kohtamäki, 2011). It helps achieve higher level of performance and competitive advantages by responding to the operational environment of the firm (Hambrick, 1983). Those principles are the philosophy that governs a firm towards the way in which the firm conducts its business with deeply rooted values and beliefs that guide the firm's endeavors to achieve superior performance (Gatignon &

Xuereb, 1997). Those principles provide the directions, guidance or motivation to the firms to work towards the initiatives of the firm (Hakala, 2011). Based on those directions, firms decide how to use and allocate resources, transcend capabilities, and unify the resources and capabilities. Accordingly, strategic orientation delineates the conduct of firm, and influential towards the adaption of novel method to manage innovation. This theoretically speculates that the strategic orientation influence the implementation of inbound open innovation.

The learning orientation is recognized as one of important strategic orientation (Hurley & Hult, 1998; Salavou, Baltas, & Lioukas, 2004; Hakala, 2011). Learning is the development or acquisition of new knowledge which has the potential to influence behavior, and more importantly it may result with new behaviors or value creation (Hakala, 2011). In an organizational setting, learning is one of key resources that determine competitive advantages (Hunt & Morgan, 1996). Sinkula et al. (1997) view learning orientation as the propensity of a firm to create and use knowledge, and that helps the firm achieve competitiveness. Also, it is a firm-wide activity that creates and uses knowledge to achieve competitive advantages (Calantone et al., 2002). It creates a generative organization rather than adaptive organization (Sinkula et al., 1997).

Also, some evidences indicate that the leaning is prominent among others determinants of competitive advantages (Baker & Sinkula, 1999). Summarizing literature on organizational learning, Sinkula et al. (1997) distinguish several characteristics of organizational learning. Organizational learning is a process which changes the shared mental model of the management team about their company, market and competitors. Also, learning transfer individuals' knowledge into the firm so that such knowledge can be shared and used by set of other individuals. Further, learning occurs if and only if the potential behavior of the firm has been changed. According to them, all these characteristics are paramount since the process of error detection and error correction can be changed from one situation to another.

Also, learning organizations quickly reconfigure their architectures and reallocate resources so that they can respond to the changes in the environment such as new opportunities and threats (Slater & Narver, 1995). This type of firms maintains close relationship with external entities such as customers and suppliers, and it makes mutual adjustments easy when a need arises. These characteristics of learning organizations are conducive towards the implementation on inbound open innovation which requires radical resource allocation and partnership capability (Fredberg, Elmquist, & Ollila, 2008)with external entities. Learning orientation includes three components which are commitment to learn, shared vision, and open mindedness (Sinkula, et al., 1997)

Commitment to Learn

Commitment to learn refers to the learning culture of a firm and it explains the extent to which a firm values and promotes learning. This helps firms understand the cause and effect relationship of their activities, and learning oriented firms value and encourage such learning (Shaw & Perkins, 1991). Highly learning oriented firms encourage learning for new knowledge even outside the immediate focus of employees. The understanding of cause and effect relationship promotes a culture which regularly detects and changes the theory in use in managing and running the firms. The firms are required to learn the changes in the environment and change the present theory in use. Accordingly, learning oriented firms understand the changes in the innovation landscape, and make adjustments to the present approach of innovation management. Consequently, such firms may understand the necessity to be opened in innovation management and adapt open innovation. Even after implementing it, firms are supposed to learn continuously how to deal with outside parties. Thus, firms possessing higher level of commitment to learn may be more incline to inbound open innovation. Therefore, the following hypothesis is proposed.

H₁: The commitment to learn has a positive effect on implementation of inbound open innovation.

Shared-Vision

Shared vision coordinates learning into a common direction, and promotes high quality, firm-wide learning into that (Baker & Sinkula, 1999). It coordinates different interest of individuals into a common destination. The firms, which do not have a shared vision, do have multiple thoughts which lead to inconclusive divergent views. Shared vision determines the likelihood of having a shared dominant logic i.e. mission etc. and desired outcomes i.e. rate of new product introduction, investment etc. (Baker & Sinkula, 1999). Thus, this increases the ability of a firm to quickly respond to a situation (such as problems, issues) that it encounters while working towards a common direction. On the other hand, absence of universally understood direction itself reduces the motivation to learn (Galer & Heijden, 1992). Adaption of open innovation is a firm-wide endeavor. It requires the contribution and involvement of managers and professional in diverse functional areas with diverse knowledge and experiences thus, integration of possible diverse interests to a common direction is a need. Thus, firms possessing shared vision may have a higher inclination to inbound open innovation. Therefore, the following hypothesis is proposed.

H₂: The shared vision has a positive effect on implementation of inbound open innovation.

Open-Mindedness

Open mindedness encourages firms to critically evaluate the present business models.

Experience of successes and failures over the time may develop mental models that are long being held within firms. The mental models that are hold by the management or the firm today may have to be changed in future since such models may become no longer be true as the time passes (Baker & Sinkula, 1999). Thus, the ability of firms in questioning long being held models is crucial. So long as a firm is open minded towards, and capable enough to question its actions, routines, assumptions and beliefs, such firm are not bounded by the usual and familiar ways of thinking and acting (Baker & Sinkula, 1999). Such firms are ready to adapt change as need arises, and adapt new approaches to business with novel business models. In contrast to closed innovation, inbound open innovation requires firms to engage in external knowledge search and work with external entities. Also, the open innovation is a new paradigm that requires firms to deviate from the previously proven business models. Thus, open minded firms may be highly inclined to inbound open innovation. Therefore, the following hypothesis is proposed.

H₃: The open mindedness has a positive effect on implementation of inbound open innovation.

Market Potential

It is commonly believed that the environment influence the firms and modify their strategies. As an external environment factor, market orientation explains the potential demand for the firm's products within the target market. Market potential refers to the extent of attractiveness of the market place which is explained by growth in customer demand and size (Song & Parry, 1997). It is reflected by anticipated growth in customers and customer demand in the target market (Henard & Szymanski, 2001). The level of the needs of the customers in the target market, and importance of products to the customers to fulfill such needs are reflected by market potential that has an effect on new product development (Song & Parry, 1997; Im & Workman, 2004). Higher level of market potential spurs faster innovation resulting higher potential sales, market share, and profit growth (Song & Parry, 1997; Acemoglu & Linn, 2004). This situation creates a better opportunity for the firms to have a higher level of learning. Thus, learning may occur at a higher level within learning oriented firms when the market potential is higher. Thus, three aspect of leaning orientation may be stronger in a highly potential market. Therefore, the following hypotheses are postulated.

H₄: Market potential positively moderates the relationship between commitment to learn and implementation of inbound open innovation.

H₅: Market potential positively moderates the relationship between shared vision and implementation of inbound open innovation.

H₆: Market potential positively moderates the relationship between open mindedness and implementation of inbound open innovation.

METHODOLOGY

Sample and Data Collection

Focusing on LMT firms in technologically less advanced countries, this study attempted to explore the effect of learning orientation on implementation of inbound open innovation. The effect of the three components of learning orientation, namely, commitment to learn, shared vision and open mindedness were assessed. Also, the moderating effect of market potential on relationship between each component of learning orientation and implementation of inbound open innovation was evaluated. The empirical research for testing the hypotheses adapted a questionnaire based cross-sectional survey conducted at firm level in a technologically less advanced country. Technologically less advanced countries are the “scientifically lagging nations” according to “RAND’s science and technology capacity index”, and Sri Lanka is under this category. Using the OECD categorization of industries based on R&D intensity (Hatzichronoglou, 1997; Hirsch-Kreinsen, 2008), five industries in LMT category were selected and other industries were dropped due to lower number of firms. Selected industries were: Rubber and plastics products; Basic metals and fabricated metal products; Wood, pulp, paper, paper products, printing and publishing; Food products, beverages and tobacco; Textiles, textile products, leather and footwear. 272 firms employing 25 or more employees were in the sample. Age of the firms ranged from 1 to 60 years, and 50 per cent is above 15 years. The size of the firm was measured by number of employees, and it ranged from 25 to 6000 employees. On an average, firms employed 107 employees.

Variables and Measures

Commitment to learn, shared-vision and open mindedness were operationalized as first order latent variables by the instrument of Sinkula et al., (1997). These instruments were appropriate in this study since several innovation-related studies were used and validated those (Calantone et al., 2002). Three variables were measured by four, four and three scale items respectively, over a seven point Likert scale (1 = “strongly disagree”, 7 = “strongly agree”). This study adapted the instrument of Song & Parry (1997) and uses four-item scale to operationalize market potential. Since this scale has been used in open innovation studies (Hung & Chiang, 2010), it is appropriate in this study. A similar seven-point Likert scale was used to measure responses. The procedure used by Laursen & Salter (2006) to measure the extent of using inbound open innovation was adapted in this research. However, this study converted it to a 10-point index where zero indicates ‘use of no inbound open innovation strategy’ while ten indicates ‘use of inbound open innovation strategy at a highest degree’.

Construct Validity: The construct validity of this study was assessed by the two-step approach recommended by Anderson & Gerbing (1988). Firstly, exploratory factor analysis was used for

all multi-item scales (commitment to learn, shared vision, open mindedness, and market potential). All items have communalities well above the cutoff point of 0.50 (Hair, Black, Babin, & Anderson, 2009). Also, the factor loadings were well above the theoretically expected values for all items (over 0.83) thus, no items were deleted. Secondly, confirmatory factor analysis was run for all the focal variables. Due to higher cross loading, two items were dropped. Then, the measurement model showed a satisfactory fit ($\chi^2 [68]=284.66, p < .001$; goodness-of-fit index [GFI] = 0.89, root mean square residual [RMR] = 0.06; incremental fit index [IFI] = 0.96, normed fit index [NFI] = 0.94, comparative fit index [CFI] = 0.96). All factor loadings were highly significant ($p < .001$). Construct reliabilities of all constructs (over 0.95) were well above the minimum threshold point of 0.60 (Bagozzi & Yi, 1988). Further, average variance extracted (AVE) of all constructs (0.66 – 0.93) exceeded the minimum threshold point of 0.50 (Hair et al., 2009). Therefore, the constructs demonstrated adequate convergent validity and reliability (Fornell & Larcker, 1981). The discriminant validity of the measures was tested by calculating the shared variance between all possible pairs of construct, and then comparing them with AVE to determine whether they were lower than the AVE of the individual constructs (Fornell & Larcker, 1981). All AVE values (0.66 – 0.93) were adequately higher than the shared variance with the other construct (0.16 – 0.54), in support of discriminant validity. These results confirm that the measures of the study possess adequate reliability and validity.

Also, the study considered two control variables: age and size of the firm. Age of the firm was measured by the number of years a firm is in business from its inception, and size was measured by the number of employees.

ANALYSIS AND RESULTS

Descriptive statistics and correlations of focal variables are presented in the table 1. Results show that adaption of inbound open innovation by LMT firms in technologically less advanced countries are at moderate level ($M = 5.69, SD = 1.80$). LMT firms possess average level of commitment to learn ($M = 4.12, SD = 1.35$), shared vision ($M = 4.66, SD = 0.96$), and open mindedness ($M = 4.49, SD = 1.04$). Also, there is an average level market potential ($M = 4.60, SD = 1.06$). Results show that 17 correlations out of 21 are positive and significant. Also, it illustrates that commitment to learn, shared vision and open mindedness have positive and significant relationship with inbound open innovation ($p < .01$), supporting the posited relationships. Market potential also demonstrates positive and significant associations with all focal variables ($p < .01$). Though age of the firms has a positive and significant association with inbound open innovation ($p < .01$), the size does not show any association with inbound open innovation ($p = .052$).

Table 1. Basic Descriptive Statistics and Correlations

Variable	Mean	SD	1	2	3	4	5	6	7
1. Inbound open innovation	5.69	1.80	1						
2. Commitment to Learn	4.12	1.35	.59**	1					
3. Shared Vision	4.66	0.96	.48**	.71**	1				
4. Open Mindedness	4.49	1.04	.54**	.69**	.55**	1			
5. Market Potential	4.60	1.06	.49**	.59**	.59**	.36**	1		
6. Age	17	9	.14**	.09	.08	.03	.24**	1	
7. Size	107	365	.10	.14*	.14*	.11*	.17**	.20**	1

Notes: $N = 272$; ** $p < 0.01$, * $p < 0.05$

This study used hierarchical regression method to test hypothesis and to assess the explanatory power of each set of variables (Aiken & West 1991). This method was appropriate since it can explain whether or not interaction terms have significant effects over and above the direct effect of the independent variables, and thereby the existence of interaction effect (Wiklund & Shepherd, 2003). The scales, which were used to construct the interaction effect, were mean-centered with the aim of alleviating the potential threat of multicollinearity and explaining the effect of interaction terms (Aiken & West 1991). The issue of multicollinearity was examined by variance inflation factor (VIF) for all constructs in each regression model. The maximum VIF value within the models (1.16) is far below the cut off value of 10 (Neter, Wasserman, & Kutner, 1990) that alleviate the threat of multicollinearity. The results of the hierarchical regression analysis are presented in the Table 2. R^2 is used to explain the proportion of variance explained by each model (Tarling, 2009).

The model 1 included control variables. Results indicated that age of the firm has a positive and significant effect on inbound open innovation ($\beta = 0.13$, $p < .05$). However, the control variables accounted only for 3 per cent of the variance in implementation of inbound open innovation ($R^2 = 0.03$, $p < .05$).

The model 2 considered direct effect of independent variables, and this set of variables contributes to a statistically significant amount of variance in inbound open innovation ($R^2 = 0.42$, $\Delta R^2 = 0.39$, $p < 0.001$). The coefficients indicate that both commitment to learn ($\beta = 0.27$, $p < 0.001$) and open mindedness ($\beta = 0.27$, $p < 0.001$) have positive and significant effect on implementation of inbound open innovation while effect of shared vision ($\beta = 0.01$, $p = 0.91$) was not significant. These findings supported the hypothesis 1, which postulated a positive effect of commitment to learn, and hypothesis 3, which postulated a positive effect of open mindedness on implementation of inbound open innovation. However, results did not support the hypothesis 2 which postulated a positive effect of shared vision on implementation of inbound open innovation.

The Model 3 considered the interaction effect of market potential with all main variables, and this interaction accounted for a significant contribution over and above the main effects ($R^2 = 0.45$, $\Delta R^2 = 0.03$, $p < 0.001$). The results showed that only two interaction terms have significant effect. Contrary to the posited positive effect in hypothesis 4, the commitment to learn \times market potential showed a negative and insignificant effect on inbound open innovation ($\beta = -0.09$, $p = 0.25$) thus, hypothesis 4 was not supported. The shared vision \times market potential have positive and significant effect on inbound open innovation, supporting the hypothesis 5 ($\beta = 0.11$, $p < 0.10$). Finally, open mindedness \times market potential showed a significant effect on inbound open innovation but, contrary to the hypothesis 6, it showed a negative effect ($\beta = -0.15$, $p < 0.05$) thus, the hypothesis 6 was not supported. Also, the adjusted R^2 increases gradually from model 1 to 3.

Table 2. Results of Hierarchical Regression Analysis

Variables	Model 1		Model 2		Model 3	
	b (s.e) ^a	β	b (s.e) ^a	β	b (s.e) ^a	β
Control Variables						
Age of the firm	.03 (.01)	.13*	.01 (.01)	.06	.01 (.01)	.02
Size of the firms	.00 (.00)	.07	-9.47E-5 (.00)	-.02	-2.75E-5 (.00)	-.01
Capabilities						
Commitment to learn			.37 (.11)	.27***	.38 (.11)	.29***
Shared vision			.01 (.13)	.01	.04 (.13)	.02
Open mindedness			.47 (.11)	.27***	.41 (.11)	.24***
Market potential			.37 (.11)	.22***	.43 (.11)	.26***
Moderating effects						
Commitment to learn \times Market potential					-.12 (.10)	-.09
Shared vision \times Market potential					.21 (.13)	.11 [†]
Open mindedness \times Market potential					-.26 (.12)	-.15*
<i>R</i>	.16		.65		.69	
<i>R</i> ²	.03		.42		.45	
ΔR^2	.03		.39		.03	
<i>R</i> ² (adj)	.02		.41		.43	

Note: Dependent variable: inbound open innovation

$N = 272$; *** $p < .001$, ** $p < .01$, * $p < .05$, [†] $p < .10$

^aUnstandardized coefficients with standard errors in the parentheses and standardized coefficients are reported

DISCUSSION AND CONCLUSIONS

There is a scant of literature on open innovation endeavors by LMT firms in technologically less advanced countries. Further, the relationship between strategic capabilities and open innovation has received no attention. This study attempted to fill these gaps by theoretically speculating a causal link between learning orientation and implementation of inbound open innovation. Particularly, the effect of commitment to learn, shared vision and open mindedness on implementation of inbound open innovation was examined. Also, the moderating effect of external environment was assessed by investigating the effect of market potential.

The present study extends open innovation literature on several ways. It widens our understanding on antecedents for implementing open innovation. The findings reveal that both commitment to learn and open mindedness have a significant positive effect but, shared vision has no significant effect on inbound open innovation. This suggests that the capabilities have an impact on implementation of inbound open innovation (Deeghawature, 2014b) however, the effects of capabilities are dissimilar. The firms, which value and promote a learning culture, have ability in understanding the need for change. Such firms understand the recent changes in the innovation landscape and adapt inbound open innovation to face the changes. Also, the ability of firms to question long-held actions, routines, assumptions and beliefs helps go beyond the usual and familiar ways of thinking and acting, and adapt new business models thus, such firms are inclined to implement open innovation. In contrast to the theoretical speculations, shared vision has no significant effect on implementation of inbound open innovation. This may be due the need of multiple and divergent thinking in innovation endeavors. Accordingly, this study contributes by insisting the importance and validity of learning orientation in implementing inbound open innovation. Moreover, the findings add to the present knowledge by insisting that the effect of capabilities on inbound open innovation is conditional on the forces of external environment, by examining the effect of market potential. The relationship between shared vision and inbound open innovation is strengthened by market potential. Highly attractive markets divert learning into a common direction and promote firm-wide high-quality learning. However, contrary to the theoretical speculations, higher market potential weakens the effect of open mindedness on inbound open innovation. This may happen since highly potential markets provides firms with ample opportunities confirming the validity of present business model. Thus, such firms may stick with usual and familiar ways of thinking and acting. Also, market potential does not influence the relationship between commitment to learn and inbound open innovation. Accordingly, though there is a moderating effect of market potential on the relationship between learning orientation and inbound open innovation, it is dissimilar across the components of learning orientation. Thus, the effects of external environment are dissimilar (Sheng, Zhou, & Li, 2011).

The findings provides important implications to the LMT firms in technologically less advanced countries in implementing inbound open innovation. Firstly, it insists the importance of strategic capabilities in open innovation implementation. Particularly, the learning orientation affects the implementation of inbound open innovation. Thus, the LMT firms should develop an ability to quickly respond and reconfigure their architectures and reallocate resources as a response to the changing environment. Secondly, LMT firms should distinguish the effect among the commitment to learn, shared vision and open mindedness, and understand their distinct roles. The effects of three components are diverse thus, firms should be cautious about capabilities. On the other hand, the firms should be cautious on the capabilities such as commitment to learn and open mindedness in implementing inbound open innovation. Finally, the effect of environment conditions should be carefully evaluated. This study finds that effect of market potential is dissimilar thus, firms should be selective in implementing inbound open innovation according to the environment conditions.

LIMITATIONS AND SCOPE OF FUTURE RESEARCH

This study investigated the effect of learning orientation on implementation of inbound open innovation by LMT firms in technologically less advanced countries, adapting a component-wise analysis. Though this study has several merits, its outcome should be considered with the appropriate understanding on the limitations of the study which open the avenues for further studies. Firstly, this study considered only five industries though LMT category includes nine industries. This limits the generalizability of the findings of the research, and opens the opportunity for further investigations over entire LMT category. Secondly, the study chose Sri Lanka as a technologically less advanced country, limiting the generalizability of findings and opening opportunity for a cross country study. Thirdly, though this study did not take differences in industries into account, it may have some effect. Thus, it is interesting to consider industry-wise and category-wise (low and medium-low) analysis in future research. Fourthly, this research considered only one strategic capability adapting component-wise analysis thus, future research should address more capabilities adapting composite analysis. Finally, the research considered only one external environment factor. However, the findings revealed the influence of such factors, opening further research with several other environmental factors.

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