



Metaverse-Enabled Coopetition based Open Innovation in Electric-car Market and Corporate Financial Growth in Automobile Industry of Thailand

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Abstract

The worldwide automotive market was estimated to be worth USD 2810.63 billion in 2022. The value of the automotive industry is expected to increase to approximately USD 3969.84 billion by 2030, growing at a compound annual growth rate (CAGR) of approximately 4.42% from 2023 to 2030. Despite the extensive contribution of automobile industry, the use of metaverse is limited in open innovation (OI). This study attempted to examine the value addition in terms of financial growth of automobile industry in electric-car market through metaverse-enabled coopetition-based OI. While using a cross-sectional research design, a survey was carried out to examine the effect of metaverse-enabled coopetition-based OI on financial growth of automobile industry in Thailand. Findings of this study identified the vital contribution of metaverse-enabled coopetition-based OI in the financial growth of automobile industry in Thailand. Metaverse trust and metaverse dependency can increase metaverse-enabled coopetition-based OI, leading to an increase in financial growth. These results are helpful for the practitioners to increase the economic contribution of automobile industry.

Introduction

The development of new kind of strategic alliances with many firms in which the coopetition is connecting both coopetition and cooperation (Bouncken et al., 2018; Crick, 2021). Now a day, a strategic element of competition is defined by cooperation among many competitors. The automobile industry is the best example where are obtaining competition on the other challengers based upon the variety of cars that are produced. In this type of coopetition, the major issue behind this is to achieve a good market share (Bengtsson & Kock, 2000; Hameed & Naveed, 2019) because of the special feature of one or two products in the marketplace. Some benefits are provided by coopetition that comes from the synergy of certain risk, economic scale and dividing a cost while using metaverse technology. The coopetition allows the market penetration strategies effectively, identification of international brand, increased sales and enhanced the share of the market.

Increase in the movements of metaverse-enabled open innovation (OI) in the aggressive environment, therefore, competition is one of the key elements (Bali et al., 2016; Kaufman et al., 2019; Topel, 2018). To get success in a competition in which the partners who are involved in coopetition require a top level of trust and dependency. Basically, OI is a conventional method of doing innovation within predetermined confines where the information has to be held. A vast array of businesses and institutions engaged in the creation, advancement, production, promotion, distribution, maintenance, repair, and customization of automobiles make

up the automotive sector, comparison to other sectors of the economy, this sector shares are increasing over the period of time. Most of the companies are introducing electric cars (Milev, Hastings, & Al-Habaibeh, 2021). This industry is also growing in Thailand, particularly in the development of electric cars as shown in Figure 1.

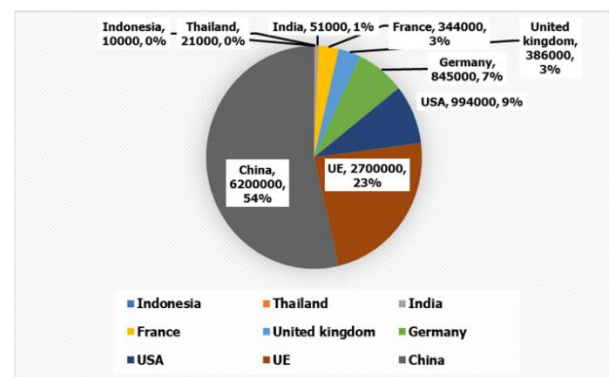


Figure 1: Electric-Car Sales Market.
Source: Electric-Vehicle (EV) Outlook 2022.

Between many competitors, the relation of metaverse based cooperation is distinguished by concurrent competitiveness. Also, cooperation is normally determined as literature defines the association of two terms such as competition and cooperation (Ghanbari et al., 2017; Lopez-Cabrales, Valle, & Herrero, 2006). Furthermore, it is also upheld in many areas like business management. Innovation has focused on the

sector of companies that are the most important source of output growth, production and generation of employment. They describe that the skilled employees have increased in companies but there is a large discrepancy in the outgrowth of employment between different sectors. The total output has risen due to an increase in employment and the growth of the economy is also enhanced with an increase in output (Anaman & Osei-Amponsah, 2007; Malyavkina, Savina, & Parshutina, 2019; Mutua, 2018). According to a prior study, there is a huge need for large flexibility and collaboration between the services that provide to companies to enhance and encourage their performance.

Concentrate on companies in the sector of automobile in that they argued for sustainable growth in which the companies should be able to advertise and innovate technology (Abdullah & Maharjan, 2003; Kulkarni, Janakiram, & Kumar, 2009; Luthra et al., 2011). In the process of production through metaverse, many companies link with other firms like a system of OI but sometimes this collaboration of companies creates difficulties and certain risks are involved. Therefore, to enhance their performance of innovation in which the Small medium enterprise produces the patent of high quality and corporate policies with outside of the companies. The companies' sector is described by size, not by uniformity of the process of business and market. In this type of business, the pros and cons are mostly linked with the size of companies, and it provides the companies flexibility to lead in a very difficult condition of the economy and at a very low cost of capital that it helps to produce a job. Economic growth, stability of income and employment are increased by these two advantages. The service sector is to change the form of intangible products (Bashir et al., 2020; Chuchuen & Chanvarasuth, 2011) such as hospitals, insurance companies, universities and the banking sector. There is a high level of interaction of customers for this type of metaverse-enabled innovation. For economic promotion, the companies are powerful forces where all developing and developed countries concentrate on the growing sector of companies. It is a fact of life that prompt entrepreneurship is the key to enhanced competitiveness, raise trade volume, increase economic activities and build job opportunities.

The word OI indicates a situation in which a firm does not only depend on internal sources, resources and knowledge (Hameed et al., 2018; Kerna & Wolff, 2019). For innovation, the OI is a model of business management, and it encourages the participants with outside people and organization of the company. To minimize the risk and costs, generate the flow of new earnings and enhance the competitive edge these are all the benefits of OI. Inbouded innovation in which the skills are sourcing and obtaining from outside of the company and for the new information to select, classify, use and internalized ideas from scanning the outside environment. Out bounded innovation is popularized targeted and internally generate ideas in the external environment of the organization (Bogers, Chesbrough, & Moedas, 2018; Chesbrough, 2012;

Chesbrough, 2006). This can be done by selectively disclosing the product to reviewers and journalists or selling the technology and service selectively to the customer to acquire feedback. Finally, this study attempted to examine the value addition in terms of financial growth of automobile industry through metaverse-enabled competition-based OI.

Literature Review

The good performance of companies is indicated through enhancing sales, earn a profit, and share of the market growing worldwide or customers are satisfied more frequently (Akpan & Amran, 2014; Chiou et al., 2017; Karami, Dolatabadi, & Rajaeepour, 2013). Companies faced one more barrier that is connected to corporate innovation. To enhance the share of an existing market, enter into the market and give firms to be competitive therefore, innovation is one common element of new growth strategies. For companies, innovation can be a possible solution. To take advantage of the assets of the company and generate income; thus, financial performance is a subjective measure of any company (Ahmed et al., 2017; Al-Matari, Hassan, & Alaaaraj, 2016; Popescu, 2020). To measure the company's whole financial health over the whole period this term is utilized also. To correlate the related companies in the same industry in which the investors and analysts use financial growth. According to this study, financial growth is influenced by metaverse enabled competition-based OI as reported in Figure 2. Metaverse trust and metaverse dependency influence financial growth.

OI is an entrance to connect with another, inside-out and outside-in move the many kinds of ideas and technologies (Lichtenthaler, 2008; Lichtenthaler & Lichtenthaler, 2009), it states that outside source for realizing the portion of information (Naqshbandi & Jasimuddin, 2018). To develop something modern, OI is a process that collaborates internal as well as external knowledge. The company can improve the performance of small medium enterprises through OI. If the company started competition-based OI that can be enhanced and increased the financial performance of companies.

It is very important to consider when to control the practice of OI that these are complex structures (Lichtenthaler & Lichtenthaler, 2009). When the firms need come to be more competitive hence the processes of innovation become more open because of an extremely competitive marketplace. At a substantial financial cost in which the companies are substantially being forced to consolidate the effort of their innovation. In the market to achieve the competitive advantage, to enhance the business production and product in which, innovative companies are willing to utilize the new system and advance technologies. Basically, for the promotion of innovation in which technical understanding and evolving technology are necessary for companies of Thailand. To encourage the performance of organization by emerging technologies where, information of high-tech is supportive. In the promotion of company's innovation in which, the emerging

technologies are used to play an important role. To raise the firm's whole production by enhancing or encouraging the

capability of the workers.

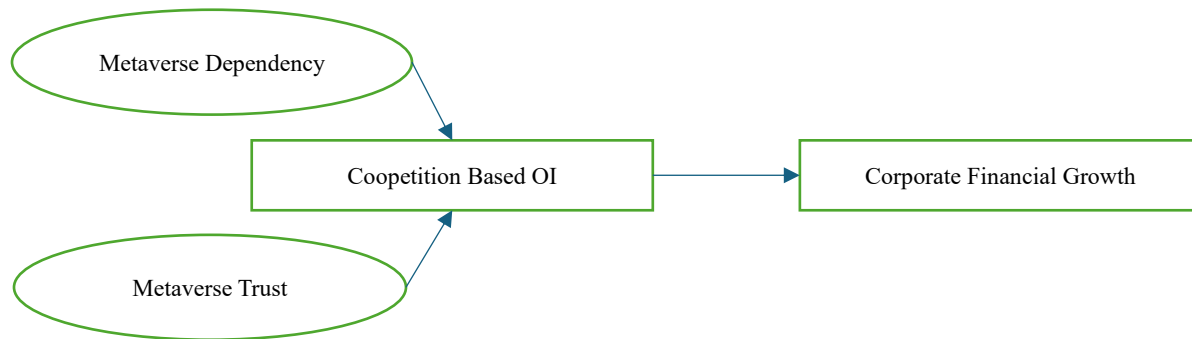


Figure 2: Metaverse-Enabled Coopetition based Open Innovation and Corporate Financial Growth (Conceptual Framework of the Study).

Metaverse-Enabled Coopetition Based OI

The metaverse-enabled coopetition-based OI is a new aspect that quickly emerged between many firms or companies to compete for the challenges and work with one another (Barney et al., 2017; Raza-Ullah, Bengtsson, & Kock, 2014). On the other hand, the coopetition-based OI face failure if there is low existence of trust and dependency between challengers; therefore, these two factors enhance the coopetition that also increases the activity of metaverse based OI. The two different coopetition approaches are very helpful connection based on competition and cooperation (Bouncken et al., 2018). Literature depended on the game theory; the performance of the company can be effectively enhanced through coopetition. With the coopetition, utilize the different motive from dependency theory of resource which proposed that among other engaged firms; the large of the business need many kinds of assets. Coopetition is creative, among participant firms to produce on collective capital. Thus, to combine and interchange resources also enhance the performance of OI, in which dependency is essential in competition.

In a high contest market where the endurance is a challenge for companies and for many entrants, in which metaverse-enabled coopetition-based OI has large significance (Chin, Chan, & Lam, 2008). To entrance into a certain market where the coopetition gives the chance to small companies and where the domination of large companies in which the cooperating allows the small industries or firms to enter in the market and where the condition of metaverse based innovations to be aggressive. The concentration of many researchers on companies have an investigation on a family business or start-ups (Welsh et al., 2018). A few researchers linked the relationship of coopetition with metaverse-enabled OI. By providing the tool for learning of organization where the coopetition has positive relations with OI are increased. To investigate the tool which the companies are engaged to secure and protect the knowledge, skills and core competencies (Barclay, Higgins, & Thompson, 1995). Figure 3 highlighted the path of close innovation and OI along with the mechanism of OI in Market.

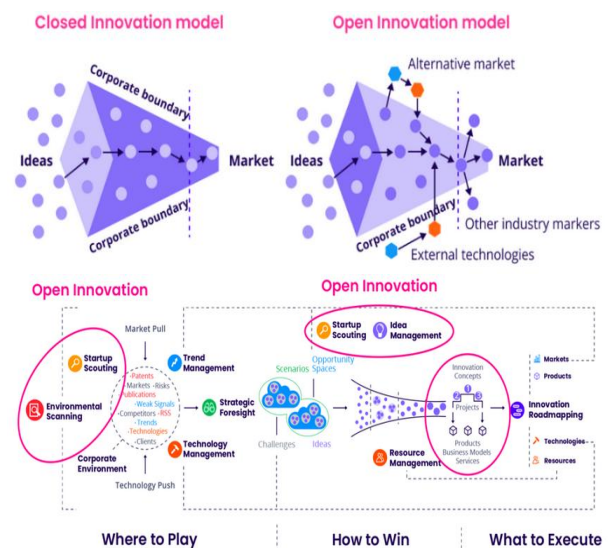


Figure 3: Close Innovation and Open Innovation-Mechanism of Open Innovation in Market.

Metaverse Trust and Metaverse Dependency

Metaverse trust and metaverse dependency play a very fundamental role in organization performance and coopetition. With every activity of coopetition in which trust is the most beneficial factor. In coopetition, dependency performance is very important (Estrada, Faems, & de Faria, 2016). For the enhancement of coopetition, that the interconnection between dependency and trust both are very important in OI. When we pursue distrust from anyone, it's normal, we have come about that which thing is main that is not secure at that individual. Mostly the interconnection between consumers, workers, buyers, partners and control of the line of goods in which the trust is the main concern. The individuals trust and believe in one another, and they sustain the organization in which our firms do jobs.

There are many points in which the manager creates metaverse trust by combining acts with orders in the organization on all stages that are as follows: be truthful and encouraging; be silent from time to time, imitate the manner,

construct in responsibility and hold diligent to developing trust and it must be obtained. The transmission and successful connection are useful in which the part of trust is necessary. The purpose of enhancing the performance is that the company accomplished many tasks in the net good worth of distinct stakeholders such as businesses, dealers and entrants (Bouncken & Fredrich, 2012; Bouncken et al., 2015). The network occurring between two companies or organizations in which trust is the main concern. The partner in the firm collaborate in an efficient and effective manner to get achievement therefore, the organization sustain the relationship of trust. The relationship can be made and maintain by increasing the level of trust and it has more effects on achievement and fulfillment between among members of company. Trust increases a strong bond with the association, and it makes it possible to handle the problems of the organization, increase rapidly to change and enhance teamwork. If the employees have high dependency that will produce a higher performance of the firms. There is more concentration on the strategic alliances and high level of performance which can be led by dependency. Particularly, the companies are depending upon the degree of trust, cooperation and communication to strengthen the level of trust and increased satisfaction of employees of the firms (Polo Redondo & Cambra Fierro, 2007). Aforementioned discussion led to the following hypotheses:

Hypothesis 1: *Metaverse trust has the potential to affect cooperation-based OI.*

Hypothesis 2: *Metaverse dependency has the potential to affect cooperation-based OI.*

Open Innovation and Corporate Financial Growth

Corporate financial growth is an aspect of improving your personal finances and becoming more financially stable (Adzimatinur & Gloriman Manalu, 2021; Babajide, 2012; Hayaloğlu, 2015) through metaverse technology. From many researchers, it is clear that numerous aspects of firms have OI and firm OI performance. Previous studies explored that the great contributing factors of FOIP are internal as well as external knowledge and one of the other has a positive connection with company OI performance. The attitude of an internal knowledge-oriented innovation has effect the performance of firms positively and the attitude of knowledge-oriented innovation has positive in performance of innovation of big companies only, deficit impact on corporate growth and innovation performance. Inbouded OI from a business point of view also increased its efficacy. To build and manage the relationships with other firms, the OI relies on outside connections and basic firm capacity, the impact of OI in the performance of a firm in which these relationships should improve (Hameed & Naveed, 2019; Suh & Jeon, 2019; Zhou, Yao, & Chen, 2018). For the promotion of an economy with regard to reducing the poverty, social incorporation and generation of business are those factors in which companies

play an important role.

The net good worth of individual shareholders such as consumers, dealers and entrants in which company accomplished many tasks such as financial growth, so that is the purpose enhancement the performance of firms. For the latest design to raise the OI achievement (Bagherzadeh et al., 2019; Mention, 2011), therefore, the organization concerted with its rival in Coopetition. To control resource dependency, it shows that many mutual firms can access to swapping the different resources also contributing their awareness. When the worker recognized, if they are motivated, they will be performed better and they will gain their outgrowth other way they will be demoralized. If we enhanced the innovation, good practice of innovation can be created, and minimize the OI challenge thus we can achieve the motivation. A company developed the policy of the business in which the capacities of OI influences instantly also affects financial performance (Esteban-Sanchez, de la Cuesta-Gonzalez, & Paredes-Gazquez, 2017). When the organization chooses the relevant methods of OI that is necessary kinds to accept all capacities, through which financial achievement of the company, where we perceive that each capacity of OI is firmly related (Ahn, Mortara, & Minshall, 2013). Figure 4 shows the important step to achieve good financial growth.

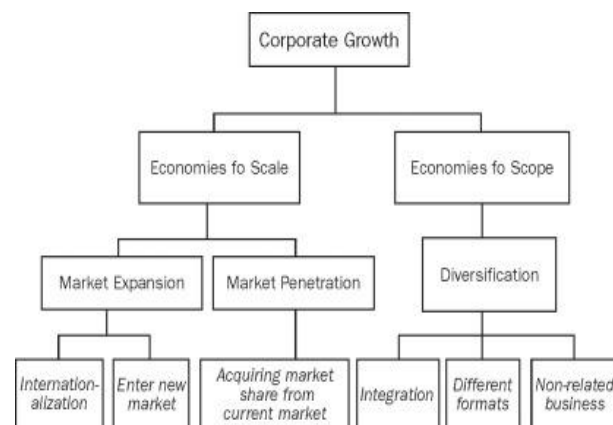


Figure 4: Corporate Growth.

To measure financial performance, there are many ways, and all measures should be taken mutually. Line items like operating income or cash flow from operating activities can be used also total sales. Moreover, in the financial statements, the investors may desire to dig deeper and focus on the margin growth rate or debt declining (Mahoney & Roberts, 2007). In the company, there are many stakeholders like bondholders, employees, management, creditors and investors. For the mass level of producers, the important thing is that the business scale of production might change from small to medium scale after getting an operating performance. The advantage is that the overall growth of the firms increased because of changes in the scale of production where to gain both competitive and financial performance that may be useful for the enterprises.

To improve and enhance the performance of firm OI by developing strategies like manipulation of internal technology and acquiring external knowledge. Hence, for the development product in which the OI considers a path of goal by combining inputs both internally and externally. The acquirer of external knowledge (inbound innovation), transferring technology to the outside (outbound innovation) in open investigation processes and coupled innovation, these are three different methods from which the OI is usually achieved (Reed, Storrud-Barnes, & Jessup, 2012). Many researchers define that many kinds of measures the performance of the firms are positively impacted by OI. Companies are flexible to comparability large firms also they are more responsible for the requirement of the market thus; the companies can take advantage from outside and the performance of firms by OI can be enhanced. To continuously achieve the advantages of competitors also increases the performance of companies where the practice of OI is a strategic resource. Through encouraging the innovation and usage of resources for companies, therefore, the firms used various methods in which the company creates and enhance the competitive advantage also increased the performance of the firm (Hilmi & Ramayah, 2008). To engage and continue in a cost-effective environment in which the innovation techniques can empower the companies. Finally, aforementioned discussion led to the following hypotheses:

Hypothesis 3: *Cooperation-based OI has the potential to affect financial growth.*

Hypothesis 4: *Cooperation-based OI mediates the relationship between metaverse trust and financial growth.*

Hypothesis 5: *Cooperation-based OI mediates the relationship between metaverse dependency and financial growth.*

Methodology

The present study, examining the part of metaverse-enabled

coopetition-based OI on corporate growth and the mediating role of metaverse-enabled coopetition-based OI. The questionnaire was used which consisted of five sections. This study developed the questionnaire for data collection. The first section of the questionnaire depends upon the respondent's demographic profile such as marital status, age, occupation, education and monthly income. The second part of the questionnaire consists of the items of coopetition-based OI and financial growth, the third section of questionnaires was comprised of items that is relevant to metaverse trust and metaverse dependency. Furthermore, the fourth section of the survey questionnaire consisted of items related to financial growth. 384 questionnaires were distributed by using the instructions of Krejcie and Morgan (1970) on sample size selection among the employees of automobile industry in Thailand and 222 were returned.

The scale items of coopetition-based OI are based on three scale items. These scale items are based on the collaboration between many competitors to get a goal and objectives, have good competition among collaborators of the company and the related partners have close competition. The items are reported in Table 1. The metaverse trust is measured by three questions. This scale focused on keeping promises among partners, trustworthiness between partners of the company and fairness in negotiations while using metaverse. The scale items of metaverse trust are provided in Table 1. Dependency is measured through items which focus on the firm needs to observe with its partners demands, relative bargaining position and partners great contributions among collaborations. The scale items of metaverse dependency are provided in Table 1. Finally, financial growth is measured by using return on assets, return on sales and profitability, scale items are given in Table 1.

Table 1: Variable Measures.

Variable	Scale Items
Coopetition-based Open Innovation	1. We business partners are in nearest competition while opening out strategies. 2. We enterprise partners correspond with opponents to get a central goal while opening up our strategies. 3. Active contests with our business opponents is useful to us in OI.
Metaverse Trust	1. Our partner always negotiates with us while involved in metaverse. 2. Our collaboration partner is honest with us while involved in metaverse. 3. Our business partners continue with their promises while involved in metaverse.
Metaverse Dependency	1. In coopetition, we depend on partners while involved in metaverse. 2. In coopetition, our partners depend on us while involved in metaverse. 3. In competition, we follow the demands of partners while involved in the metaverse.
Financial Growth	1. Our return on assets has increased over the last three years. 2. Our return on sales has increased over the last three years. 3. Our profitability has increased over the last three years.

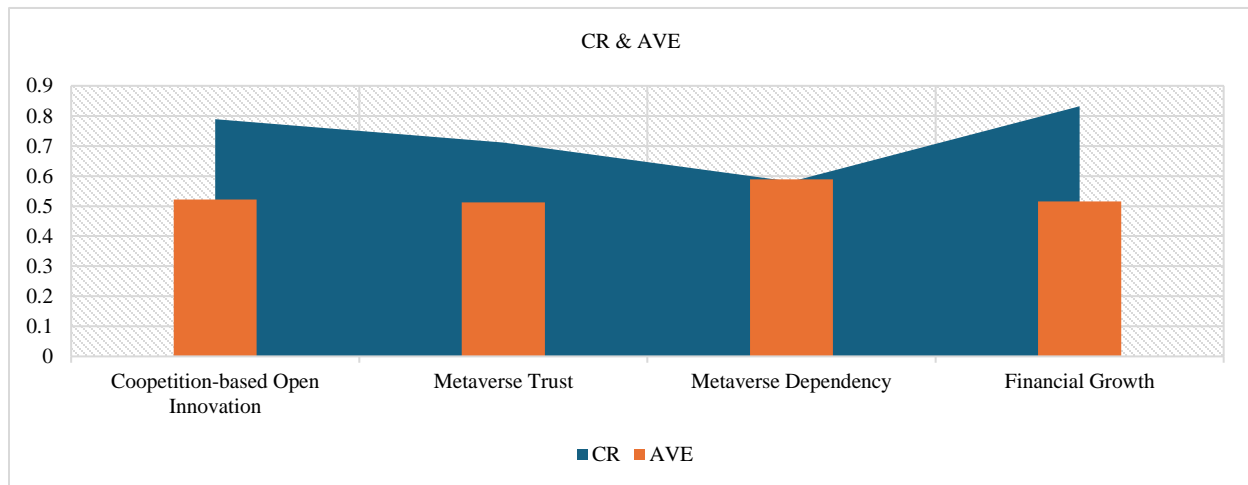
Findings

This study employed structural equation modeling to examine the relationship between variables. SEM is a statistical model that spreads factor analysis as well as multiple regression analysis and can be used to comprehend and classify the putative causal associations between latent along with observed variables (F. Hair Jr et al., 2014; Hair & Alamer, 2022). In this

process, the reliability was considered through factor loadings and composite reliability (CR) (Hafkesbrink, 2021; Streukens & Leroi-Werelds, 2016). Factor loadings was used to examine reliability of each items (Hair Jr, Howard, & Nitzl, 2020; Matthews, 2017). CR is used to examine variable reliability. All values are given in Table 2, which shows that factor loadings and CR are higher than 0.7 which confirmed reliability.

Table 2: Reliability Statistics.

Variable	Scale Items	Loadings
Coopetition-based Open Innovation	1. We business partners are in nearest competition while opening out strategies.	1. 0.785
CR = 0.789	2. We enterprise partners correspond with opponents to get a central goal while opening up our strategies.	2. 0.899
AVE = 0.522	3. Active contests with our business opponents is useful to us in OI.	3. 0.755
Metaverse Trust	1. Our partner always negotiates with us while involved in metaverse.	1. 0.856
CR = 0.711	2. Our collaboration partner is honest with us while involved in metaverse.	2. 0.852
AVE = 0.512	3. Our business partners continue with their promises while involved in metaverse.	3. 0.701
Metaverse Dependency	1. In coopetition, we depend on partners while involved in metaverse.	1. 0.734
CR = 0.851	2. In coopetition, our partners depend on us while involved in metaverse.	2. 0.826
AVE = 0.589	3. In competition, we follow the demands of partners while involved in the metaverse.	3. 0.851
Financial Growth	1. Our return on assets has increased over the last three years.	1. 0.789
CR = 0.832	2. Our return on sales has increased over the last three years.	2. 0.769
AVE = 0.516	3. Our profitability has increased over the last three years.	3. 0.788

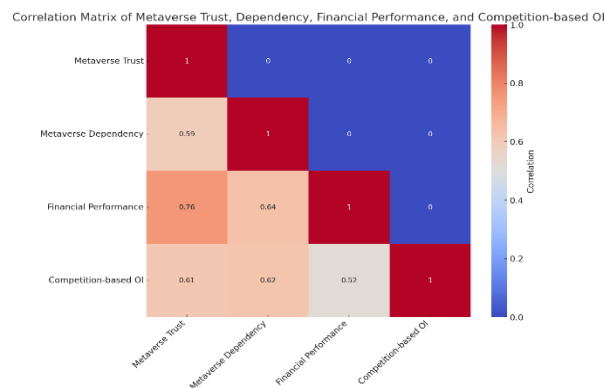
**Figure 5:** Composite Reliability (CR) and Average Variance Extracted (AVE).

The correlation between scale items of same variables was confirmed by using average variance extracted (AVE) which used to examine convergent validity (Alarcón, Sánchez, & De Olavide, 2015; Cheah et al., 2018; Cowin et al., 2008). AVE is higher than 0.5 which confirmed convergent validity. Both CR

and AVE are given in Table 2 and Figure 5. Discriminant validity was considered through heterotrait-monotrait ratio of correlations (HTMT) which is given in Table 3 and Figure 5. The correlation matrix is reported in Figure 5 which shows that all values are less than 0.9.

Table 3: Discriminant Validity (HTMT).

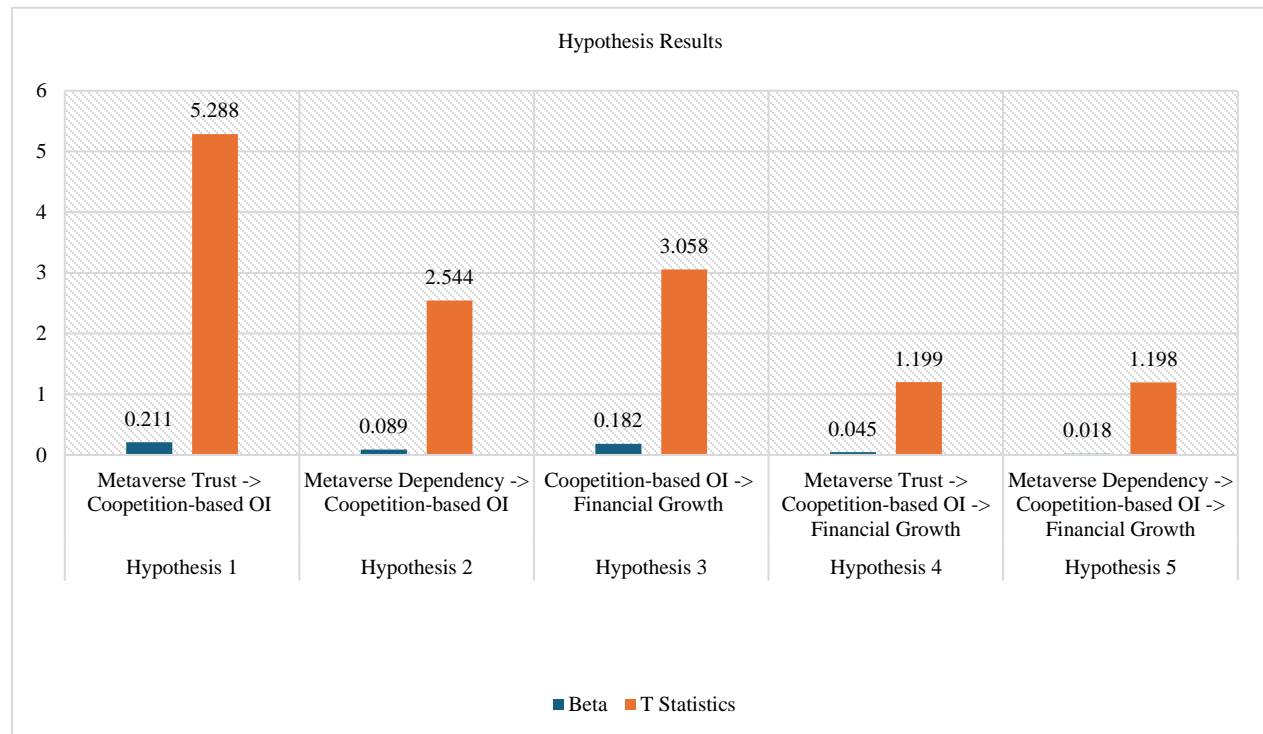
	Metaverse Trust	Metaverse Dependency	Financial Performance	Competition-based OI
Metaverse Trust				
Metaverse Dependency	0.59			
Financial Performance	0.76	0.64		
Competition-based OI	0.61	0.62	0.52	

**Figure 6:** Correlation Matrix.

Finally, results are reported in Table 4 and Figure 6. According to the results, all the hypotheses are supported because the t-value of all the hypothesis is higher than 1.96 which was the minimum threshold level. All the beta values are positive which shows positive relationship. It shows that metaverse trust has a positive effect on coopetition-based OI. Furthermore, metaverse dependency has a positive effect on coopetition-based OI and coopetition-based OI has positive effect on financial growth. Additionally, the mediating role of coopetition-based OI is significant between metaverse trust and financial growth. The mediation effect of coopetition-based OI is also significant between metaverse dependency and financial growth.

Table 4: Results.

Hypothesis		Beta	T Statistics
Hypothesis 1	Metaverse Trust -> Coopetition-based OI	0.211	5.288
Hypothesis 2	Metaverse Dependency -> Coopetition-based OI	0.089	2.544
Hypothesis 3	Coopetition-based OI -> Financial Growth	0.182	3.058
Hypothesis 4	Metaverse Trust -> Coopetition-based OI -> Financial Growth	0.045	1.199
Hypothesis 5	Metaverse Dependency -> Coopetition-based OI -> Financial Growth	0.018	1.198

**Figure 7:** Hypothesis Results.

Discussion and Conclusion

This study attempted to examine the value addition in terms of financial growth of automobile industry in electric-car market through metaverse-enabled coopetition-based OI. It is found that metaverse trust and metaverse dependency has a position contribution to the promotion of financial growth. Among competing firms, cooperation with competitors plays a positive contribution in progressing organization technological growth also increase the capabilities of innovation. Because of high uncertainty in markets, the more flexible activities of collaboration at which competitors must place to speed up innovation and that eventually enhance the performance of OI. [van den Broek, Boselie and Paauwe \(2018\)](#) coopetition is a planned and forceful procedure in which, cooperative interaction and economic actors developed value with the concert. For the global competition, this coopetition method is very beneficial ([Bouncken et al., 2018](#); [Estrada et al., 2016](#)). The internal innovation activities are promoted by external knowledge that affects the overall system of OI directly. It has many types such as the link with outside partners include consumers, suppliers and challengers. These outside partners have great value for OI.

It is reported in the literature that the metaverse related coopetition has a significant positive relationship among incremental practice of radical innovation. [Chesbrough \(2008\)](#) the pair of before and after stages of different activities connected to incremental innovation in which this strategy of coopetition is very important. In large scale companies, this is essential to increase their performance in a highly competitive environment, therefore the companies need extra OI activities. Additionally, a study conducted by [Bengtsson and Kock \(2000\)](#) and [Bouncken and Fredrich \(2012\)](#) coopetition enhance innovation allied to the production of a new product. To increase the performance of the company in which the role of coopetition has significant importance.

Companies interchange their information and knowledge with one another in practices of fair collaboration and through trust and dependency; firms make a powerful and strong relationship. In each activity of coopetition in which trust is very important ([Castaldo & Dagnino, 2009](#)). Since there has been a substantial correlation between trust and coopetition that affect the performance of a company and firm OI performance. Social strength such as trust is interconnected among many other economic forces that have affected the performance of firms. According to [Chesbrough \(2006\)](#), [Chesbrough \(2012\)](#)

and Enkel, Gassmann and Chesbrough (2009), metaverse based OI is based upon utilizing both internal and external resources, but external resources can be used in the way of coopetition.

Dependency influences the relationship with combined activities of coopetition in large scale companies. In the system of coopetition, to promote the procedure of OI where many competing firms depend on one another (Cheah & Yuen-Ping, 2021; Hameed & Naveed, 2019; Mention, 2011). The most important type in coopetition success is trust but another factor is dependency that is very beneficial for the success of coopetition. By identifying the relation, the trust in competitive environment and create a positive collaboration. Literature evidenced that trust is a very important element of OI that is dependent upon coopetition. Many kinds of coopetition relationships and firm OI performance where trust performs as a great role. To enhance performance of OI thus, many partners share their knowledge with each other also increase the level of trust with one another. In coopetition, trust as well as dependency are important factors and has a positive impact on the success of OI, also these components impact the relationship with the action of different innovations and competition's (Bouncken et al., 2018). New plans that facilitate the internal innovation by OI and coopetition depend on the trust and dependency where, new ideas take from competitors. Therefore, to achieve success in OI therefore, they can make the relationships between both partners also challengers while using metaverse technology in automobile industry of Thailand.

Implications and Future Directions

The practitioners can enhance the performance of companies through increase the financial performance of companies by using metaverse-enables OI in Thailand. On the other hand, in large companies, for the adoption of OI in which the companies face many issues because of lack small scale and due to of resources. Hence, as compared to companies, it is easier for a big corporation to achieve success in metaverse-enabled OI. If the companies get a rare success in OI so, they needed to alliance with their competitors. With the increase in OI, the coopetition must be increased. Trust and dependency are the most important factors that are beneficial for this study.

The OI and firm financial performance relationships were not clearly defined before, and the coopetition-based OI is a new phenomenon that was not studied in Thailand automobile sector before. However, Thai companies are incapable to develop a stable coopetition mechanism that negatively influence on performance of OI. The research is accomplished to define the problem of low OI in Thailand companies. Many firms are unwilling to open up various strategies of innovation which negatively impact OI success. Therefore, the Thai companies' overall performance is poor and low than the large-scale companies. Generally, in metaverse coopetition-based OI trust and dependency are the main elements of this study. In coopetition-based OI trust and dependency are helpful factors, and these factors were not studied before in the financial growth

of companies and metaverse-enables OI. Future studies should focus on the practices adopted by the Thai automobile industry. The barriers in the metaverse technology adoption should also be explored in relation to the OI practices. Additionally, metaverse benefits in the future from the perspective of automobile industry must be explored.

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CRedit Authorship Contribution Statement

Jessada Pochan: Conceptualization, Data curation, Formal analysis, Funding acquisition, Investigation, Methodology, Project administration, Resources. Boonsub Panichakarn: Software, Supervision. Jessada Pochan: Validation: Visualization, Writing – original draft. Boonsub Panichakarn: Writing – review & editing.

Declaration of Competing Interest

The authors report no conflicts of interest, financial or otherwise, to disclose.

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The authors confirm the absence of financial assistance from external agencies.

Ethical Statement

Ethical compliance was ensured, and approval was deemed unnecessary as no biological or tissue samples were included.

Data Availability Statement

The authors state that data generated during this study can be made available upon reasonable request from the corresponding author.

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