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## Entrepreneurial Orientation, Market Orientation, Customer Orientation and Innovation Performance: A Cross-Cultural Meta-Analysis

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### Abstract

**Research aim:** Existing research has yielded inconclusive results regarding the relationship between entrepreneurial orientation, market orientation, customer orientation, and innovation performance. As a result, the focus of this article is to conduct a quantitative review of entrepreneurial orientation, market orientation, customer orientation, and innovation performance based on existing literature findings to assess the impact of this relationship and the potential impact of moderating factors on this relationship.

**Research methodology:** A total of 35 studies were collected and analyzed. A meta-analytic technique was used to evaluate the association between entrepreneurial orientation, market orientation, customer orientation, and innovation performance. The influence of potential moderating variable factors was investigated further.

**Research findings:** According to the findings, entrepreneurial orientation, market orientation, and customer orientation all have a significant and beneficial impact on innovation performance. Furthermore, industry moderators influence the association between entrepreneurial orientation, market orientation, and innovation performance, whereas culture moderators influence the relationship between customer orientation and innovation performance.

**Research originality:** Meta-analysis was used to explore possible mechanisms linking entrepreneurial orientation, market orientation, customer orientation and innovation performance, discussing research findings and offering future research directions.

**Keywords:** *Cultural dimensions, Customer orientation, Entrepreneurial orientation, Market orientation, Innovation performance.*

### Introduction

New entrepreneurial opportunities are emerging in the intense market environment and technological changes characterized by digitization. Not only do entrepreneurs and start-ups promote entrepreneurship with innovation and risk-taking at its core, but incumbent companies also emphasise corporate entrepreneurship (Jiang et al., 2021). Entrepreneurial orientation (EO) as an organizational structure has been a dynamic topic for decades (Covin and Lumpkin, 2011, Covin and Wales, 2019). It is a strategic approach aimed at enhancing the company's ability to deal with the unpredictability of the external environment and various risk issues. It is an entrepreneurial trait reflected in the company's decision-making style, decision-making procedures, and specialized practises (Lumpkin and Dess, 1996,

Lomberg et al., 2017). The meta-analysis by S. Kraft and Bausch (2016) confirms that flexibility in hotel innovation requires Market orientation (MO) and EO. Entrepreneurial orientation significantly impacts organisations' innovative behaviour, and firms with a high entrepreneurial orientation gain a competitive advantage through ongoing innovative activity, strategic positioning ahead of the competition, and a higher risk tolerance (Avlonitis and Salavou, 2007). Several meta-analyses have confirmed its positive impact on firm performance (Soares and Perin, 2020, Saeed et al., 2014) as well as antecedent meta-analyses examining entrepreneurial orientation (Rostain, 2021).

Market orientation is a strategic orientation intended to enhance the firm's overall grasp of market information and to improve the firm's internal innovation capabilities (Shergill and Nargundkar, 2005). It is possible to ensure consistency between the strategic and the execution levels, which are closely related to the enterprise's external environment and organizational learning. MO and EO are part of the same strategic orientation of the enterprise, which is the enterprise's organizational learning and selection mechanism (Atuahene-Gima and Ko, 2001). According to Erdil et al. (2004), the correlation between market orientation and innovation performance is low, and the correlation coefficient between the two is less than 0.3. Market orientation's impact on corporate innovation has received much attention in the strategy and innovation field. Scholars have performed several theoretical and empirical research but have not come to a consensus.

Narver and Slater (1990) argue that customer orientation is fundamental to organizational adaptation to a market-oriented culture. Slater and Narver (1998) define customer orientation as satisfying customers' needs and is considered a short-term concern while being essentially reactive, clearly distinguishing between market orientation and customer orientation. This study joins customer orientation (CO) and innovation performance (IP) to analyze the differences in the relationship between MO and CO respectively with innovation performance and the potential moderating variable effects.

Whether businesses should investigate the distinct effects of EO, MO, and CO on innovation performance independently and the existence of differences before adopting them together to pursue innovation was investigated. This study examines the relationship between EO, MO, CO and IP whilst identifying potential moderating variables' effects. This study used a meta-analysis approach by statistically analyzing quantitative results from the literature. Overall, a total of 35 independent empirical studies for meta-analysis were involved. The relationship between EO, MO, CO and IP is verified at a more integrated level.

### **Theoretical background and hypotheses**

#### *Entrepreneurial orientation and innovation performance*

Formerly, one-dimensional EO consisted of innovativeness, risk-taking, and proactiveness, which must be positively associated with EO in order to be represented (Montiel-Campos, 2018, Miller, 2011, Covin and Slevin, 1989). The second concept, multidimensional EO, considers two more major EO dimensions: competitive aggressiveness and autonomy (Lumpkin and Dess, 1996, Montiel-Campos, 2018). The third one is proposed by Anderson et al. (2015) as a joint demonstration of observed entrepreneurial behaviour (innovativeness and initiative) and managerial tendencies at the strategic decision level, favouring actions with uncertain outcomes (risk-taking).

Lumpkin and Dess (1996) distinguish between entrepreneurial orientation and innovation, arguing that innovation is a new entry, while entrepreneurial orientation focuses on how this innovation is achieved. Covin and Slevin (1991) argue that the entrepreneurial orientation of firm leadership reflects the overall strategic orientation, and this strategic orientation has important implications for how firm leadership

interprets and responds to environmental change. The innovative behaviour of firms is rooted in entrepreneurial orientation, and the success of a firm's innovative activities is a concrete response to its entrepreneurial orientation (Avlonitis and Salavou, 2007). Many firms view innovation as an important behaviour to survive in a rapidly changing business environment (Lyon et al., 2000), and existing studies suggest that entrepreneurial orientation is beneficial to improving high-tech firms' performance (Xianming et al., 2017, Zhai et al., 2018). Therefore, this study proposes the first hypothesis:

**H1:** Entrepreneurial orientation is positively related to performance in innovation.

*Market orientation and innovation performance*

Narver and Slater (1990) suggest that market-oriented companies rely on shared employee values and norms and effective organizational process integration to create superior value for buyers and sustained superior performance for the firm. Kohli and Jaworski (1990) define MO as three types of information behaviours: intelligence generation (market information about current and future customer needs), intelligence dissemination (dissemination and diffusion of market information among different departments), and responsiveness (reacting to market information promptly at the organizational level). Deshpandé and Farley (1998) adopted customer-centric MO, MO as an aspect of organizational culture that creates more value for customers through cross-functional processes and behaviours that continuously track market needs.

Baker and Sinkula (2009) showed that market-oriented strategies enhance firms' innovation performance by inducing innovative behaviors. Leonard- argued that a market-oriented approach focusing excessively on current customer needs reduces firms' motivation to innovate, reducing their new product development performance. Based on the above, the following hypotheses are proposed in this study.

**H2:** Market orientation is positively related to performance in innovation.

*Customer Orientation and innovation performance*

Saxe and Weitz (1982) defined customer orientation as a complement to the market perspective at the individual level, whereas Slater and Narver (1994) defined customer orientation as an organizational culture characterized by the ability to deliver superior value to customers consistently. In Kumar et al. (2000) study, it was argued that companies should define customer needs from the customer's point of view and that all departments in the company should work together to meet customer needs. Companies acquire the most up-to-date market data to develop products and services that satisfy customer requirements and necessitate new approaches. Consequently, the function of customer orientation in fostering innovative performance is self-evident.

Yang and Tsai (2019) found that customer orientation contributes to firm innovation performance, and in Ernst et al. (2011) study, it was noted that firms invite customers to participate in the development of new products, which in turn increases development costs and is detrimental to firm performance. Based on the above, the following hypotheses are proposed in this study.

**H3:** Customer Orientation is positively related to performance in innovation.

**Moderators**

*Industry type*

Different industries differ significantly in the products they offer, the resources they invest, the needs of their customers, the environment they face, and the structure of their organizations. For instance,

innovation in manufacturing necessitates multiple links, high investment, high risk, and the monopoly of a few large corporations.(Fang and Yanyun, 2014). Gray and Hooley (2002) point out that the market orientation on firm performance is more pronounced in the service sector because of the face-to-face sales model of service firms.In contrast, innovation is simpler to introduce and imitate in the service industry, it is more dependent on valuable information from customer feedback(Atuahene-Gima, 1996).The same degree of EO,MO, and CO will produce different innovation performances in different industries. Based on the above, this study proposes the following hypotheses.

**H4:** Industry type moderates the relationship between entrepreneurial orientation and innovation performance.

**H5:** Industry type moderates the relationship between market orientation and innovation performance.

**H6:** Industry type moderates the relationship between customer orientation and innovation performance.

#### *Country's economic development level*

Entrepreneurial orientation is a resource-consuming business strategy (Covin and Slevin, 1991). Its successful implementation requires significant resources, good infrastructure, and sound social institutions, without which it is difficult for firms to translate entrepreneurial strategies into actual business performance. In developed regions, well-established market mechanisms and systems provide companies with stable product marketplaces and ensure the movement and distribution of technology, capital, and other resources among businesses. Suppose companies are in an environment with relatively abundant economic resources that can well support the implementation of market-oriented strategies. In this instance, they can significantly enhance their role in stimulating the development of new products and services and contribute to market-driven implementation(Bin and Zhihe, 2016). Despite the relative lack of resources and economic environment in developing nations, businesses may have additional entrepreneurial or inventive opportunities. Cong and Xie (2013) also pointed out in a previous study that the firm's location significantly affects the relationship between market orientation and innovation performance. Therefore, we believe that the relationship between EO,MO,CO and innovation performance in developed and developing countries may have some inconsistency. Based on the above, this study proposes the following hypothesis.

**H7:**Country's economic development level moderates the relationship between entrepreneurial orientation and innovation performance.

**H8:** Country's economic development level moderates the relationship between market orientation and innovation performance.

**H9:** Country's economic development level moderates the relationship between customer orientation and innovation performance.

#### *Cultural moderators*

The practice-culture fit management theory underpins the claim that national culture influences corporate conduct and results (Naman and Slevin, 1993). We used Hofstede's cultural framework for cross-cultural meta-analysis, e.g., Watts et al. (2020). Hofstede (1980) argues that it is only meant to study culture at the national level, dividing it into five dimensions: Individualism /Collectivism、Power Distance、 Uncertainty Avoidance, Masculinity/Femininity and Long-Versus/Short-Term Orientation.

### *Power Distance*

Hofstede et al. (2010) suggest that power distance is frequently reflected in the degree of authority and resource concentration. In cultures with a high power distance, organisational structures are often formal and centralised, with clearly defined hierarchical structures. In contrast, in low power distance cultures, the organisation's structure tends to be informal, decentralized, and organically flexible (Hofstede, 1984b). The basic characteristics of entrepreneurial orientation are consistent with the basic characteristics of low power distance cultures, such as empowerment, flexibility, communication, support, and participation (Nakata and Sivakumar, 2001). This line of reasoning suggests that a low power distance culture is more conducive to the effective transformation of entrepreneurial orientation as a strategy to corporate performance. Strychalska-Rudzewicz (2016) and Andrijauskienė and Dumčiuvienė (2017) realized that low levels of power distance were connected with organisational innovation, whereas high levels of power distance were not. In addition, Kouriloff (2000) argues that certain entrepreneurship-related activities, such as new product development, are more likely to succeed in more decentralized organizations. Kaasa (2017) presents similar findings, arguing that a low power distance culture emphasizes subordinates' autonomy in the decision-making process (related to motivation) and promotes innovation and invention, increasing market and customer orientation effectiveness. Besides, Guilbault and Omanwa (2014) also argued that it is more challenging to pursue decent customer service in countries with high power distance (such as India) than in countries with low power distance (such as U.S.). Based on the above, this study proposes the following hypothesis.

**H10a:** Power Distance moderates the relationship between entrepreneurial orientation and innovation performance.

**H10b:** Power Distance moderates the relationship between market orientation and innovation performance.

**H10c:** Power Distance moderates the relationship between customer orientation and innovation performance.

### *Uncertainty Avoidance*

Hobfoll (1989) showed that uncertainty avoidance varies considerably across countries, organizations, and national cultures. Uncertainty avoidance (UAV) is the degree to which one feels threatened by uncertain situations and tries to avoid them by intolerant deviant thoughts and behaviours through believing in absolute truth and expertise (Hofstede, 1980). Cultures with high uncertainty avoidance emphasize stability, predictability, risk aversion, resistance to change, reliance on strict control systems, and fear of future unknowns (Hofstede, 1984b). This cultural environment is incompatible with entrepreneurship's innovation, risk-taking, and forward-thinking characteristics, which can impede the effective implementation of entrepreneurially oriented strategies (Nakata and Sivakumar, 2001). In contrast, cultures with low uncertainty avoidance are risk-taking, innovative, adaptable, comfortable with the unknown, and enthusiastic about the future (Hofstede, 1984a). Herbig and Miller (1991) argue that radical innovation is more likely to be valued and effectively implemented. In such a cultural environment, EO, MO, and CO advantages are more effectively utilized, and new ideas and concepts are more readily accepted, facilitating the identification, development, and exploitation of new opportunities. Based on the above, this study proposes the following hypotheses.

**H11a:** Uncertainty Avoidance moderates the relationship between entrepreneurial orientation and

innovation performance.

**H11b:** Uncertainty Avoidance moderates the relationship between market orientation and innovation performance.

**H11c:** Uncertainty Avoidance moderates the relationship between customer orientation and innovation performance.

#### *Individualism/Collectivism*

According to Hofstede (1984b), individualism emphasizes the sense of "I", autonomy, private rights, personal initiative, universalism, etc., personal initiative, self-development, personal fulfilment, autonomy, self-reliance, personal privacy, and self-esteem (Samovar et al., 2016). Collectivism emphasizes the sense of "we", collective identity, responsibility and obligation, group solidarity, particularism, close links between individuals and other group members, and loyalty and dependency on the group (Jin, 2013). People in individualistic cultures value autonomy, self-expression, independence, and performance-based compensation systems (Hofstede, 1984a), and collectivist cultures emphasize values of conformity, coordination, harmony, and sacrifice (Beechler and Yang, 1994). Although entrepreneurial orientation-related behavioral traits are more prevalent in countries with an individualistic orientation, they appear to integrate well with collectivist cultures. Multiple researchers contend that Japanese firms with a clear collectivist orientation have a high degree of vision and goal cohesion. They tend to work in project teams, mixed marketing and R&D teams, and new product development teams, and have a greater likelihood of success in entrepreneurial-related activities (Howard et al., 1983, MacDowall, 1984). Based on the above, the following hypotheses are proposed in this study.

**H12a:** Individualism/Collectivism moderates the relationship between entrepreneurial orientation and innovation performance.

**H12b:** Individualism/Collectivism moderates the relationship between market orientation and innovation performance.

**H12c:** Individualism/Collectivism moderates the relationship between customer orientation and innovation performance.

#### *Masculinity/Femininity*

Masculinity is more associated with the elements of competition, achievement, recognition, and challenge. In contrast, femininity is more associated with relationships, dependence, and group orientation (Hofstede et al., 2010), and the characteristics of entrepreneurial orientation seem to be better integrated with the intrinsic meanings of femininity-prone cultures. Deshpandé et al. (1993) and Hunt and Morgan (1995) argue that firms in a feminist culture are more willing to stay in touch with external stakeholders, which facilitates identifying opportunities and acting ahead of time. Additionally, the ability of employees to create external relationships and observe the market is strengthened, hence enhancing their capacity to perceive and manage risk. Moreover, a culture with a feminine bias can foster an environment where employees collaborate and support one another through communication, cooperation, and trust, thereby improving their inventiveness and willingness to take risks (Thwaites, 1992). Firms in masculine-inclined cultures are more likely to be formalized and centralized, with strict hierarchical hierarchies at the top and bottom of the hierarchy. Thomas and Mueller (2000) study suggested that these organizational characteristics can harm the relationship between entrepreneurial

orientation and firm performance.

**H13a:** Masculinity/Femininity moderates the relationship between entrepreneurial orientation and innovation performance.

**H13b:** Masculinity/Femininity moderates the relationship between market orientation and innovation performance.

**H13c:** Masculinity/Femininity moderates the relationship between customer orientation and innovation performance.

People focus on the current and immediate future in short-term cultures, whereas in long-term cultures, people plan and invest for the future (Hofstede, 1984a). Similar to Cano et al. (2004), who hypothesized that the relationship between market orientation and firm performance is positively moderated by collectivism, long-term orientation is expected to impact the relationship. Firms in long-term-oriented countries can generate greater capacity and resources, and firms in long-term countries EO, MO, and CO are more innovative and create more products and solutions for their customers (Selnes et al., 1996). This study adds Long/Short Term Orientation as a moderating variable based on the above.

**H14a:** Long-/Short-Term Orientation moderates the relationship between entrepreneurial orientation and innovation performance.

**H14b:** Long-/Short-Term Orientation moderates the relationship between market orientation and innovation performance.

**H14c:** Long-/Short-Term Orientation moderates the relationship between customer orientation and innovation performance.

**Materials and Methods**

*Literature search and data collection*

Document search using the definitions of EO, MO, CO and IP and different keywords, independent variable search keywords "entrepreneurship orientation", "market orientation", "customer orientation", dependent variable keywords. "innovation performance" "performance" "innovation" "innovation outcome", "firminnovation". These keywords were derived from various articles, and complementary search strategies were used to identify and retrieve previously published researches. Through the search strategy, the following digital databases were first analysed: Google Scholar, ISI Web of Knowledge, EBSCO, JSTOR, Elsevier, Springer, Emerald and Wiley databases. A snowballing procedure was used in this study, with the latter database supplementing the articles not retrieved in the previous database in a sequential progression of supplemental data. Total 411 articles were obtained through the search strategy, and 35 articles were further extracted for analysis, with an adoption rate of 8.5%, published articles spanning from 2003 to 2021, and the most used research method was PLS-SEM.

**Table1:** Analysis methods in sampled articles.

| <b>Analysis Method</b>           | <b>Total</b> |
|----------------------------------|--------------|
| PLS-SEM                          | 10           |
| hierarchical regression analysis | 8            |
| regression analysis              | 5            |
| SEM                              | 3            |
| ordinary least squares           | 2            |
| stepwise regression analysis     | 2            |

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|                                  |   |
|----------------------------------|---|
| covariance structure analysis    | 1 |
| factor analysis                  | 1 |
| path-analytic framework          | 1 |
| Simultaneous regression analysis | 1 |
| Tobit regression                 | 1 |

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*Note:* SEM Structural equation modelling; PLS-SEM Partial least squares-structural equation modelling

#### *Inclusion Criteria*

The selection criteria for the literature in this paper are: 1. the literature was based on the research context of EO,MO,CO and IP; 2. quantitative studies were used for EO,MO,CO and IP measurement information; 3. there are clear or translatable effect values in the study, such as correlation coefficients, t-values,  $\beta$ -coefficients, etc.; 4. the same research sample cannot be repeatedly coded, and for the use of uniform numbers in different literature, after coding which is more comprehensive to ask literature. Based on these criteria, 35 papers were finally screened for review, and the number of papers evaluated met the minimum requirement for meta-analysis proposed by Hedges and Olkin (2014).

#### *Coding and measure*

To improve data quality under the premise of assuring literature coverage, the retrieved literature must be further filtered and converted into coding information that could be utilized for meta-analysis. The data were independently coded by two researchers and validated against each other. The coding manual includes author's name, year of publication, location, the industry of the sample, and cultural dimensions. The quantitative information includes sample size and effect size, and the effect size commonly used in the management field is the correlation coefficient  $r$ . Therefore, the effect sizes of different forms and types are normalized, i.e., all of them are converted into  $r$  by the formula.

#### *Method of the analysis procedure*

Meta-analysis is a method of summarizing and re-analyzing the results of numerous independent studies in a given research area (Hunter and Schmidt, 2004) to estimate the overall effect size between variables. Consequently, this study employs meta-analysis to synthesize the results of dispersed investigations to explore the overall effects of EO, MO, and CO on innovation performance, as well as the moderating role of moderators. In this study, we conducted tests using comprehensive meta-analysis (CMA) 3.0, including heterogeneity and publication bias tests, and tested the stated hypotheses. The coding table is shown in **Table 5**.

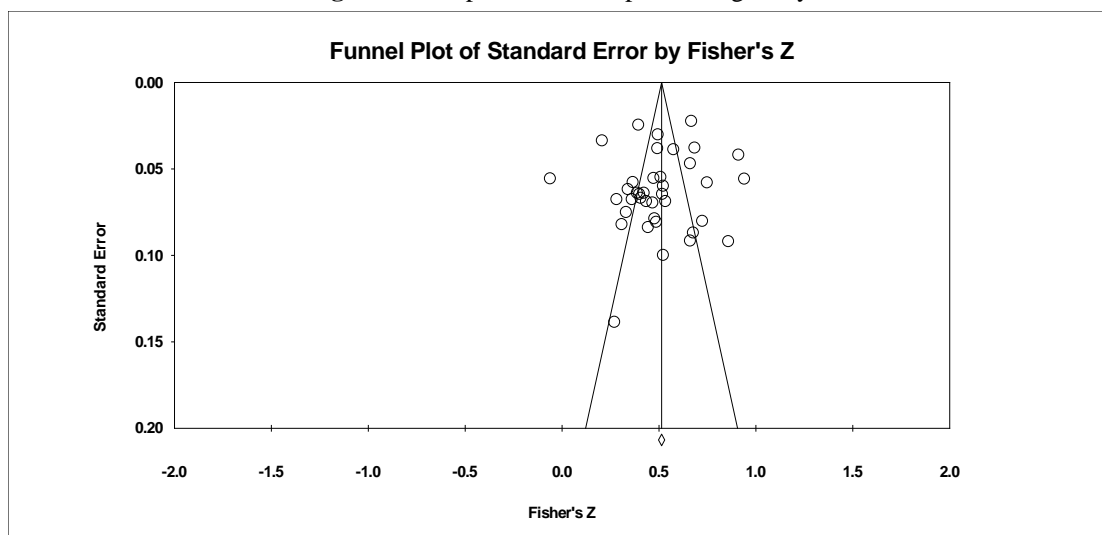
#### *Publication bias*

This study examines the robustness of the meta-analysis based on graphical and statistical methods for publication bias. First, a funnel plot was used to test that the almost symmetric distribution of effect sizes around the mean indicates that the meta-analysis results are free from publication bias (Pigott, 2012). Second, the three most used statistical methods are the fail-safe  $N$  (Rothstein et al., 2006), Egger's regression test (Egger et al., 1997) and the "Trim-and-fill" method (Duval and Tweedie, 2000) to test whether the results are affected by publication bias. From the funnel plot (**Fig. 1**), the funnel plots of the samples on both sides are almost symmetrical. According to this distribution feature, the study



does not have publication bias. The funnel plots can only check publication bias initially from the perspective of subjective observation. To further assure the checking of publication bias more accurately, we conducted the fail-safe N test: according to Rosenthal (1986) study, the significant threshold of fail-safe N at the 95% confidential level is  $N_{fs} > 5 \times \text{sample size} + 10$ , where  $N_{fs}$  is the fail-safe N. In the case of  $\alpha = 0.05$ , for entrepreneurial orientation, 8901 articles with insignificant effect size are required to make the current effect size insignificant,  $Z\text{-value}=40.39779, P<0.001$ , indicating no publication bias. For market orientation, 1672 articles with insignificant effect size were needed to make the current effect size insignificant,  $Z\text{-value}=25.41566, P<0.001$ , and for customer orientation, 1698 articles with insignificant effect size were required to make the current effect size insignificant,  $Z\text{-value}=30.58689, P<0.001$ . Egger's regression test was also performed, and the P-value (2-tailed) was greater than 0.05, indicating no significant publication bias. Outliers were not eliminated because the results of the meta-analysis were not significantly different from the previous analysis.

**Fig. 1:** Funnel plot of the sample heterogeneity.



In order to determine whether there is a significant difference between the sample studies and to select the appropriate model for further study, the heterogeneity of the sample was examined.  $Q$  and  $I^2$  determined the heterogeneity of the sample, if  $Q$  value is significant means there is a systematic difference in the sample. The higher the  $I^2$  value, the higher the heterogeneity, the amount of heterogeneity is 25% (low), 50% (medium) and 75% (high), respectively (Higgins et al., 2003). If there is high heterogeneity, a random effects model was used rather than a fixed effects model (Borenstein et al., 2010). The heterogeneity results are shown in **Table 2**, and the analysis shows that the  $I^2$  of the meta-analysis for Entrepreneurial orientation is 94.6113. This indicates that 94.6113% of the observed variance in the study is due to real differences in the relationship. The  $I^2$  for Market orientation was 94.6113. For Market orientation,  $I^2$  is 91.2096, indicating that 91.2096% of the observed variation in the relationship between Market orientation and innovation performance is due to the real differences in this relationship.

Furthermore, for Customer orientation,  $I^2$  is 89.5017, indicating that 89.5017% of the observed variation in the relationship between Market orientation and innovation performance is due to the real differences in this relationship. The 89.5017% of the observed variance in the study of the relationship between Customer Orientation and Innovation Performance is due to the real differences in this relationship. There is a highly significant difference in the effect size of this study, and we selected a

random effects model for the meta-analysis.

**Table 2:** Meta-analytic results of the main effect

| Random-Effects Model | Sample Size | Studies | Effect Size (R) | 95% CI      |             | Z-Value | P-Value | Q-Statistics | I <sup>2</sup> | Standard Error |
|----------------------|-------------|---------|-----------------|-------------|-------------|---------|---------|--------------|----------------|----------------|
|                      |             |         |                 | Lower Limit | Upper Limit |         |         |              |                |                |
| EO                   | 8394        | 21      | 0.4465          | 0.3659      | 0.5205      | 9.7339  | <0.001  | 371.1439     | 94.6113        | 0.0214         |
| MO                   | 2348        | 10      | 0.4828          | 0.3666      | 0.5841      | 7.2637  | <0.001  | 102.3843     | 91.2096        | 0.0268         |
| CO                   | 4164        | 7       | 0.4765          | 0.3937      | 0.5516      | 9.9413  | <0.001  | 57.1519      | 89.5017        | 0.0122         |

Notes: EO: Entrepreneurial orientation; MO: Market orientation; CO: Customer Orientation

## Results

### Main results

The overall effect detection results are shown in **Table 2**, in the random effect model, the effect size between EO and IP is 0.4465, between MO and IP is 0.4828, and between CO and IP is 0.4765, which are moderately correlated. Approximately 95% confidence intervals are (0.3659, 0.5205), (0.3666, 0.5841), (0.3937, 0.5516), excluding 0,  $p < 0.001$ , **H1**, **H2** and **H3** are significant, indicating that EO, MO, and CO have significant positive effect on firm innovation performance.

### Meta subgroup analysis

According to the heterogeneity test, there is strong heterogeneity among the independent samples in the study, which suggests that potential moderating variables influence the relationship between EO, MO, and CO on innovation performance. Hence, we conducted a subgroup analysis with industry type and Country's economic development level, respectively. The test results are shown in **Table 2**.

The analysis of the relationship between EO and IP, grouped by Industry type, showed that the effect size of the education industry was the highest at  $r = 0.635$  ( $p < 0.001$ ), followed by the effect size of the manufacturing industry at  $r = 0.5029$  ( $p < 0.001$ ), which was higher than other industries, as shown in **Table 3**. The analysis of the relationship between MO and IP showed that the effect size of insurance was the highest at  $r = 0.58$  ( $p < 0.001$ ), and the heterogeneity between groups was significant ( $p < 0.001$ ), supporting **H5**. The relationship between CO and IP analysis showed that the heterogeneity between groups was not significant ( $p = 0.82$ ), not supporting **H6**. The analysis of the relationship between EO, MO and IP, grouped by Country's economic development level, showed that the heterogeneity between groups was insignificant ( $p = 0.84, p = 0.37$ ) and did not support **H7** and **H8**.

### Meta-regression analysis

For cultural dimensions analysis, we used regression analysis for further validation, and the experimental results are shown in **Table 4**. With Power Distance as the moderating variable, the results do not support **H10a**, **H10b**, but support **H10c**. Power Distance moderates the relationship between CO and IP. Uncertainty Avoidance regulates the relationship between CO and IP, and the results do not support **H11a**, **H11b**, but support **H11c**. The results of using Individualism/Collectivism as the moderating variable do not support **H12a**, **H12b** and **H12c**. Using Masculinity/Femininity as the moderating variable, the results do not support **H13a**, **H13b**, but support **H13c**. Masculinity/Femininity moderates the relationship between CO and IP. Long-/Short-Term Orientation was used as a

moderating variable, and the results did not support **H14a**, **H14b**, but supported **H14c**. Long-/Short-Term Orientation moderated the relationship between CO and IP.

**Table 3:** Test for moderating effect (Cultural moderators)

|        | Factors  | Subsamples                             | k  | r      | 95% CI      |             | Z-value | Heterogeneity test |         |
|--------|----------|--|----|--------|-------------|-------------|---------|--------------------|---------|
|        |          |  |    |        | Lower limit | Upper limit |         | Q <sub>b</sub>     | P-value |
| EO(H4) | Industry | Electronics and information technology | 1  | 0.4000 | 0.2896      | 0.4999      | 6.6176  | 18.9334            | <0.001  |
|        |          | manufacturing                          | 4  | 0.5029 | 0.3555      | 0.6258      | 5.9756  |                    |         |
|        |          | MNES                                   | 1  | 0.4520 | 0.3174      | 0.5687      | 6.0265  |                    |         |
|        |          | multiple                               | 14 | 0.4173 | 0.3062      | 0.5172      | 6.8003  |                    |         |
|        |          | education                              | 1  | 0.6350 | 0.5622      | 0.6980      | 12.9210 |                    |         |
| EO(H7) | Region   | Developed                              | 2  | 0.4127 | -0.0124     | 0.7115      | 1.9060  | 0.0381             | 0.8453  |
|        |          | Developing                             | 19 | 0.4502 | 0.3677      | 0.5256      | 9.5886  |                    |         |
| MO(H5) | Industry | High-tech                              | 1  | 0.4700 | 0.3821      | 0.5495      | 9.2939  | 76.9431            | <0.001  |
|        |          | industrial                             | 1  | 0.2650 | -0.0003     | 0.4955      | 1.9577  |                    |         |
|        |          | insurance                              | 1  | 0.5800 | 0.4485      | 0.6869      | 7.2266  |                    |         |
|        |          | manufacturing                          | 3  | 0.4268 | 0.3603      | 0.4889      | 11.3531 |                    |         |
|        |          | multiple                               | 3  | 0.4541 | 0.2702      | 0.6060      | 4.5120  |                    |         |
|        |          | Service                                | 1  | 0.7220 | 0.6802      | 0.7591      | 21.7118 |                    |         |
| MO(H8) | Region   | Developed                              | 2  | 0.5011 | 0.3257      | 0.6431      | 5.0734  | 0.0508             | 0.8217  |
|        |          | Developing                             | 8  | 0.4773 | 0.3375      | 0.5966      | 6.0514  |                    |         |
| CO(H6) | Industry | Electronics and information technology | 1  | 0.3700 | 0.2571      | 0.4730      | 6.0674  | 3.1396             | 0.3706  |
|        |          | manufacturing                          | 4  | 0.5030 | 0.3725      | 0.6140      | 6.6959  |                    |         |
|        |          | MNES                                   | 1  | 0.4800 | 0.3158      | 0.6163      | 5.2298  |                    |         |
|        |          | Service                                | 1  | 0.4570 | 0.3957      | 0.5143      | 12.8976 |                    |         |

**Table 4:** The results of meta-regression analysis

|             | Potential moderators         | k  | $\beta$ | Standard error | 95% CI      |             | Z-value | P      |
|-------------|------------------------------|----|---------|----------------|-------------|-------------|---------|--------|
|             |                              |    |         |                | Lower limit | Upper limit |         |        |
| <b>H10a</b> | Power Distance               | 21 | 0.0016  | 0.0030         | -0.0043     | 0.0075      | 0.54    | 0.5925 |
| <b>H11a</b> | Uncertainty Avoidance        | 21 | -0.0018 | 0.0029         | -0.0074     | 0.0038      | -0.63   | 0.5281 |
| <b>H12a</b> | Individualism/Collectivism   | 21 | -0.0017 | 0.0029         | -0.0074     | 0.0040      | -0.59   | 0.5584 |
| <b>H13a</b> | Masculinity/Femininity       | 21 | 0.0018  | 0.0043         | -0.0066     | 0.0103      | 0.43    | 0.6708 |
| <b>H14a</b> | Long-/Short-Term Orientation | 13 | -0.0007 | 0.0012         | -0.0032     | 0.0017      | -0.61   | 0.5428 |
| <b>H10b</b> | Power Distance               | 9  | -0.0079 | 0.0079         | -0.0234     | 0.0075      | -1.01   | 0.3145 |
| <b>H11b</b> | Uncertainty Avoidance        | 9  | 0.0001  | 0.0036         | -0.0069     | 0.0070      | 0.02    | 0.9845 |
| <b>H12b</b> | Individualism/Collectivism   | 9  | -0.0055 | 0.0066         | -0.0185     | 0.0074      | -0.84   | 0.4027 |
| <b>H13b</b> | Masculinity/Femininity       | 9  | -0.0075 | 0.0055         | -0.0184     | 0.0033      | -1.36   | 0.1746 |
| <b>H14b</b> | Long-/Short-Term Orientation | 5  | -0.0014 | 0.0025         | -0.0064     | 0.0036      | -0.55   | 0.5794 |
| <b>H10c</b> | Power Distance               | 7  | -0.0104 | 0.0037         | -0.0177     | -0.0030     | -2.77   | 0.0057 |
| <b>H11c</b> | Uncertainty Avoidance        | 7  | 0.0032  | 0.0014         | 0.0004      | 0.0059      | 2.25    | 0.0242 |
| <b>H12c</b> | Individualism/Collectivism   | 7  | 0.0041  | 0.0062         | -0.0082     | 0.0163      | 0.65    | 0.5140 |
| <b>H13c</b> | Masculinity/Femininity       | 7  | -0.0083 | 0.0031         | -0.0144     | -0.0023     | -2.69   | 0.0072 |
| <b>H14c</b> | Long-/Short-Term Orientation | 5  | -0.0073 | 0.0024         | -0.0119     | -0.0027     | -3.10   | 0.0019 |

**Table 5:** Coding results of samples studies

| Study | Category                | Industry                    | Power Distance | Uncertainty Avoidance | Individualism/Collectivism | Masculinity/Femininity | Long-/Short-Term Orientation | Region            | Effect Size       | Sample Size |      |
|-------|-------------------------|-----------------------------|----------------|-----------------------|----------------------------|------------------------|------------------------------|-------------------|-------------------|-------------|------|
| 1     | Madhoushi et al. (2011) | Entrepreneurial orientation | Manufacturing  | 58                    | 59                         | 41                     | 43                           | developing region | 0.445             | 164         |      |
| 2     | Li et al. (2010)        | Market orientation          | Multiple       | 80                    | 30                         | 20                     | 66                           | 118               | developing region | 0.48        | 281  |
| 3     | Zhai et al. (2018)      | Entrepreneurial orientation | Multiple       | 80                    | 30                         | 20                     | 66                           | 118               | developing region | 0.351       | 302  |
| 4     | Song et al. (2019)      | Entrepreneurial orientation | Multiple       | 80                    | 30                         | 20                     | 66                           | 118               | developing region | 0.437       | 209  |
| 5     | Tang et al. (2015)      | Entrepreneurial orientation | Manufacturing  | 80                    | 30                         | 20                     | 66                           | 118               | developing region | 0.3         | 151  |
| 6     | Shaher and Ali (2020)   | Entrepreneurial orientation | Multiple       | 80                    | 68                         | 38                     | 53                           | developing region | 0.34694           | 221         |      |
| 7     | Shaher and Ali (2020)-1 | Market orientation          | Multiple       | 80                    | 68                         | 38                     | 53                           | developing region | 0.2754            | 221         |      |
| 8     | Hanifah et al. (2021)   | Entrepreneurial orientation | Manufacturing  | 104                   | 36                         | 26                     | 50                           | developing region | 0.696             | 121         |      |
| 9     | Ince et al. (2021)      | Entrepreneurial orientation | Manufacturing  | 66                    | 85                         | 37                     | 45                           | developing region | 0.52              | 665         |      |
| 10    | Iqbal et al. (2021)     | Entrepreneurial orientation | Multiple       | 55                    | 70                         | 14                     | 50                           | 0                 | developing region | 0.459       | 1095 |
| 11    | Shahzad et al. (2021)   | Entrepreneurial             | Multiple       | 55                    | 70                         | 14                     | 50                           | 0                 | developing        | 0.62        | 158  |

|    |  | orientation                 |               |     |    |    |    |     | region            |       |      |
|----|--|-----------------------------|---------------|-----|----|----|----|-----|-------------------|-------|------|
| 12 | Ha et al. (2018)                         | Entrepreneurial orientation | Multiple      | 104 | 36 | 26 | 50 |     | developing region | 0.489 | 214  |
| 13 | Jantunen and Hurmelinna-Laukkanen (2006) | Entrepreneurial orientation | Multiple      | 33  | 59 | 63 | 26 | 41  | developed region  | 0.205 | 881  |
| 14 | Otoo et al. (2021)                       | Entrepreneurial orientation | MNES          | 77  | 54 | 20 | 46 | 16  | developing region | 0.452 | 156  |
| 15 | Khalili and Fazel (2013)                 | Entrepreneurial orientation | Multiple      | 58  | 59 | 41 | 43 |     | developing region | 0.32  | 180  |
| 16 | Alzuod et al. (2017)                     | Entrepreneurial orientation | Multiple      | 80  | 68 | 38 | 53 |     | developing region | -0.06 | 325  |
| 17 | Kaya and Patton (2011)                   | Market orientation          | Multiple      | 66  | 85 | 37 | 45 |     | developing region | 0.59  | 135  |
| 18 | Erdil et al. (2004)                      | Market orientation          | Industrial    | 66  | 85 | 37 | 45 |     | developing region | 0.265 | 55   |
| 19 | Zhang (2010)                             | Customer orientation        | MNES          | 80  | 30 | 20 | 66 | 118 | developing region | 0.48  | 103  |
| 20 | Yang and Tsai (2019)                     | Customer orientation        | Manufacturing | 58  | 69 | 17 | 45 | 87  | developing region | 0.58  | 456  |
| 21 | Wang et al. (2016)                       | Customer orientation        | Service       | 80  | 30 | 20 | 66 | 118 | developing region | 0.457 | 686  |
| 22 | Wang et al. (2016)-1                     | Customer orientation        | Manufacturing | 80  | 30 | 20 | 66 | 118 | developing region | 0.376 | 1646 |
| 23 | Eren (2019)                              | Customer                    | Manufacturing | 66  | 85 | 37 | 45 |     | developing        | 0.441 | 328  |

|    |                                 | orientation                 |  |    |    |    |    |     | region            |         |      |
|----|---------------------------------|-----------------------------|--|----|----|----|----|-----|-------------------|---------|------|
| 24 | Maydeu-Olivares and Lado (2003) | Market orientation          | Insurance                              |    |    |    |    |     | developed region  | 0.58    | 122  |
| 25 | Wahyuni et al. (2020)           | Market orientation          | Manufacturing                          | 78 | 48 | 14 | 46 |     | developing region | 0.4763  | 242  |
| 26 | Zehir et al. (2019)             | Customer orientation        | Manufacturing                          | 66 | 85 | 37 | 45 |     | developing region | 0.595   | 698  |
| 27 | Baker et al. (2016)             | Entrepreneurial orientation | Multiple                               | 40 | 46 | 91 | 62 | 29  | developed region  | 0.584   | 1978 |
| 28 | Yan (2020)                      | Market orientation          | High-tech                              | 80 | 30 | 20 | 66 | 118 | developing region | 0.47    | 335  |
| 29 | Liao and Zhao (2020)            | Customer orientation        | Electronics information technology and | 80 | 30 | 20 | 66 | 118 | developing region | 0.37    | 247  |
| 30 | Liao and Zhao (2020)-1          | Entrepreneurial orientation | Electronics information technology and | 80 | 30 | 20 | 66 | 118 | developing region | 0.4     | 247  |
| 31 | Mekhum (2020)                   | Market orientation          | Service                                | 64 | 64 | 20 | 34 | 56  | developing region | 0.722   | 570  |
| 32 | Leal-Rodríguez et al. (2018)    | Market orientation          | Manufacturing                          | 57 | 86 | 51 | 42 | 19  | developed region  | 0.418   | 145  |
| 33 | Song et al. (2015)              | Market orientation          | Manufacturing                          | 80 | 30 | 20 | 66 | 118 | developing region | 0.38    | 242  |
| 34 | Junya and Xinghua (2015)        | Entrepreneurial orientation | Multiple                               | 80 | 30 | 20 | 66 | 118 | developing region | 0.32832 | 264  |



|    |                            |                             |           |    |    |    |    |     |                   |       |     |
|----|----------------------------|-----------------------------|-----------|----|----|----|----|-----|-------------------|-------|-----|
| 35 | Shuang (2017)              | Entrepreneurial orientation | Multiple  | 80 | 30 | 20 | 66 | 118 | developing region | 0.736 | 323 |
| 36 | Xianfang et al. (2020)     | Entrepreneurial orientation | Multiple  | 80 | 30 | 20 | 66 | 118 | developing region | 0.41  | 214 |
| 37 | Ying et al. (2018)         | Entrepreneurial orientation | Multiple  | 80 | 30 | 20 | 66 | 118 | developing region | 0.386 | 226 |
| 38 | Badruddin and Halim (2019) | Entrepreneurial orientation | Education | 78 | 48 | 14 | 46 |     | developing region | 0.635 | 300 |

## **Discussion**

### *Theoretical contributions*

The results of previous research on the impact of EO, MO, and CO on IP are contradictory. This study summarized previous literature findings to explore further the effects of industry and cultural dimension variables on EO, MO, CO and IP. First, the findings of the meta-analysis provided unambiguous confirmation of the significance of the EO, MO, and CO effect on IP. Although there is a weak correlation in the existing literature, after analysis, it may be due to the moderating effect of the industry and cultural dimensions.

Second, current findings revealed that industry type significantly impacts EO, MO and innovation performance. Without taking into account the individual samples, manufacturing has a greater impact on entrepreneurial performance than multiple from the perspective of entrepreneurial orientation, and manufacturing firms can gain more from this strategy and take fewer risks. In contrast, multiple is more pertinent than manufacturing from the perspective of market orientation. Future research can investigate the impact of other industry features on the relationship between entrepreneurial orientation, market orientation, and innovation performance. The internal and external circumstances faced by firms and the resources available vary across industry life cycles, and these variances may affect the effective implementation of entrepreneurial orientation, resulting in varying impacts on firm performance (Lumpkin and Dess, 2001).

The level of the nation's economy has no significant impact on EO, MO, or innovation performance (CO only in developing countries, no test was done). According to previous theories, the adoption of entrepreneurial and market orientation by firms in developed and developing countries affects firm performance (Xiao and hu, 2013). If additional research were accessible, it would be possible to conduct a more thorough analysis of innovation performance in industrialised and developing countries. Further research on the moderating variables of economic development is necessary.

Concerning cultural dimension, the results of the meta-analysis did not support the moderating effect of the cultural dimension on the relationship between entrepreneurial orientation, market orientation, and firm performance. In other words, there was no statistically significant difference between the effects of adopting an entrepreneurial approach and a market orientation on the innovation performance of enterprises in diverse cultural contexts. This result may be attributable to the level of research variables; entrepreneurial orientation and market orientation are firm-level variables that reflect the behavioural approach of specific firms, whereas the cultural dimension in this study reflects the culture of the country in which the firm is located (Xiao and Hu, 2013).

However, the effect significantly moderates the effect from the customer orientation perspective, power distance, uncertainty avoidance, masculinity/femininity, and long/short-term orientation. In contrast, the individualism/collectivism moderate is not significant, and individual opinions are more easily made in an individualistic cultural environment. The tendency of collectivism can be more teamwork and easier to innovate output. Future studies must determine whether individual innovation or group wisdom is more conducive to innovation. The higher the power distance, the lower the impact of customer orientation on innovation performance. With low power distance, the company's organisational structure is decentralized, more flexible, and more timely to adjust the company's innovative ideas in response to customer orientation, affecting innovation performance.

In countries with high uncertainty avoidance, customer orientation focuses on customers' expressed needs rather than potential needs. Customer orientation is more integrated with femininity culture, where firms are more willing to maintain contact with external stakeholders (Hunt and Morgan, 1995). Customer orientation focuses on customers, and national culture implicitly influences customer orientation. Future research may investigate the various levels of influence and cultural interactions between customer orientation, market orientation, and entrepreneurial orientation, as well as the type of culture most conducive to implementing corporate strategy and innovation.

#### *Managerial implications*

Managers and leaders should also encourage the development of a culture that fosters openness to innovation, new processes, products, or new ideas within the organization (Hult et al., 2004). This study reveals that the influence of EO and MO on innovation performance varies among industries, and managers should analyze their business and product characteristics in this era of global marketplaces before adopting EO and MO. Ethno-cultural characteristics are still important shapers of consumer behaviour (Ellis, 2006). When implementing market-oriented tactics, local sales, after-sales service, management, design, and competition practises and attitudes must still be considered (Van Birgelen et al., 2002).

#### **Conclusion**

In this study, using a meta-analysis of 35 empirical studies, we examined the effect of industry type, national economic development, and cultural factors on the relationship between EO, MO, and CO and innovation performance. First, the current meta-analysis is based solely on correlational and cross-sectional investigations, whereas experimental studies of EO, MO, CO, and innovation performance require future longitudinal studies. Second, the number of studies examining the relationship between EO, MO, and CO and innovation performance is on the rise, but the total number of identified studies is restricted, with some industries already having published literature. Therefore, there is a need to increase the amount of literature and investigate further the moderating influence of industry type and other industries. Last but not least, this meta-analysis examines the moderating effects of cultural differences, industry characteristics, and national economies, but other variables cannot be added to the test because many studies do not report the pertinent variables. Due to the limitations of the meta-analysis method, the coordination or interaction mechanism of entrepreneurial orientation, market orientation, and customer orientation can be studied using other methods.

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