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Adoption of open innovation and entrepreneurial orientation practices in Malaysian furniture industry

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ABSTRACT

Objective: The main objective of this research is to integrate the resource-based view (RBV) to analyse how the relationship between firm performance and entrepreneurial orientation is mediated by outbound innovation among furniture firms in Malaysia.

Research Design & Methods: In this research, data has been poised via questionnaire from the furniture firms in Johor state, Malaysia. In this study, 391 responses were considered and analysed. The partial least squares (PLS) model was employed to test the hypothetical relationships among entrepreneurial orientation, firm performance and outbound innovation intention to adopt open innovation practices.

Findings: Research findings show that innovativeness, competitive aggressiveness, risk-taking, outbound innovation are statistically significant factors influencing entrepreneurial orientation and open innovation adoption among furniture companies in Malaysia. However, autonomy and proactiveness do not have significant effects on entrepreneurial orientation and open innovation adoption intention.

Implications & Recommendations: Few implications that are significant for academics and practitioners are also debated according to research findings. This research can serve as a guideline for successfully implementing entrepreneurial orientation and open innovation among furniture firms in an emerging economy. Thus, offering an external knowledge search-collaboration mechanisms-superior performance framework. Through using this open approach, companies will seek to find opportunities for creativity that go beyond their current capabilities to dramatically boost success.

Contribution & Value Added: This research, expanding the open innovation (OI) paradigm, explicates and measures the impact of OI's direct and mediating inputs on entrepreneurial orientation (EO) and firm performance. The results are consistent with the current OI literature demonstrating the complex connection among together outbound innovation and EO dimensions and firm performance by investigating Malaysian furniture manufacturers by building scales and evaluating their validity by developing outbound innovation. The initial findings are direct ties between entrepreneurial orientation dimensions with business performance and outbound open innovation. All the indirect (mediation) relations among the study variables were the second part of the results.

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INTRODUCTION

An overwrought surge in the literature that discusses the role and essence of innovation illustrates the increasing prominence of innovation to entrepreneurship (Birkinshaw, Hamel, & Mol, 2008). Innovation is the basic step of entrepreneurship whereby entrepreneurs take advantage of transition as a

catalyst for a unique brand or a company. In both nature and academics, the premise of open innovation (OI) has drawn tremendous interest. Several scholars have provided valuable insights and have introduced strategies to help management decision-making by dwelling on key viewpoints of the OI framework (Huizingh, 2011). The current article emphasises two concerns that have been identified as an important area in the field of OI: the urge to grasp how OI can help, especially in terms of its effects on company's overall performance and the function of contextual factors (mediation or moderation) (Huizingh, 2011; Lichtenthaler, 2009; Schroll & Mild, 2011).

The entrepreneurial orientation (EO) explains how new initiation is carried out through main business processes (competitive aggressiveness, proactiveness, autonomy, innovativeness, and risk-taking), which are incontrovertibly related to organisational higher performance. By building the conceptual framework of EO performance, researching probable mediators (outbound), and analysing the significance of the correlation among EO and organisational performance, incorporating on the company's resource-based viewpoint (Barney, 1991; Barney, 2001), we enter the prevailing EO and OI literature argument by addressing the following question: How is outbound openness linked to business performance? In the relationships amid firm performance with regard to EO, what function can outbound open innovation perform?

Although prior OI efficacy studies centred predominantly on inbound OI, minimal emphasis was devoted to researching the outbound impact and combined effects (Akbar, Bon, & Wadood, 2020; Chesbrough & Bogers, 2014). This article aims to discover the function of outbound OI in the EO-Performance relationships by integration of the theoretical perspective of the resource based-view (RBV).

We claim that there are many contributions to the current literature in the article: it affirms the dimensions deemed to determine the degree of openness, level of efficiency, and the connection among the different dimensions. Secondly, to address existing limitations, it builds on existing literature, advocating the assessment of outbound openness by using entrepreneurial orientation and firm performance dimensions. These variables, as indicated, are more reliable indicators towards firm openness than in OI literature. Furthermore, the study also recommends that the effects of acquisition versus development have different performance dimensions, *i.e.* Human Capital Development, Economic Growth, and financial worthiness.

LITERATURE REVIEW (AND HYPOTHESES DEVELOPMENT)

The suggested conceptual model is primarily RBV enunciated by Covin and Lumpkin, 2011; Edmond and Wiklund, 2010; Miller, 2011; William, Wales, Gupta, and Mousa, 2013. In essence, the RBV has been broadly used to clarify the association among entrepreneurial orientation and company performance (Ferreira & Azevedo, 2007; Ferreira, Azevedo, & Ortiz, 2011; Puffer, McCarthy, & Jaeger, 2016) and also to clarify the direct influence of OI on company performance (inbound and outbound) (Carvalho, 2016; Wales, 2016). According to this theory, businesses are expected to adopt successful entrepreneurship with valuable human capital resources, which can contribute to a competitive advantage against competitors (Maritz & Donovan, 2015; Puffer *et al*., 2016; Wales, 2016). Therefore, the researchers contend that entrepreneurship is a vital resource that has significant consequences for implementing an effective open innovation strategy. In particular, RBV offers theoretical lenses for explaining the association between the EO dimensions, *i.e.* competitive aggressiveness autonomy, proactiveness, innovativeness, and risk-taking concerning firm performance where it endorses the mediation significance of open innovation (outbound innovation) for improved sustainability of organisations. But since confluence of a firm's capabilities with its entrepreneurial mind-set facilitates superior firm performance (Martin & Javalgi, 2016), and the firm's resources and capabilities impact its strategies (Hult, Ketchen & Slater, 2005; Hullova, Trott & Simms, 2016). Furthermore, RBV encourages creativity in identifying important corporate resources in order to improve R&D effectiveness (Plank & Doblinger, 2018; Camara, 2018).

Innovativeness and firm performance

The current literature shows tremendous relation among innovation within a firm with high profitability in term of overall investment, *i.e*. return on asset and sales (Calantone, Cavusgil, & Zhao, 2004). The study of Casillas and Moreno, (2010) on Spanish SMEs has the same result, i.e. that innovative firms are found to be more developed in term of sale, growth in assets, and employment generation. Besides, process innovation has also shown a positive connection among sales performance and overall organisational growth (Klomp & Van Leeuwen, 2001). Moreover, Li and Calantone (1998) studied the relationship of product innovation with firm market performance and found an expressively positive relationship. In the same vein, Wang and Yen (2012) studied the Taiwanese SMEs working in China has found that firm performance is strongly linked with firm innovativeness. The findings of Hameed & Ali (2011) on Pakistani SMEs, Yoo, Sawyerr, and Tan, (2016) on Korean SMEs, Cannavale and Nadali, (2019) on Iranian SMEs and Karacaoglu, Bayrakdaroglu, and San (2013) on Turkish SMEs found that firm innovativeness has a significantly positive relationship with overall growth. Hence, it is concluded that in this hyper-competitive environment, firms must have to search for new ideas and update their approach to becoming successful, maintain, and sustain its position. Therefore, we hypothesise that:

H1a: There is positive relationship among Innovativeness and firm performance.

Proactiveness and Firm Performance

Proactiveness is the best strategy to be a part of a competition. Most of the study shows that when a firm introduces new products, offering new services or marketing their products differently is highly rewarding. Furthermore, proactive firms have mover advantages over other firms in the industry and capture the opportunities (Ambad & Wahab, 2013). When an organisation introduces new product or services, it compels the customer to switch and gains existing customer loyalty. Moreover, the study by Coulthard (2007) on start-up companies shows that a new firm is more likely to be proactive than established firms. In this regard, Meuer and Rupietta (2015) further emphasise that due to the bureaucratic nature of larger and established firms are lacking the ability to easily grab the opportunities. Hence, we can conclude that proactiveness is the best policy, and specifically, SMEs has to be proactive toward innovation to gain a competitive advantage. In this regards, diverse investigations show how firm proactiveness has a great impact on firm performance, e.g. Becherer and Maure (1999) studied US firms, Cassillas and Moreno (2010) studied Spanish Firms, Wang and Yen (2012) studied Chinese firms, and Cannavale and Nadali (2019) wtydied Iran firms and reached the same results. Therefore, we hypothesise that:

H1b: There is positive relationship among Proactiveness and firm performance.

Risk-Taking and Firm Performance

Enterprises that seek to make substantial pledges to high-risk, high-return projects gain from enhanced company resources and revenue (Boermans & Willebrands, 2012; Kitigin, 2017; Olaniran, Namusonge, & Muturi, 2016; Rezaei & Ortt, 2018; Rossi, 2016; Wambugu, Gichira, Wanjau, & Mung'atu, 2015; Akbar *et al.,* 2021). Risk-taking ability leads organisation towards success, which is a naturally accepted phenomenon. Risk-taking behavior develops the tendency that leads from a predictable situation to grabbing the opportunities in unpredictable situations (Wiklund & Shepherd, 2005; Covin & Slevin, 1991b). As the findings of Gibb and Haar (2010) from the study on 167 large New Zealand firms confirm, organisation with risk taking profile shows high financial performance. In the same vein, the finding on Iranian technology-based SMEs shows that risk-taking ability is a highly rewarding activity and leads to success (Cannavale & Nadali, 2019). The study of Wang and Yen (2012) on Taiwanese SMEs operating in China also confirms that risk taking shows high performance in term of growth, financial reward and reputation. Therefore, we hypothesise that:

H1c: There is positive relationship among Risk-Taking and firm performance.

Autonomy and Firm Performance

The findings of different studies related to firm performance regarding autonomy as an EO dimension show varied results (Yu, *et al.,* 2019; Akbar *et al.,* 2021). In this regard, the findings of Jancenelle *et al*., (2017) and Chen *et al.,* (2014) show that firm autonomy has a significant influence on overall firm performance. On the other hand, studies of Lechner and Gudmundsson (2014) and Hughes and Morgan (2007) show no significant results. The available literature has varied research findings, and the phenomena are paradoxical (Short *et al.,* 2009; Zellweger & Sieger, 2012). Some scholars suggest that giving autonomy to all stakeholders motivates significant performance scholars (Coulthard, 2007c; Lumpkin *et al*., 2009; Prottas, 2008). Chen, Neubaum, Reilly, and Lynn, (2014), and Jancenelle, Storrud-Barnes, and Javalgi, (2017), for example, found a significant relation between autonomy and performance. Therefore, the main purpose of this investigation is to study the phenomena with an alternative solution. Therefore, we hypothesise that:

H1d: There is positive relationship among Autonomy and firm performance.

Competitive aggressiveness and Firm Performance

The main focus of a firm to develop its abilities to be competitive and do better than others in the industry is described as competitive aggressiveness (Kuivalainen, *et al.,* 2010; Yu *et al.,* 2019). Rauch *et al.,* (2009) describe competitive aggressiveness as an aggressive response and 'competitors' actions (Lumpkin & Dess, 2001) to competitors' threats. The study (meta-analytic review) of Hughes-Morganet *et al.,* (2018) regarding competitive aggressiveness about firm performance shows positive relation between the two. Whereas the finding of Kljucnikov, Belas, and Smrcka, (2016), shows a negative result among competitive aggressive and firm performance. Conversely, Lumpkin and Dess (2001) did not find any direct relationship among the phenomena. Kuivalainen *et al.,* 2010 and Yu *et al.,* (2019) argue that only few studies have directly hypothesised the phenomena. Therefore, we hypothesise that:

H1e: There is a positive relationship among Competitive Aggressiveness and firm performance.

Outbound open innovation and firm performance

Enkel *et al.,* (2009) state that outbound innovation practice allows organisations for directly implement their knowledge. It can be possible to explore their knowledge with other firms or license their intellectual property to obtain related benefits. (Oltra *et al.,* 2018; Cassiman & Valentini, 2016; Hung & Chou, 2013). Out-licensing allows organisations to properly and effectively commercialise their unexploited assets and knowledge when organisation is lacking current market knowledge. It only reduces earned profit in licensing payments (van de Vrande *et al.,* 2009). Conversely, Oltra *et al.,* (2018) and Hung and Chou (2013) found that firm perusing outbound open innovation gain some specific advantages of utilisation of their unused resources and exploiting their technical knowledge outside their boundaries. Hence, following outbound open innovation grab possibilities outside the market to create extra revenue (Gassmann & Enkel, 2004; Enkel *et al.,* 2009; Oltra *et al.,* 2018). Therefore, outbound OI positively improving a firm overall performance and profitability (Oltra *et al.,* 2018). In this regard, the discussion leads to the succeeding expected relationship:

H2: There is positive relationship among Outbound open innovation and firm performance.

Outbound open innovation and entrepreneurial orientation dimension

Autonomy (relationship):

In this current hyper-competitive marketplace, organisations have to adopt and develop multifunctional HR to solve complex nature problems and innovate exactly according to customer orientation beyond company limits (Brodner, 2013). In this regard, Markman, Gianiodis, and Phan (2009) and Carvalho (2016) developed hypothesis representing different kinds of firms with context to open innovation theories, centralisation, decentralisation, autonomous which shows positive results related to commercialisation and consideration. Therefore, in regards to commercialization and exploration of

technological advancement outbound open innovation is considered crucial in EO-FP relationship (Carvalho, 2016; Markman *et al.,* 2009). Therefore, we hypothesise that:

H3a: Autonomy affects outbound open innovation.

Competitive aggressiveness:

Leão and Mello (2007) foresee the impact of competitive aggressiveness on open innovation dimensions. In their findings, the importance and effectiveness of open innovation – also highlighted by Carvalho (2016) – to create appropriate value organisation need to be involved with third party. Furthermore, the third party, *i.e.* the customer, R&D partners and suppliers, are important tool for commercialisation of innovative ideas. Based on the previous literature about competitive aggressiveness and open innovation. Therefore, we hypothesise that:

H3b: Competitive aggressiveness affects outbound open innovation.

Proactiveness:

Martínez-Román and Romero (2013) studied in detail more than 1500 SMEs in Spain and explored basic determinants of product innovation. They used different variables to identify alternatives and identification of unexplored opportunities. In this study, the authors measure two basic factors that affect innovation, *i.e.* 1) entrepreneurial personnel characteristics (their motivations, educational background, degree of interpersonal trust and age), 2) organisations management related characteristics, *i.e.* risk-taking ability, proactivity, cooperation, growth-related policies and specific innovation (Carvalho, 2016). Furthermore, these variables may be used for discovering prospects in existing and outside markets. Therefore, we hypothesise that:

H3c: Proactiveness affects outbound open innovation.

Risk-taking:

There is high risk associated with outbound activities compared to inbound activities, because outbound activities sometimes cause firm to lose their value (Schroll & Mild, 2011). In this regard, Jeong, Lee, and Kim (2013) discuss in detail and differentiate selling and licensing. According to them, in the case of sales of licensing it lowers the basic payment of the licensee. However, it increases the uncertainty concerning overall revenue. Because the supplier will acquire technology that can be determined in a regular case by paying a licence fee. On the other hand, Carvalho, (2016) and Jeong *et al.* (2013) states that in selling, there is no risk as all associated risk is transferred to the seller. Therefore, we hypothesise that:

H3d: Risk-Taking affects outbound open innovation.

Innovativeness:

Innovativeness does not simply enable a company to be in market competition but also provides and facilitates the company to grab opportunities that refresh firm growth (Garud & Nayyar, 1994; Cho & Pucik, 2005, and Carvalho, 2016). In this regard, Hughes and Morgan (2007) state that innovativeness facilitates and also differentiates the actors from rivals. Therefore, one firm can be differentiating through exploration (inbound) while developing and offering services or new products to satisfy the customers' necessities. On the other hand, Carvalho (2016) further adds that outbound, *i.e.* Exploitation, can be achieved through a competitive offering. Furthermore, innovativeness can also increase a company reputation in the existing market while creating and maintain customers. In a nutshell, it is concluded that outbound OI has significant impact of on a firm's innovativeness (Carvalho, 2016).

H3e: Innovativeness affects outbound open innovation.

Performance Relationship of Entrepreneur Orientation and Integrated outbound open innovation:

It's indeed instantly apparent from the literature that mediating factors in the EO literature have attracted substantially less exposure than moderator variables (Carvalho, 2016). Overall, current EO literature study of mediators shows no knowledge of the causal processes of how or why EO influences

other factors in the hypothesised model. We are trying to address the following question while testing those hypotheses: What is the role of outbound open innovation in the relationship between entrepreneurial orientation and firm performance? We propose that Entrepreneurial Orientation dimensions are strongly related with Open Innovation and that both influence the company's performance.

According to Hutter, Hautz, Repke, and Matzler, (2013), internal factors such as staff are still regarded as significant sources of creativity in the investigated SMEs and have the autonomy to perform. Moreover, employees and organisations are proactive, trying to get ahead of rivals by implementing a new concept or product that is perceived to be innovative. There is research on R&D outsourcing, but none have been reported to contribute to entrepreneurial orientation. There are many case studies, and the same is effectively tested, which establishes a theory. Although evidence tying the relation with risk-taking, proactiveness, and consumer engagement dimensions are strongly linked to the network dimension. According to Chesbrough (2003), the production and appropriation of value often include outside parties with a valued chain and composed, such outside events create significant networks. Ståhlbröst (2012) argues that if it opens up as early as appropriate, the risk of keeping open the company's process reduces, because the company gets to know the customers' needs earlier on, which is known as risk-taking.

In other terms, as a result of its outbound open innovation policy, the firm uses both customer engagement and external collaboration. Hutter *et al.* (2013) illustrate that besides some external sources of innovations, inventions and motivation are predominantly other businesses and affiliate companies within the small and micro companies surveyed. In Brazilian firms, research conducted by Carvalho (2016) concludes that open innovation (outbound innovation) intervenes in the association among EO dimensions and firm performance. Therefore, from the survey of previous literature, we hypothesise in the Malaysian context that:

H4a: Outbound open innovation mediates the relationship among autonomy and firm performance.

H4b: Outbound open innovation plays a mediating role in the relationship between competitive aggressiveness and firm performance.

H4c: Outbound open innovation mediates the relationship between innovativeness and firm performance.

H4d: Outbound open innovation mediates the relationship between proactiveness and firm performance.

H4e: Outbound open innovation mediates the relationship between risk-taking and firm performance.

RESEARCH METHODOLOGY

We have used a post-positivist method in this article because of its objective orientation and to contact with participants as little as practicable. The study's major objective is to allow researchers to reproduce and validate the findings in the future using a post-positivist methodology (Teles & Schachtebeck, 2019). We gathered the data from the owners and managers of furniture manufacturing enterprises in the Malaysian state of Johor. A sample of technology-based companies has been selected from the Malaysian Technology Development Centre (MTDC), Johor Furniture Manufacturers and Trader Association Federation. We randomly contacted businesses via Facebook, e-mail, and phone calls, asking that would want to participate in the research, and 500 questionnaire were distributed. The link was emailed to the companies that agreed to participate in the survey. We approached almost all of the firms after three months. A total of 415 firms participated in our inaugural survey. However, 24 documents were marked ineligible due to incomplete responses to questions. It is worth noting that 95% of respondents were owner-managers, with the rest being CEOs, managers, or lower managers. Table 1 shows the administration of questionnaires.

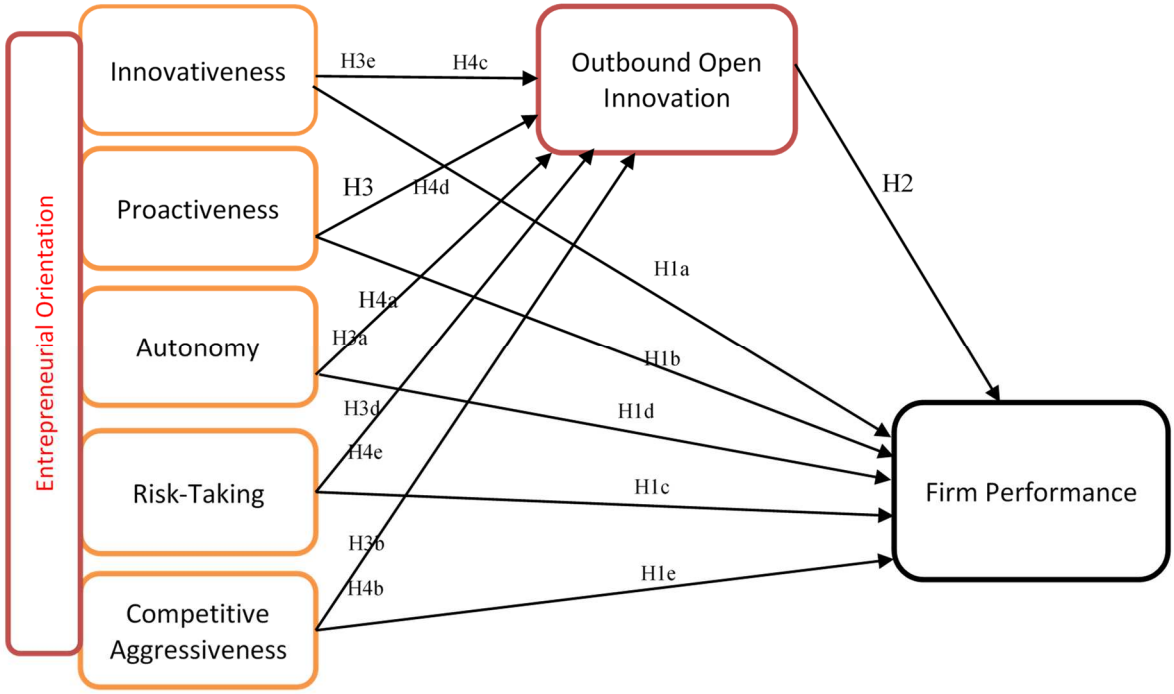

Figure 1. Conceptual framework
Source: own elaboration.

Table 1. The questionnaire distribution analysis

Questionnaire characteristics	Frequency	Percentage
Total questionnaire distributes	500	100%
Total retrieved	415	83%
Effective sample to be used	391	78.2%

Source: own study.

The survey questions were close-ended, and data collection was divided into three parts to effectively measure the response. Sections One and Two consist of 27 items using the Likert scale (Five-point scale) to know the value of individual five dimensions of EO about performance. Independent variables are divided into 5 dimensions, *i.e.* 1) autonomy, 2) competitive aggressiveness, 3) innovativeness, 4) risk-taking, and 5) Proactiveness. The top management decides and have to choose which dimension is more appropriate for their business success. The performance measurement was based on growth and profitability and adopted from previous studies (Akbar *et al*., 2020; Akbar, Razak, Wadood, & Al-subari, 2017; Birkinshaw *et al*., 2008; Wolff & Pett, 2006). The adopted performance measurement was modified accordingly. Finally, the last section consists of outbound open innovation. WE analysed the data through Smart-PLS 3.0 and SPSS.

Variables and calculations

In this research, we used previous literature for the variables. All scales were calculated by a Likert scale of five points ranging from "strongly agree" *i.e.* high to "strongly disagree" *i.e.* low. Open innovation has different magnitudes and dimensions hence based on Inauen and Schenker-Wicki, (2012) descriptions and Gassmann and Enkel, (2004) theory we operationalised open innovation into two broad variables *i.e.* inbound and outbound open innovation. However, this study considers outbound OI and measurement scales established while following Cámara, (2018); Carvalho, (2016); and Akbar *et al.,* (2020). Entrepreneurial orientation has been considered as a unidimensional variable such as firm leaning to practice innovativeness, proactiveness, risk-taking, autonomy, and competitive aggressiveness (Matchaba-Hove, Farrington, & Sharp, 2015; Arshi, 2016, Akbar *et al*., 2020). Furthermore,

Wiklund & Shepherd's measurements have been embraced to quantify organization performance such as sale, profit and growth of last three year with competitor comparison (Akbar *et al*., 2020; Akbar, *et al*., 2017; Akbar, Omar, Wadood, & Tasmin, 2017) (see Table 2).

Table 2. Questionnaire items

Construct	Number of items	Source
Entrepreneurial Orientation	28	(Tajeddini, 2013; Dai *et al*., 2014; Matchaba-Hove *et al*., 2015; Arshi, 2016; Akbar, *et al.,* 2020b)
Outbound Open Innovation	5	(Akbar, *et al.,* 2020; Cámara, 2018; Carvalho, 2016; Lichtenthaler, 2009; Sisodiya, Johnson, & Grégoire, 2013)
Firm Performance	6	(Nasir, 2013; Matchaba-Hove *et al.*, 2015; Akbar, Razak, *et al*., 2017; Rajapathirana & Hui, 2017; Akbar, *et al.,* 2020b)

Source: own study.

RESULTS AND DISCUSSION

For the evaluation of the previously adopted model, this article utilises Smart-PLS and SPSS tools. The two-stage process internal (measurement) and external model (structural) are employed to assess the conceptual or theoretical model in PLS-SEM. These two methods will be explored in-depth in the upcoming section.

Respondents socio-demographic characteristics

In this study, Table 3 shows participants socio-demographic characteristics. Its analysis shows that 42.5% of the companies are 1-4 years old. The gender distribution of the respondents indicated that about 57.3% were males while the remaining 42.7 were females. Exactly 52.9% of the companies have above 200 employees, 40.8% represent medium-size firms, while 6.3% represent small companies with less than 75 employees. The respondents' position indicates that 36.40% of the respondents were in the position of middle management. The top management respondents were 34.71%, while 28.88% of the respondents were positioned lower management in their respective company. The educational background of the respondents showed that above half (54.9%) had master's degree-level education, 35% holds degree education, 7.3% have diploma education. The location of the company in Johor state has the high establishment in Muar 45.1%. Segamat have an establishment of 20.9%, Batu Pahat has 16.3% establishment, and Kulang has 11.2%, while Johor Bharu has almost 6.6% of the 'company's establishments.

Evaluation of measurement (inner) model

Three distinct methodologies were used to adopt assessment parameters. These methods are Cronbach's alpha to check (Composite Reliability for internal consistency), average variance extracted to check (convergent validity), and discriminant validity (cross-loadings, Fornell and Larcker criteria and heterotrait-monotrait). However, to check the reliability, validity, and loading of all indicators in their respective constructs, the PLS algorithm procedure was carried out (Akbar, *et al*., 2020b; Urbach & Ahlemann, 2012). The structure's AVEs meet the necessary criterion of 0.50. However, its loadings are equal to or greater than 0.7, except five items between 0.4 and 0.6, on the advice of (Hair, Ringle, & Sarstedt, 2011), although the researcher maintains certain items if the values of the AVEs are obtained.

Individual reliability of the study has revealed that the detected variables have got $\lambda \geq 0.70$, which is the minimum required level. According to Hair, *et al*., 2017, Hair *et al*., 2011, the least required criteria for composite reliability is 0.7 and average variance extracted is 0.5 correspondingly. Hereafter, the results specify – as according to Hair *et al.,* (2011) – that the measurement model constant within and the detected items or variables measured their corresponding latent variables (Hair *et al.,* 2011). The composite reliability (CR) for the variables' innovativeness, proactiveness, risk-taking, competitive aggressiveness, autonomy, outbound innovation and firm performance are 0.924, 0.837, 0.928, 0.920,

Table 3. Respondents Socio-demographic characteristics

Variables		Frequency	Percent
1-4	Age of the company	160	42.5
5-9		126	32.0
10-14		81	19.7
15 & above		24	5.8
Total		391	100.0
Male	Gender	225	57.3
Female		166	42.7
Total		391	100.0
Large more than 200 employees	Size of the Firm	208	52.9
Medium less than 200 and more than 75		157	40.8
Small less than 75		26	6.3
Total		391	100.0
Top Management	Position in the Firm	142	34.71
Middle Management		140	36.40
Lower Management		109	28.88
Total		391	100.0
Diploma	Educational Background	30	7.3
Degree		144	35.0
Master's		217	54.9
Total		391	100.0
1-5	Working Experience	255	65.3
6-10		71	17.7
11-15		65	16.0
Total		391	100.0
Muar	Location of company	181	45.1
Batu Pahat		61	16.3
Kluang		45	11.2
Johor Bahru		28	6.6
Segamat		76	20.9
Total		391	100.0

Source: own study.

0.799, 0.887, and 0.925 respectively. Similarly, AVE ratios of study constructs innovativeness, proactiveness, risk-taking, competitive aggressiveness, autonomy, outbound innovation and firm performance are 0.669, 0.531, 0.683, 0.659, 0.513, 0.662and 0.673 in that order. All the AVE are above the recommended minimum of 0.5 (Bagozzi & YI, 1988; Hair *et al.,* 2014; Memon & Rahman, 2013).

By examining the factorial load of the items and AVEs, the number of iterations of the measurement model convergence were weighted for convergent validity as according to Wong, (2013), Memon, Ting, Ramayah, Chuah and Cheah (2017) and Hair et al., (2017). The items should sustain a higher load on their principal construct for successful convergence and must not hold a high load on other variables. The convergence validity criterion for the load factor must be 0.7 or greater (Hair *et al.,* 2017). Further, Hair *et al.,* (2011) advise that loads of items lower than 0.4 must be dropped. Nevertheless, Hair *et al.,* (2013) recommende that if the AVE ≥ 0.5 is succeeded, the items with a loading of ≥ 0.4 can be retained. The item loadings with 0.4 and beyond were retained in this research.

The Table (Appendix A) presented that maximum factor loadings are ≤0.7. Two items are less than 0.7 suggested threshold, but those items were retained, because of the AVEs surpassed the essential threshold as indicated in Hair *et al*., (2017; 2013). Furthermore, factor loads of the variables were less than 10 iterations, according to Wong (2013), which lower the 300 iterations. Hence, the measurement model defines the convergence validity of the study.

The discriminant validity is distinct as that each construct is significantly different from other constructs that are non-theoretically linked. According to Fornell and Larcker (1981), this is the primary proof that the square root of the AVE is greater than that of the collective variances amid the structure as well as other model structures (Mason & Perrault, 1991). The diagonal entries that reflect the square root of each construct's AVE are greater than that of the inter-correlations with certain factors in the model. The highest inter-correlations ratios were among EOCA and EOA with a value of 0.481. None of the values from diagonal view exceed that of inter-correlated main scores. Moreover, for additional authentication of discriminant validity, we embraced the 'Heterotrait-Monotrait' (HTMT) technique. Henseler and Sarstedt (2013) find the HTMT method the most conservative and adequate method for discriminative valuation. The rule of thumb for HTMT validity shows that the relationship between target variable and other are (r<HTMT0.85) which is below than 0.85 (Henseler, *et al.,* 2009; Kline, 1994). The highest value recorded on the diagonal of EOCA and row of EOA was 0.593. As revealed in the results, all recorded values are less than (r<HTMT0.85) lower than HTMT0.85 thresholds, which further substantiate the effectiveness of the constructs and discernment is being established.

Outer (structural) model

The achievement of the first step in the PLS-SEM assessment procedure is now the comprehensive valuation of the second step structural model. This assessment model is a five-step process. This contains collinearity assessment, significance check of the relationship among structural model, R-square assessment, effect size f^2 assessment and 'model's predictive relevance (Hair *et al.,* 2011). Table 4 illustrates the assessment of the structural models of the research.

Table 4. Path coefficient

Path	Beta (β)	Standard Deviation (STDEV)	T Statistics	P-Values	F-Square	Decision on Hypotheses
EOA -> FP	0.094	0.094	1.000	0.318	0.009	Not Accepted
EOA -> OUTBI	0.050	0.114	0.439	0.661	0.002	Not Accepted
EOCA -> FP	0.128	0.053	2.414	0.016	0.014	Accepted
EOCA -> OUTBI	-0.088	0.056	1.561	0.119	0.006	Not Accepted
EOIN -> FP	-0.219	0.057	3.847	0.000	0.042	Accepted
EOIN -> OUTBI	0.219	0.054	4.083	0.000	0.039	Accepted
EOPR -> FP	0.006	0.086	0.066	0.948	0.000	Not Accepted
EOPR -> OUTBI	0.089	0.062	1.436	0.152	0.007	Not Accepted
EORT -> FP	0.186	0.053	3.528	0.000	0.033	Accepted
EORT -> OUTBI	0.273	0.051	5.382	0.000	0.067	Accepted
OUTBI -> FP	0.350	0.043	8.078	0.000	0.136	Accepted

Source: own study.

Table 4 presents path coefficients (Beta), T-values, P-values, and respective F-square. The table shows direct relationships among the study variables. The highest positive path relationships were among outbound innovation and firm performance. Likewise, other positive path relationships were risk taking-outbound innovation, risk taking-firm performance, innovativeness-outbound innovation, innovativeness-firm performance and competitive aggressiveness-firm performance. Hypothesis H1a states that innovativeness affects firm performance, the result shows positivity (β=-0.219, t=3.847, p<0.05). Similarly, other positive results are risk-taking, competitive aggressiveness and outbound innovation with firm performance. The results for these hypotheses are, H1c risk-taking (β=0.186, t=3.528, p<0.05), H1e competitive aggressiveness (β=0.128, t=2.414, p<0.05), H2 outbound innovation (β=0.350, t=8.078, p<0.05). The associations among outbound innovation and entrepreneurial orientation dimension were

also drawn. The positive correlations were among innovativeness and risk-taking with outbound innovation. Findings for the H3e innovativeness were β=0.219, t=4.083, p<0.05 and for H3d risk-taking – β=0.273, t=5.382, p<0.05. Both the hypotheses H1b and H1d showed a non-significant relationship with firm performance. While EO dimensions with outbound innovation, H3a autonomy, H3b competitive aggressiveness, H3c Proactiveness also showed non-significant relationships.

In this regard, Cohen, Manion, and Morrison (2013) recommend that an R-squared value from 0.1 to 0.12 may be considered low, a value ranging from 0.13 to 0.25 is considered medium, and 0.26 or above is considered important. The company's average R-square on performance value is 0.265, which shows that independent variables explain 26.5% of the performance variations while outbound innovation R-square value is around 0.179, which is an explanation of around 18%. The association among independent variables and dependent variables are considered above the imperative threshold. Nevertheless, through outbound innovation, the value displays moderate effects. These assessments are used to conclude the influence of a single exogenous construct on their respective endogenous construct R-square value (Hair *et al.,* 2017).

Mediation assessment in the relationship

In this article, the outbound open innovation was defined as a mediator in the relations among the entrepreneurial orientation dimensions, *i.e.* innovativeness, Proactiveness, autonomy, risk taking, competitive aggressiveness and firm performance. Hypotheses were formulated with each construct with outbound innovation as mediation. Table 5 shows the mediation effects on each construct of EO with firm performance.

Table 5. Mediation path coefficient

Path	Original Sample (O)	Sample Mean (M)	Standard Deviation (STDEV)	T Statistics (|O/STDEV|)	P Values	Decision on Hypotheses
EOA -> FP	0.018	0.003	0.040	0.438	0.662	Not Accepted
EOCA -> FP	-0.031	-0.022	0.019	1.581	0.115	Not Accepted
EOIN -> FP	0.077	0.072	0.021	3.671	0.000	Accepted
EOPR -> FP	0.031	0.030	0.022	1.424	0.155	Not Accepted
EORT -> FP	0.095	0.091	0.021	4.594	0.000	Accepted

EOA, Entrepreneurial Orientation Autonomy, EOCA, Entrepreneurial Orientation Competitive Aggressiveness, EOIN, Entrepreneurial Orientation Innovativeness, EOPR, Entrepreneurial Orientation Proactiveness, EORT, Entrepreneurial Orientation Risk-Taking, FP, Firm Performance.
Source: own study.

This article embraced Preacher and Hayes (2008) recommendations to measure the mediation impact. The article employed a two-step approach. The first step is a two-way calculation of all direct path effects. The former step is conducted mediator as an indirect relationship goes through the mediator. All the effects are measured in the second level, and their values are determined by bootstrapping. Table 4 shows the EO constructs Beta (β), t-statistics, and p-value on FP with outbound innovation as mediation. Furthermore, to tests the significance bootstrapping procedure was adapted with 5000 irritations. The significantly positive path coefficients were between innovativeness and risk-taking. There are significant results for H4c innovativeness, (β=0.077, t=3.671, p<0.05), H4e risk-taking, (β=0.095, t=4.594, p<0.05). However, outbound innovation did not show positive mediation effects among other EO-FP relationships, such as H4a autonomy, H4b competitive aggressiveness, and H4d proactiveness. Consequently, in mediation tests, only H4c and H4e hypotheses were supported according to the results. While H4a, H4b and H4d hypotheses illustrate a non-significant relationship, the hypotheses were not supported.

Discussion

This research, expanding the OI paradigm, explicates and measures the impact of OI's direct and mediating inputs on EO and firm performance. The results are consistent with the current OI literature demonstrating the complex connection among outbound innovation and EO dimensions and firm results by investigating Malaysian furniture manufacturers through building measuring items and evaluating their strength by evolving outbound innovation. This study also adds to the current Open Innovation literature by stating outbound parameters for innovation based on previous theoretical foundations (Lichtenthaler, 2015). This article's results have two-dimensional implications. The initial findings are direct ties between entrepreneurial orientation dimensions with business performance and outbound open innovation. Hence the results are found consonant with the findings of (Casillas & Moreno, 2010; Wang & Yen, 2012; Yoo, Sawyerr, & Tan, 2016; Cannavale & Nadali, 2019; Jeong *et al.,* 2013; Carvalho, 2016; Carvalho and Sugano, 2016). All the indirect (mediation) relations among the study variables were the second part of the results. The findings of the article displayed mixed findings. The positive mediation associations are consistent with the article results (Carvalho, 2016; Carvalho and Sugano, 2016), whereas the other non-significant mediation outcomes are not consistent with the above studies. Overall, our findings affirm the value of outbound innovation in terms of entrepreneurial orientation and firm performance.

Hypothesis H1a states that innovativeness affects firm performance, the result shows positivity, which is consistent with the previous studies such as Akbar, Khan, Wadood, and Bon Bin, 2020; Cannavale and Nadali, 2019; Yoo *et al*., 2016; Wang and Yen, 2012; Casillas and Moreno, 2010. The results for hypotheses are H1c risk-taking, H1e competitive aggressiveness, H2 outbound innovation are supported. The finding of the study is in line with previous studies such as Akbar, *et al*., 2020; Cannavale and Nadali, 2019. The relationships between entrepreneurial orientation dimension and outbound innovation was also drawn. The positive correlations were among innovativeness and risk-taking with outbound innovation. Findings for the H3e innovativeness, and H3d risk taking. These findings are also consistent with Jeong *et al.,* (2013); Carvalho, (2016) and Carvalho and Sugano, (2017). The hypotheses H1b proactiveness, H1d autonomy, shows non-significant relationship with firm performance, which is departing from the current literature such as Cannavale and Nadali, (2019); Yoo *et al.,* (2016); Wang and Yen, (2012) and Casillas and Moreno, (2010). While EO dimensions with outbound innovation, the hypotheses H3a autonomy, H3b competitive aggressiveness, H3c proactiveness also showed non-significant relationships, which departed from literature such as the finding of Carvalho, (2016) and Carvalho and Sugano, (2017).

Consequently, in mediation evaluation, only H4c and H4e hypotheses were supported according to the results. Hypotheses. These results depart from previous studies (Akbar *et al.,* 2020; Carvalho, 2016). However, outbound innovation did not show positive mediation effects among other EO-FP relationships, for example, H4a autonomy, H4b competitive aggressiveness, H4d Proactiveness. While H4a, H4b, and H4d hypotheses illustrate a non-significant relationship, the hypotheses were not accepted. Hence, departing form the literature (Akbar *et al.,* 2020; Carvalho, 2016).

In brief, for academics and entrepreneurs, the association among EO and firm performance with outbound open innovation is crucially significant. By undertaking outbound open innovation initiatives, companies will achieve positive results, if innovative strategic actions are carried out under control environment. Also, to minimise potential risks and capture significant benefits, competent internal management of outbound OI is important. In this regard, to supplement emphasis of the previous studies on inbound OI and entrepreneurial orientation, further research on outbound OI is necessary. A recent study offers valuable guidance for future studies (Akbar, *et al.,* 2020b; West & Bogers, 2017; Brunswicker & Vanhaverbeke, 2015; Lichtenthaler, 2015; West, *et al.,* 2014; Huizingh, 2011). Hence, detailed analysis of the different elements of outbound OI with resultant firm's performance on current and entrepreneurial orientation dimensions will be a significant step. Furthermore, detailed analyses of internal and external influences concerning the intensity and direction of those effects will significantly enhance insights into the importance and function of open outbound innovation with different variables.

Theoretical implications

Such findings contrast with those of Lichtenthaler (2009b) according to whom outbound OI had a substantial influence on company's success. The following factors may cause variability in outcomes. Firstly, Lichtenthaler (2009b) was the first to use return on sales (ROS) to evaluate company productivity, but this analysis utilised Tobin's q to explain long-term company success (Lin *et al.,* 2006; Lee & Grewal, 2004; Chung and Pruitt, 1994). Using Chesbrough (2003) and similar research, this study defines multi-dimensional concepts and produces accurate measures to weigh the dimensional value of outbound OI. Secondly, as opposed to American or European businesses, Asian companies have a relative advantage in technological competence, despite having a lower level of market experience. This result implies that Malaysian companies have a cautious mind-set towards EO compared to their strategy to outbound innovation since they merely practise such tactic at the early juncture and prerequisite to acquire further experience and acquaintance to participate in this approach. In conclusion, the outcome does not emphasise the weight of outbound OI on company performance; companies must be cognisant of the constraints whereby outbound OI's strength is particularly significant.

Manufacturing companies, which are typically one of the most technology-intensive companies, are the focus of this report. At the same time, open innovation values and practices can be applied to various enterprises. As a result, the experiences from this research can be helpful to former segments of the economy, like the service industry and emerging countries. Furthermore, because of the effects of inadequacies in technology markets, most companies do not engage in entrepreneurial activities or outbound innovation, as external technology utilisation is more difficult than product or service commercialisation. The government would prosper from the transformation of technology operations, the stabilisation of the technology sector, and the resulting open environment of innovation because both entrepreneurial focus and outbound innovation are beneficial for companies and, therefore, for the overall economy. Business leaders will further address dissent by creating legislation that safeguards intellectual property rights.

Limitations and future study

This research provides guidelines for future research, but it also has its limitations. Firstly, sample is limited to Malaysian furniture manufacturers. They are not as large as their partners nor do they have the same advanced technology and marketing experience, as they primarily work with top-tier multinational corporations. To improve the generalisation of the current results, future research in diverse segments and areas are highly recommended. In-depth study from different sector of the economy is necessary to validate and generalize the findings in this area to enhance body of knowledge of entrepreneurial orientation and outbound innovation.

Thirdly, previous research has shown that performance evaluation is a complex occurrence which requires a multi-dimensional approach, which is particularly true in open innovation research. Fourthly, by inspecting the mediation impact of outbound innovation on the bond among business and consumers, the contemporary research purpose to learn how businesses can perform EO further efficiently and easily. Future studies should investigate the concurrent impact of introducing entrepreneurial behaviour and outbound innovation. Researchers are advised to look at the meaning of the two OI components as mediators, such as organisational, cultural, and leadership factors (Akbar, *et al.,* 2020; Akbar *et al.,* 2021).

CONCLUSIONS

This research has far-reaching significance for management. Because the structure and ideas broaden the comprehension of open strategic management to managers transcend closed innovation, which provides a significant theoretical and empirical framework that can be used to managers in other industries as an analytical approach. This article refers to previous literature recommendations concerning entrepreneurial orientation about furniture manufacturing industry, which plays a very important

role in the current hyper-competitive environment specifically for young entrepreneurs. Because globally, entrepreneurs are the focused area of all rapidly developing economies. On the other hand, technology is rapidly changing its design and value, which also increases interest in the field of study.

Existing literature records the extensive use of open practices in innovation. This article enhances our understanding of this phenomenon and contributes to existing entrepreneurship, open innovation and firm performance research. This article provides a model for explaining the effect on open innovation and firm performance of entrepreneurial orientation. Research capacity is enormous at the crossroads of entrepreneurial theory, innovation and performance evaluation. This work constitutes a point of departure for future theoretical growth and progress.

The findings also bestow to the literary work regarding open innovation and entrepreneurial orientation. Firstly, we verified the value of the competitive dimension of aggression identified by (Akbar *et al.,* 2020; Dess & Lumpkin, 2005), which supports the competitive dimension of aggressiveness. According to Gündoğdu (2012), existing traditional entrepreneurs should also become entrepreneurs to escape the possibility of being excluded by the system. Innopreneurs are entrepreneurs who transform into partnership and innovation. Hence, we propose that our system constructs can be combined into a single tool: open innopreneurial orientation. We are also contributing to potential experiments on new ideas. Overall, most of the previous studies has established positive relation among EO concerning performance. In a nutshell, we can conclude that the findings of the study will provide a basis for future research work on EO-Performance and outbound innovation concepts in different areas.

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Appendix A:

Variables	EOA	EOCA	EOIN	EOPR	EORT	FP	OUTBI
EOA1	0.664						
EOA3	0.799						
EOA4	0.892						
EOCA1		0.806					
EOCA2		0.880					
EOCA3		0.852					
EOCA4		0.897					
EOCA5		0.750					
EOIN2			0.801				
EOIN3			0.817				
EOIN4			0.778				
EOIN5			0.818				
EOIN6			0.812				
EOIN7			0.824				
EOPR1				0.657			
EOPR2				0.954			
EOPR3				0.940			
EORT1					0.812		
EORT2					0.786		
EORT3					0.811		
EORT4					0.882		
EORT5					0.815		
EORT6					0.820		
FP1a						0.861	
FP2a						0.853	
FP3a						0.730	
FP4						0.850	
FP6						0.857	
OutI1a							0.830
OutI2a							0.814
OutI3a							0.794
OutI5a							0.779

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Conflict of Interest

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

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