



# Co-location with marketing value activities as manufacturing upgrading in a COVID-19 outbreak era

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## ABSTRACT

Co-location has been a relevant topic in the international business literature, yet the extant literature focuses on the co-location of research and development (R&D) and production activities and overlooks marketing value activities. Marketing innovation is an agile and effective way to respond to crises such as the COVID-19 pandemic, and many manufacturers in global value chains aim to upgrade functionally following the trajectory of the OEM-ODM-OBM. Thus, this study proposes the co-location of marketing activities as a flexible and organizational learning strategy for manufacturing upgrades, and explores the antecedents of marketing co-location in foreign direct investment (FDI) decisions. The proposed research framework was examined using survey data from 343 Taiwanese manufacturing firms in China, which were drawn from a database compiled by Taiwan's Ministry of Economic Affairs in 2020. The results show that the breadth of international experience, linkage to R&D, marketing as a primary knowledge source in the host country, upgrading for local demands, and new product development for global supply are all positively associated with the co-location of marketing and production functions. Additionally, it was found that there was a negative association between FDIs that had been impacted by COVID-19 and marketing co-location. The findings provide valuable theoretical, practical, and strategic insights into how firms should manage their global value chains with respect to marketing co-location in case of another crisis.

## 1. Introduction

Co-location has been a relevant topic in the international business literature over the past two decades (Castellani & Latoratori, 2020). It began with the global offshoring or outsourcing phenomenon, in which companies dissect their value chains and distribute less valued activities outside their original organization boundaries, endorsing the formation of global value chains (Ambos, Brandl, Perri, Scalera, & Van Assche, 2021; Ghauri, Strange, & Cooke, 2021). Location becomes an ensuing question when companies want to determine and derive specific local resources or benefits from specific nation-states within a global value chain (GVC). Co-location discusses what kinds of value activities are combined to uplift a subsidiary venue's value. Firms that learn through action and transform via functional upgrades successfully follow a common trajectory. They renovate themselves along their value chains, from original equipment manufacturing (OEM) to original design manufacturing (ODM) to own-brand manufacturing (OBM) (Eng & Spickett-Jones, 2009). OEM manufacturers augment the per-unit value

of products through functional upgrades to compete on design and marketing innovations in GVCs, instead of engaging in a price war. Functional upgrades maneuver the mix of activities within and between links in a GVC and can effectively transform a production organization into a design or branding corporation (Chin & Rowley, 2018; Gereffi, Humphrey, & Sturgeon, 2005). However, there is also a warning that upgrading from OEM to OBM in GVC is not a panacea (Gereffi, 2009). First, the transformation to an OBM requires significant investments in research and development (R&D) and branding, and the risk of failure is high. Second, the move may generate hostility among current GVC leaders (Chin, Liu, & Yang, 2016). Therefore, the current study presumes that given the high uncertainties and risk of jeopardizing the present clientele, marketing co-location is a safer strategy for OEMs to perform functional upgrades while inducing flexibility and competitiveness in opportunities of future transformation.

The co-location of various functional activities (R&D, marketing, and manufacturing) has been touched upon in prior research (Kahn & McDonough, 1997; Van den Bulte & Moenaert, 1998). However, the

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extant literature on manufacturing upgrades or co-location primarily concentrates on the relationship between R&D and production activities, whereas marketing has been largely overlooked (Ambos et al., 2021; Castellani & Lavoratori, 2020; Eng & Spickett-Jones, 2009). Additionally, although it proves to be a relatively efficient and effective instrument in the face of changing environments and customer needs, marketing receives limited attention in crisis management (Naidoo, 2010; Wang, Hong, Li, & Gao, 2020). To address these research gaps, this study explores the antecedents of firms' co-location with marketing functions and the investment impact of the COVID-19 pandemic, which has heavily impacted GVCs (Ambos et al., 2021; Gereffi, 2020; Kano & Oh, 2020; Verbeke, 2020). We examine Taiwanese firms' investments in Mainland China. Taiwan and China have played substantial roles in GVCs (Grimes & Du, 2020; Pananond, Gereffi, & Pedersen, 2020) and have been affected by the COVID-19 crisis. They consider constant upgrades a key requirement to improve service for competitive clients. Therefore, a strategy that increases growth potential and agility in the face of a crisis will be welcome, especially if firms intend to become OBMs in the future.

The research follows the rationale behind the relationship between innovation and production in the GVC literature and the school of thought regarding interactive and open innovation (Ambos et al., 2021) to tackle co-location investments in marketing, and the production activities of Taiwanese suppliers in China. The upgradation or transformation of a firm does not happen in a void. It involves organizational learning, and how co-location and organizational learning affect each other. For instance, prior literature supports that firms' previous international experiences are key to organizational learning and influence their abilities to coordinate a complex, dispersed, organizational architecture (Castellani & Lavoratori, 2020). In addition to past and internal know-how accumulation, the interactive and open innovation model in the GVC literature emphasizes the importance of escalating one's capabilities through collaboration with external local partners. Knowledge connectivity, consisting of diverse foreign linkages, can facilitate a firm's retrieval of expertise from varying regions for knowledge

recombination and novelty. However, such innovation is better captured and enhanced through a vertically linked co-location practice (Ambos et al., 2021).

When it comes to marketing innovation, especially when entering an unfamiliar or dissimilar market, foreign direct investment (FDI) companies potentially seek local collaborators to obtain local market knowledge and access (Pedada, Arunachalam, & Dass, 2020). In this study, marketing innovation represents an organization's devotion to novel or improved measures through marketing–production co-location for more efficient resource deployment, more effective satisfaction of customer needs, or improved creation of customer values through products, services, and delivery (Lin & Chen, 2007; Mauborgne & Kim, 1997; Wang et al., 2020). The purposes of firms' marketing innovation are divided into two types in this study: serving local customers and developing new products/services that are not necessarily limited to the host market. The proposed conceptual framework and hypothesized relationships are illustrated in Fig. 1. To summarize, the current study aims to answer the following research questions:

- RQ1. What kind of resource inputs (in terms of internal and external knowledge dependence) are associated with the co-location of marketing and production activities?
- RQ2. Which types of marketing innovation purposes are correlated with the co-location of marketing and production activities?
- RQ3. How has COVID-19 impacted marketing co-location?

The study uses the latest data from 2020, and the research findings can help firms consider upgrades with marketing capabilities and capacities for FDI decisions. Furthermore, the results can assist in understanding the reaction to co-location investments in the face of uncertainties, such as the COVID-19 crisis.

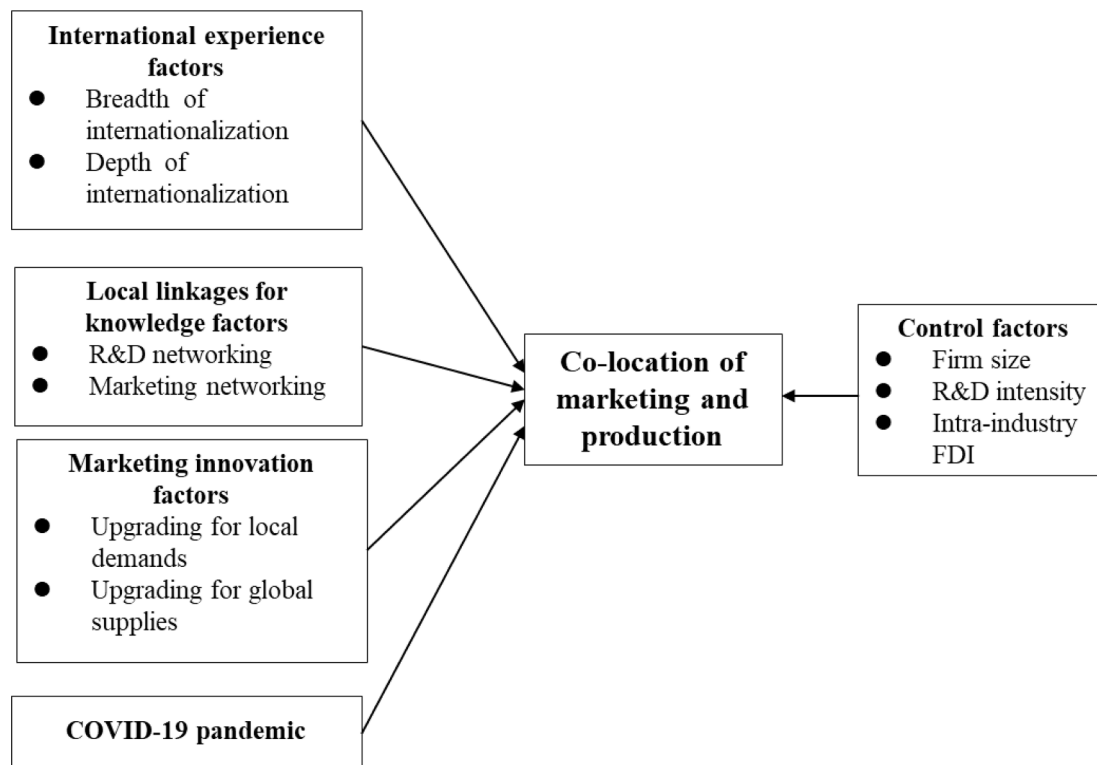


Fig. 1. The conceptual framework.

## 2. Literature and hypothesis development

### 2.1. GVC and knowledge accumulation

The rise of GVCs due to globalization has led to a tremendous amount of literature in the past two decades, and three distinctive innovation models have been developed. Sequentially, they are the linear and closed model, the interactive and closed model, and the interactive and open model (Ambos et al., 2021; Cohendet & Simon, 2017). However, these models, along with the GVC literature, primarily focus on R&D function and innovations. The linear and closed model focuses on internal capability growth by sparking ideas in a single location within the focal company. The interactive and closed model peaks when multinational enterprises (MNEs) are regarded as decentralized networks of subsidiaries; they are no longer pure replicators of parent companies. Such MNEs also act as creative sources of progression because making headway is rarely achieved inside a single location, but rather via linkages to other locations (Ambos et al., 2021; Cantwell & Piscitello, 2000). Internationalization then extends firms' innovative endeavors from adapting products/services for local demands to achieving foreign R&D breakthroughs for global supply. The interactive and open model entered the scene in the early 2000s. Access to different types of knowledge acquisition via links to external organizations and then owning the ideas are highlighted for firms' innovation (Ambos et al., 2021). After reviewing the literature on global knowledge sourcing or co-location, we can conclude that the discussion on marketing is either related to adaptations for a lucrative market or new product/service invention considerations. Additionally, the footprints of the innovation models in the GVC literature echo the progression of resource- and knowledge-based views (RBV and KBV, respectively), shifting attention from inside to outside with time. The RBV is the most applied theory in contemporary management. Its extension, the KBV, argues that organizational excellency hinges on firms' integration and transformation of divergent knowledge into competitive outputs, that is, goods and services (Pereira & Bamel, 2021). In other words, knowledge is a firm's strategic asset and includes feature capabilities of aggregation and appropriability (Grant, 1996). Pereira and Bamel (2021) recent review article found that RBV and KBV appear recurrently in studies concerning outsourcing or alliances and networks, and these two views are often linked to product development, knowledge sharing, customer satisfaction, and marketing. They concluded their review article with suggestions for future research that social capital and intellectual capital can be enhanced through a type of infrastructure that facilitates knowledge-sharing among various actors. The current paper focuses on KBV and follows their suggestion to propose marketing co-location alongside production as a potential infrastructure and stepping stone for an upgrade. We start with internal actors and internal knowledge: the focal parent company and its international experience.

### 2.2. Internal factors: International experience and co-location

KBV is often connected to the idea of organizational learning (Pereira & Bamel, 2021), and international experience is believed to be a significant source of organizational learning (Barkema & Vermeulen, 1998; Castellani & Lavoratori, 2020; Thakur-Wernz & Samant, 2019). International experience can reflect companies' internationalization, which can be further differentiated owing to the varied knowledge gathered (Arregle, Miller, Hitt, & Beamish, 2018; Eriksson, Johanson, Majkgård, & Sharma, 2015). "General international experience" comprises broad knowledge regarding internationalization across nations instead of "country-specific international experience." Evidence shows that, once a firm makes inroads into a specific country or region, prior internationalization experience positively impacts subsequent internationalization in that country or region (Arregle et al., 2018; Arregle, Miller, Hitt, & Beamish, 2016; Chang & Park, 2005). One reason is that the focal company learns and gets acquainted with the host territory, and is also

equipped by it. Thus, the co-location investment of one more value function becomes easier.

General international experience also benefits co-location greatly because of the decrease in knowledge-related barriers to FDI and corresponding transaction costs (Arregle et al., 2018; Delios & Beamish, 1999; Eriksson, Johanson, Majkgård, & Sharma, 1997), and an increase in absorptive capacity, which helps analysis and heuristics (Arregle et al., 2018; Eriksson & Chetty, 2003). Although accumulated general international experience helps MNEs transfer internal knowledge over distances across an MNE's dispersed units, the literature also articulates that general international experience enhances an MNE's ability to coordinate a more complicated overseas structure (Castellani & Lavoratori, 2020). As a result, an MNE's general international experience and managerial capability appear to allow it to choose from spatially scattered functions or co-locating complicated functions simultaneously. In our case, we examine how double-sided general international experience affects the co-location of marketing and production activities.

International experience can also be viewed in terms of breadth and depth (Jankowska & Götz, 2017; Riviere & Bass, 2019; Tang, Tang, & Su, 2019). International experience breadth, sometimes referred to as international (geographical) dispersion, is the extent to which an MNE's FDIs are distributed across foreign countries (Arregle et al., 2018; Castellani & Lavoratori, 2020). As an enterprise may choose to invest in a country/region multiple times, international experience depth represents the total number of FDI cases an MNE has had, as samples from diverse industries may have different monetary investment figures. Marketing knowledge is more locale-specific in learning (compared to R&D or production), and any international experience contributes to a firm's ability to manage a more complex subsidiary structure at a given location. Thus, from the perspective of organizational learning, international experience should positively relate to a firm's chance of co-locating marketing alongside the production function in a given host country. Therefore, the following hypotheses are proposed:

**H1-1.** *A firm's international experience breadth is positively correlated to its chance of co-locating marketing and production in an FDI host country.*

**H1-2.** *A firm's international experience depth is positively correlated to its chance of co-locating marketing and production in an FDI host country.*

### 2.3. External factors: Dependence on local linkages for knowledge and co-location

Many firms are intimidated and confine themselves to their home territories because the liability-of-foreignness concept assumes that cultural and institutional differences between a foreign country and the home country impose a risk on foreign investments (Chang & Park, 2005). Nevertheless, internationalization enables learning and allows firms to accrue three types of knowledge: technology, market, and social learning (Thakur-Wernz & Samant, 2019; Yeoh, 2004). Among all modes of foreign market entry, the highest levels of organizational learning result when firms choose to build foreign subsidiaries in host countries (Zahra, Ireland, & Hitt, 2000). Such international expansion, also known as FDI, positively impacts innovation, regardless of the type of value activity (manufacturing, R&D, or marketing) initiated (Thakur-Wernz & Samant, 2019). However, prior research has focused on studying the correlation between R&D and innovation for manufacturers, overlooking marketing.

Manufacturers in GVC generally display a pattern of local linkages in FDI by forming associations with the lowest risk first, and then with time implementing a sequence beginning with workers, to components and parts, to subcontracting, and finally to sources of R&D (T.-J. Chen, Chen, & Ku, 2004). Thus, when the chief technological know-how in an FDI is provided by a local R&D partner, the manufacturing firm should already have confidence in the host country, irrespective of whether the firm has a co-location of R&D and production or a pure production plant. If a firm grows confident in the host country, it is likely to increase its interest in

supplying the market nearest to the plant and conducting marketing-related activities. Earlier attempts to understand co-location found that marketing was often near the R&D function because co-location facilitates interaction and collaboration between the two different professional domains, resulting in new product development (NPD) (Allen, 1984; Griffin & Hauser, 1996; Kahn & McDonough, 1997; Van den Bulte & Moenaert, 1998). The globalization trend accelerates the exploitation and exploration of external R&D, and firms use external knowledge acquisition and offshore R&D outsourcing to improve innovation performance and employ FDI in R&D internationalization to hone competitiveness through knowledge acquisition (Leung & Sharma, 2021). For instance, emerging economies are interested in utilizing cross-border networking and offshore R&D facilities to target the global market, particularly in knowledge-intensive industries (Binz & Truffer, 2017; Cano-Kollmann, Cantwell, Hannigan, Mudambi, & Song, 2016; Leung & Sharma, 2021). In summary, it is postulated that a plant collaborating with or relying upon a local R&D partner as the chief source of technological knowledge has a higher chance of marketing and production co-location than a counterpart that does not do so. Thus, we propose the following hypothesis:

**H2.1.** *When the local R&D linkage is the chief source of R&D knowledge, there is a higher chance of co-locating marketing and production in the host country.*

In Resmini's (2000) study, manufacturing FDI shows that countries in Central and Eastern Europe with larger populations entice more FDI inflows. MNEs that search for customers in host countries conclude by encompassing productive activities once the market confers higher value to the firm (Bhattacharyay, 2018). Supplying host market consumption can save some transportation and administration costs, yet a capable manufacturing firm may not be proficient in marketing. In this case, manufacturing FDI might have to resort to a local partner for marketing co-efforts, especially because locals often have better knowledge of domestic environments than foreign firms. Once a firm is dependent on a local linkage for marketing, it could potentially co-locate the marketing function to supervise collaboration because the firm may not want to lose access and control over its customers or clients. In addition, the local marketing linkage is likely to be a means for organizational learning and upgrade in terms of market knowledge and social learning for the focal firm. Additionally, a higher internal and external embeddedness of MNC subsidiaries contributes to positive and multiplicative effects on the degree of knowledge transfer (Ferraris, Santoro, & Scuotto, 2018; Leung & Sharma, 2021). Hence, we propose the following hypothesis:

**H2.2.** *When the local marketing linkage is the chief source of marketing knowledge, there is a higher chance of co-locating marketing and production in the FDI host country.*

#### 2.4. Purposes: Marketing innovation for local market/global NPD and co-location

When manufacturers pursue functional upgrades through marketing, they choose marketing innovation. Marketing innovation does not yet have a universal definition in the literature, and is subject to change according to its usage context. For example, marketing innovation can cover the groundbreaking emergence of new ideas, products, business models, and alliance relationships, or incremental improvisation of existing ideas, products, business models, and alliance relationships (Gupta, Malhotra, Czinkota, & Foroudi, 2016; Lin & Chen, 2007). This can contribute to competitiveness or be a consequence of competitiveness (Gupta et al., 2016). It can also mean the effective acquisition of consumer information or efficient reduction of consumer transaction costs (Y. Chen, 2006). Marketing innovation can also be an innovative implementation of the 4Ps of marketing: product, price, promotion, and place (Shergill & Nargundkar, 2005). For economists, marketing

innovation concerns product and process initiatives, whereas for marketers, marketing innovation is captured more in the sense of commercialization (Gupta et al., 2016). Mauborgne and Kim (1997) posited that value innovation materializes through products, services, and deliveries. The current study follows a more integrated conception and views marketing innovation as an organization's devotion to novel or improved measures through marketing–production co-location, leading to more effective satisfaction of customer needs or creation of customer values through products, services, and delivery (Lin & Chen, 2007; Mauborgne & Kim, 1997; Wang et al., 2020). Additionally, the purposes of marketing innovation are divided into manufacturers upgrades for local demands or upgrades for global supplies of new products (which may or may not include the host country's market). The local market and NPD seem to be the two most prevalent factors for the co-location of production and marketing, and the current study aims to provide empirical support.

In terms of manufacturers upgrades with marketing co-location for local markets, cost-wise, supplying to local host markets decreases a firm's transportation, tariff, and other expenses. However, the firm's evolution to a different professional marketing domain requires organizational learning, resources, coordination, and expenses, which are likely to be more expensive than the transportation fees and tariffs combined. Additionally, the co-location of an extra department is costly and time-consuming, even for facility management alone (Kahn & McDonough, 1997). Therefore, potential profits must be lucrative enough to entice a manufacturer to incur extra costly investments.

The market size (including population -and affordability-wise) of the host country is often associated with FDI decisions. Scholars have shown that market size can potentially influence FDI inflows (Kravis & Lipsey, 1982; Na & Lightfoot, 2006). Dunning (1973) studied the determinants of FDI and revealed that market forces such as market size, growth, and per capita income in the host country, and cost factors, such as labor costs and inflation, are antecedents of FDI. Krugman (1991) developed a formal model explaining manufacturers' agglomeration in places of larger demand due to the desire to exploit economies of scale and minimize transportation costs. Resmini (2000) examined manufacturing FDI and found that nations with larger populations attract more FDI. Makki, Somwaru, and Bolling (2004) investigated the US food processing industry and concluded that market size, per capita income, and trade openness determine US food processing firms' overseas investments. Xaypanya, Rangakulnuwat, and Paweenawat (2015) examined FDI in the Association of Southeast Asian Nations (ASEAN) and linked market size and infrastructure facilities to FDI attractiveness. In summary, the market is repeatedly a driving force for foreign MNEs going abroad. Therefore, we argue that serving the local host market for profits (usually translated from a market size of affordability) will likely lead a manufacturing firm in a GVC to upgrade, learn, and co-locate marketing functions alongside production functions to better understand and cater to the host market. This relationship is supported by the following hypothesis:

**H3.1.** *When a manufacturer seeks to upgrade local demand, there is a higher chance of co-locating marketing and production in the FDI host country.*

OEM suppliers who take outsourced orders from advanced Western countries are often seen as followers of GVCs. Under competition pressure, OEM suppliers fortify themselves by upgrading their R&D or marketing capabilities. They upgrade and co-locate R&D or marketing functions either spontaneously or reactively to respond smoothly to their clients or changing market demands. Marketing is sometimes a means for upgrading, or part of customer commands, because of its potential to adapt to changing environments, create value for customers, and enhance performance (Day, 1994). In contrast, the mediation of the headquarters in passing on information to subsidiaries defers time and hurts agility. Even so, literature regarding the relationship between OEM upgrades and marketing capabilities is lacking. An exception is Eng

and Spickett-Jones (2009), who applied the eight marketing capabilities proposed by Vorhies and Morgan (2005) and found that NPD, marketing communication, and channel management are important marketing capabilities for manufacturing upgrades. When a subsidiary plant takes on the responsibility of NPD, the NPD is likely to support a host market with sufficient economies of scale or supply customers across boundaries at a larger global scale, or both. In addition to market considerations, if a subsidiary undertakes NPD rather than pure manufacturing, knowledge resources and human capital must either be excellent or cost-effective (in comparison to other counterparts in GVCs), and the location must be conducive to internal and external organizational learning. However, less codifiable or more complex knowledge can be difficult to transcribe even within a firm (Zander & Kogut, 1995). Co-location can facilitate mutual communication and collaboration within and between professions. This explains why marketing is often placed in proximity to R&D functions (Allen, 1984; Griffin & Hauser, 1996; Kahn & McDonough, 1997; Van den Bulte & Moenaert, 1998).

Although learning via the OEM seems plausible for transformation into an OBM, in reality, the number of successful examples is low. OEMs upgrade by shifting from cost competition to value creation in GVCs, as encouraged by marketing scholars. They also functionally upgrade their design and brand to intensify ties to GVCs and extend to the global market (Gereffi et al., 2005). However, there are concerns regarding the high uncertainties in terms of the failure rate and potential customer backlash resulting from the attempt to transform into an OBM. Accordingly, co-location is safer for OEMs to upgrade conservatively through value-added activities and maintain a low profile in cultivating flexibility, competitiveness, and profits. In conclusion, we propose that a subsidiary production site supports NPD (not necessarily limited to the host market, and possibly on a global level), as one of its key missions is more likely to have marketing co-located together with production functions.

**H3.2.** *When a manufacturer seeks to upgrade through NPD for global supply, there is a higher chance of co-location of marketing and production in the FDI host country.*

### 2.5. COVID-19 pandemic and co-location

Based on the extant literature (Barbieri et al., 2020; Boffelli, Fratocchi, & Kalchschmidt, 2021; Boffelli, Golini, Orzes, & Dotti, 2020; McIvor & Bals, 2021; van Hoek & Dobrzykowski, 2021), COVID-19 may initiate MNEs' relocation decisions. During the COVID-19 pandemic, relocating instead of co-locating could potentially reduce reliance on sources in a single area and improve supply chain resilience. Consequently, the co-location of marketing functions may be impaired because of the COVID-19 pandemic. However, this hurts the finding that firms should hone their marketing skills during and after a crisis. Gartner's (2020) survey of 260 global supply chain leaders across North and South America, the EMEA (Europe, Middle East, and Africa), and APAC (the Asia and Pacific Accreditation Cooperation) regions in February and March 2020 revealed that 33% moved or planned to move businesses out of China by 2023 owing to the COVID-19 pandemic. In contrast, a report by Euler Hermes-Allianz (2020) found that although 94% of respondents reported that their companies had suffered from supply chain disruption caused by the COVID-19 pandemic, only 15% considered relocating to a different production site. In a special edition of IBM's (2020) Global Location Trends, 60% of the respondents answered that they considered consolidating their company's operations in their home countries, whereas only 27% considered consolidating their overseas activities. In short, around 15%–27% of respondents from different studies reported that they considered to relocate or consolidate overseas activities. According to Chen, Hsu, Shih, and Caskey (2022), 151 out of 702 Taiwanese firms (around 21.15%) surveyed in March 2020 reshored back to Taiwan or to other offshore locations. Furthermore, because of the sunk costs incurred by divesting an old

production site and the burden of transplanting physical assets, if without institutional pressures and policy incentives, risk management is believed to be milder and more feasible than reshoring/nearshoring, relocation, and diversification (UNCTAD, 2021; Zhan, 2021). Co-location is also a type of FDI decision. As the COVID-19 pandemic may influence FDI in different ways such as the firm may become more conservative in investment figures or want to reduce reliance on a single site, the current authors propose the following hypothesis, validated empirically with actual events:

**H4.** If the COVID-19 pandemic affects a firm's foreign direct investment concerning GVC deployment, the chance of co-location of marketing and production in the FDI host country decreases.

## 3. Methodology

### 3.1. Data and sample collection

The data for this investigation were collected from questionnaires mailed to general or deputy general managers responsible for foreign investments in Taiwanese manufacturing firms. The *Survey on the Outward Foreign Investment of Taiwanese Manufacturers in the Year 2020*, compiled by the Ministry of Economic Affairs (MEA) in Taiwan, was sent to all 1,800 firms in the national database. The 1,800 firms had been officially registered in Taiwan for more than a year, and had attained the Taiwan government's approval for FDI. Questionnaires were distributed at the end of June 2020, and data collection by MEA lasted until December 2020. In total, 896 (49.78%) questionnaires were returned, 795 (44.17%) were valid. Of this population, 343 had manufacturing operations in China. Of the 343 firms in China, 173 recently initiated marketing and manufacturing operations. Many of the 343 firms had FDI in other countries, which is reflected as the breadth of international experience. The globe was divided into ten regions to capture this breadth. Among the 343 firms, 154 had FDI only in China, 103 had FDI in two different regions, and 86 had FDI in more than three regions, indicating that more than half of the firms had FDI experience in other regions.

Taiwanese FDI in China provides an empirical context for this study. China was selected as the host country for two reasons: First, given the statistical sample size consideration and the recent importance of China in GVCs, it was chosen as the host country for observation in this study. Second, as shown by increasing evidence (H. Chen & Chen, 1998; S.-H. Chen, 2004; Liu & Chen, 2012), Taiwanese firms in China have extended their operations from low-cost production to marketing and innovation for upgrading GVCs.

The MEA has conducted the *Survey on the Outward FDI of Taiwanese Manufacturers* in Taiwan, the government's official statistics database, annually since 2007. The collection process was divided into two stages to enhance the accuracy of the data: the first stage was to send the questionnaire, and the second stage was to confirm and clarify, by telephone or e-mail, any questions with general or deputy general managers regarding their answers. Furthermore, to ensure the validity of the research, between March and April 2021, the authors repeatedly validated the data and findings through discussions with the officers responsible for this statistical investigation.

### 3.2. Variables and measures

The dependent variable, the co-location decision, was a dummy variable assigned a value of 1 if the firm decided to co-locate manufacturing and marketing activities, and 0 if the firm only had a production function. Information on firms' co-locating activities was collected from the MEA database.

The independent variables in this study have five dimensions: international experience factors, local linkages for knowledge factors, marketing innovation, COVID-19, and control factors. The international experience factors were the breadth and depth of internationalization.

Referring to the approach of Hsu, Lien, and Chen (2013) and Khavul, Pérez-Nordtvedt, and Wood (2010), *breadth of internationalization* was measured by the firm's FDI geographic distribution across the global market. Specifically, we divided the global market into ten regions: mainland China, Northeast Asia, Southeast Asia, North America, Latin America, Bermuda and Caribbean, Western, North and Central Europe, Eastern and Southern Europe, Australia, and Africa. Furthermore, the variable FDI breadth of internationalization for each firm was the number of regions the company had invested in, spread across these 10 regions. Firms with existing operations in a greater number of areas have a greater ability to co-locate production than firms with fewer operational bases. In addition, *depth of internationalization* was calculated by identifying the total FDI of each company in the past. Firms with richer international experience in a greater number of areas or investment cases have a greater ability to co-locate production than firms without international experience.

Two local linkages for knowledge factors were measured; *R&D linkage* and *marketing linkage* were dummy variables. *R&D linkage* takes a value of 1 if the primary R&D knowledge source of the firm's FDI comes from local R&D recruits, local joint ventures, local R&D institutions, local OEM, or ODM manufacturers' technology transfer, and 0 otherwise. *Marketing linkage* takes a value of 1 if the primary marketing knowledge source of the focal firm's FDI case includes local marketing hires and marketing collaboration with a local partner, and 0 otherwise. Firms that are located offshore to take advantage of local R&D and marketing knowledge are more likely to co-locate. Previous studies have suggested that these variables are reasonable indicators of co-locating decisions (Chang & Park, 2005; Van den Bulte & Moenaert, 1998).

Two marketing innovation factors were measured; *upgrading for local demand* and *upgrading for NPD for global supply* were dummy variables. *Upgrading for local demand* took a value of 1 if the motivation of the firm's FDI for innovation expanded into local markets, and 0 otherwise. Furthermore, *upgrading for NPD for global supply* took a value of 1 if the motivation of the firm's FDI for innovation was developing new products for global supply and 0 otherwise. As the market is a driving force for MNEs to go abroad, we argue that serving the local or global market for profit will likely lead a manufacturing firm to upgrade and co-locate marketing functions alongside production functions. *COVID-19 pandemic* is captured using a dummy variable. If a firm replied that their FDI had been affected by the COVID-19 outbreak, they received a value of 1, and 0 otherwise.

Four control variables were added to our testing model because of their potential impact on the firm's co-locating decision. The control factors include four variables for their potential impact on the decision to co-locate: *firm size*, *R&D intensity*, and *intra-industry FDI*. *Firm size* and *intra-industry* were dummy variables. Following Taiwan's standards for identifying small- and medium-sized enterprises (SMEs) published by the MEA (an SME is defined as a manufacturing firm with less than 200 employees), the survey asked the respondent the type of their company and the number of employees working for the company. *Firm size* was set at 1 for large firms (200 or more employees) and 0 for small and medium-sized firms (<200 employees), as not all respondents filled in the exact number. Firms with a greater number of employees are likely to have employees working in different locations, increasing the chances of co-locating. Following Hsu et al. (2013), *R&D intensity* as a continuous variable is measured as the ratio of R&D expenditure to the firm's total sales revenue. As the R&D budget probably increases cooperation with the research community external to the organization in marketing (Florida, 1997; Ketokivi & Ali-Yrkkö, 2009), we suspect that marketing and manufacturing may be strongly interdependent. A dummy variable captures intra-industry FDI, with a value of 1 for firms within the same industry investing between headquarters and subsidiaries, and 0 otherwise. The underlying reason for interdependence may lie in the varying roles of manufacturing and marketing across different industries (Ketokivi & Ali-Yrkkö, 2009). According to Florida (1997), increasing internal linkages or contact points can help decrease communication

and coordination costs. We suspect that the co-location of marketing functions may help in understanding a different industry's market intelligence and mutual communication. Therefore, firms are more likely to co-locate marketing functions to increase contacts and facilitate inter-industry communication.

### 3.3. Regression model specification

The nature of the dependent variable requires the use of a logistic model to predict a firm's co-locating choice. The model is specified as follows.

$$P(Y_i = 1) = 1/[1 + \exp(-\alpha - X_{1i}\beta_1 - X_{2i}\beta_2 - X_{3i}\beta_3 - X_{4i}\beta_4 - X_{5i}\beta_5)]$$

where  $P(Y_i = 1)$  estimates the probability of co-locating for the  $i$ th observation.  $X_1$  is the vector of independent variables that capture international experience factors;  $X_2$  is the vector of variables that capture local linkages for knowledge factors;  $X_3$  is the vector of variables that capture marketing innovation factors;  $X_4$  is the vector of the variables that capture COVID-19 pandemic factors;  $X_5$  is the vector of the control factor;  $\alpha$  is the intercept; and  $\beta_1$ ,  $\beta_2$ ,  $\beta_3$ ,  $\beta_4$ , and  $\beta_5$  are estimated parameters.

## 4. Empirical results

Table 1 presents the variables, descriptive statistics, and correlation matrix for the 343 firms. Table 2 presents the results of the logistic regression model. All equations were well specified, with significant chi-square values (all  $ps < 0.01$ ). We only included the control variables to establish Model 1, while Models 2–4 show the hypothesized main effects.

To verify Hypotheses 1, we first added the international experience factors in Model 2 to test their effects on the decision to co-locate. The results of Model 2, shown in Table 2, indicates that the breadth of internationalization is positively related to the decision to co-locate. Hypothesis 1–1 ( $\beta_1 = 0.109$ ,  $p < 0.1$ ). A firm's international experience breadth has a positive association with the likelihood of its co-location of marketing and production in the FDI host country. However, the depth of internationalization is not statistically significant. Therefore, Hypothesis 1–2 ( $\beta_1 = -0.003$ ,  $p$  greater than 0.1) is not supported.

Next, we added local linkages for knowledge factors in Model 3 to test their effects on the decision to co-locate. The results of Model 3, shown in Table 2, indicate that firms that are located offshore to take advantage of local R&D and marketing linkages in the FDI host country were positively related to the decision to co-locate. These results support Hypothesis 2–1 ( $\beta_2 = 0.627$ ,  $p < 0.05$ ) and Hypothesis 2–2 ( $\beta_2 = 3.397$ ,  $p < 0.01$ ). These empirical results reveal that local R&D and marketing linkages for knowledge positively influence the decision to co-locate.

Third, we added marketing innovation factors in Model 4 to test their effects on the decision to co-locate. The results of Model 4, shown in Table 2, indicate that firms that are located offshore to seek upgrades for local demands or through NPD for global supply are positively related to the decision to co-locate. These results support Hypothesis 3–1 ( $\beta_3 = 0.599$ ,  $p < 0.05$ ) and Hypothesis 3–2 ( $\beta_3 = 0.580$ ,  $p < 0.05$ ). This study uses the latest data from December 2020 to extend the understanding of investment decisions under high uncertainties of the ongoing COVID-19 pandemic. In Model 4, we tested the COVID-19 pandemic factors for a firm's decision to co-locate. The results displayed in Table 2 show that the coefficient for COVID-19 impact ( $\beta_4 = -0.772$ ,  $p < 0.05$ ) is significant and negative, indicating that Hypothesis 4 is supported.

In Model 4, we tested the potential effects of the control factors on the firm's decision to co-locate. The results in Table 2 show that the coefficients for firm size ( $\beta_5 = 0.638$ ,  $p < 0.05$ ) and R&D intensity ( $\beta_5 = 1.656$ ,  $p < 0.05$ ) are significant and positive, indicating that large

**Table 1**  
Descriptive Statistics and Correlation Matrix.

| Variable                              | Mean  | S.D.   | 1       | 2       | 3       | 4      | 5       | 6      | 7      | 8      | 9     | 10     | 11   |
|---------------------------------------|-------|--------|---------|---------|---------|--------|---------|--------|--------|--------|-------|--------|------|
| 1 Co-location decision                | 0.504 | 0.501  | 1.000   |         |         |        |         |        |        |        |       |        |      |
| 2 Breadth of internationalization     | 2.035 | 1.277  | 0.082   | 1.000   |         |        |         |        |        |        |       |        |      |
| 3 Depth of internationalization       | 6.362 | 12.112 | 0.022   | 0.389** | 1.000   |        |         |        |        |        |       |        |      |
| 4 R&D linkage                         | 0.566 | 0.496  | 0.084   | -0.018  | 0.033   | 1.000  |         |        |        |        |       |        |      |
| 5 Marketing linkage                   | 0.810 | 0.392  | 0.428** | -0.051  | 0.047   | -0.064 | 1.000   |        |        |        |       |        |      |
| 6 Upgrading for local demands         | 0.583 | 0.494  | 0.262** | 0.056   | 0.024   | -0.025 | 0.330** | 1.000  |        |        |       |        |      |
| 7 Upgrading for NPD for global supply | 0.324 | 0.469  | 0.112*  | -0.068  | -0.062  | 0.003  | 0.017   | 0.016  | 1.000  |        |       |        |      |
| 8 Firm size                           | 0.729 | 0.445  | 0.130*  | 0.320** | 0.202** | 0.034  | -0.061  | 0.003  | -0.055 | 1.000  |       |        |      |
| 9 R&D intensity                       | 0.134 | 0.224  | 0.207** | -0.003  | -0.031  | 0.081  | 0.106*  | 0.013  | 0.057  | 0.119* | 1.000 |        |      |
| 10 Intra-industry FDI                 | 0.974 | 0.160  | -0.090  | 0.047   | -0.060  | 0.077  | -0.033  | -0.028 | 0.036  | -0.018 | 0.015 | 1.000  |      |
| 11 COVID-19 pandemic                  | 0.184 | 0.388  | -0.117* | -0.007  | 0.021   | 0.051  | -0.020  | -0.072 | -0.022 | 0.018  | 0.029 | -0.016 | 1.00 |

Note: SD stands for standard deviation. Sample size: 343; Co-location cases: 173; Non-colocation cases: 170. \*Significant at the 0.05 level; \*\*significant at the 0.01 level.

**Table 2**  
Logistic Results for the Marketing and Production Co-location Decision.

| Independent variable                | Model 1      |         | Model 2      |         | Model 3      |         | Model 4      |         |
|-------------------------------------|--------------|---------|--------------|---------|--------------|---------|--------------|---------|
|                                     | Coefficients | P-value | Coefficients | P-value | Coefficients | P-value | Coefficients | P-value |
| Intercept                           | 0.850        | 0.315   | 0.767        | 0.367   | -2.386**     | 0.033   | -2.689**     | 0.014   |
| Breadth of internationalization     | -            | -       | 0.109*       | 0.078   | 0.212*       | 0.067   | 0.203*       | 0.084   |
| Depth of internationalization       | -            | -       | -0.003       | 0.758   | -0.013       | 0.235   | -0.012       | 0.284   |
| R&D linkage                         | -            | -       | -            | -       | 0.627**      | 0.016   | 0.634**      | 0.016   |
| Marketing linkage                   | -            | -       | -            | -       | 3.397***     | 0.000   | 3.155***     | 0.000   |
| Upgrading for local demands         | -            | -       | -            | -       | -            | -       | 0.599**      | 0.027   |
| Upgrading for NPD for global supply | -            | -       | -            | -       | -            | -       | 0.580**      | 0.039   |
| COVID-19 pandemic                   | -0.701**     | 0.018   | -0.701**     | 0.019   | -0.799**     | 0.016   | -0.772**     | 0.021   |
| Firm size                           | 0.513**      | 0.043   | 0.430        | 0.110   | 0.632**      | 0.032   | 0.638**      | 0.034   |
| R&D intensity                       | 2.036***     | 0.000   | 2.057***     | 0.000   | 1.648**      | 0.010   | 1.656**      | 0.011   |
| Intra-industry FDI                  | -1.370*      | 0.100   | -1.433*      | 0.087   | -1.791*      | 0.072   | -1.819*      | 0.061   |
| <b>Model Fit</b>                    |              |         |              |         |              |         |              |         |
| Log-likelihood                      | -223.571     |         | -222.974     |         | -183.516     |         | -178.754     |         |
| Restricted Log-likelihood           | -237.736     |         | -237.736     |         | -237.736     |         | -237.736     |         |
| Chi Square                          | 28.331       |         | 29.525       |         | 108.441      |         | 117.965      |         |
| Significance level                  | 0.0000***    |         | 0.0000***    |         | 0.0000***    |         | 0.0000***    |         |
| Cox & Snell R2                      | 0.079        |         | 0.082        |         | 0.271        |         | 0.291        |         |
| Correct classification rate (%)     | 61.20        |         | 61.80        |         | 71.10        |         | 73.50        |         |

Note: Dependent variables: Co-location = 1; Non-colocation = 0.

\*Significant at the 0.10 level; \*\*significant at the 0.05 level; \*\*\*significant at the 0.01 level.

firms and manufacturers with a high degree of R&D intensity are more capable of co-locating. However, the coefficient of intra-industry FDI ( $\beta_{5-3} = -1.819, p < 0.1$ ) is significant and negative, meaning that firms with intra-industry FDI are less likely to co-locate.

**5. Discussion and conclusion**

Previous studies have concentrated on the co-location of R&D and production (Ambos et al., 2021; Castellani & Latoratori, 2020; Eng & Spickett-Jones, 2009) or the co-location of R&D and marketing (as the juxtaposition of R&D and marketing is the most frequent) (Griffin & Hauser, 1996; Kahn & McDonough, 1997; Van den Bulte & Moenaert, 1998). Consequently, the co-location of marketing and manufacturing has been underexplored. This scarcity is particularly prominent when a crisis, such as the COVID-19 epidemic, seriously affects GVC (Ambos et al., 2021; Gereffi, 2020; Kano & Oh, 2020; Verbeke, 2020). Similar to the COVID-19 pandemic, crises and associated challenges can spur innovation (Ebersberger & Kuckertz, 2021), and marketing innovations have been found to have the most agile response strategies (Wang et al., 2020). Therefore, this study aims to focus on marketing upgrades, especially for OEMs interested in transforming along the trajectory of the OEM-ODM-OBM. In reality, successful examples of OEM transformation to OBM are scarcer than theoretically implied. Reasons for

this include high investment, failure rate, and the possibility of outages from outsourcing clients (Chin et al., 2016; Gereffi, 2009). Therefore, we propose co-locating marketing and production as a safe strategy for organizational learning, upgrading, flexibility, and margins. Through evidence, we provide empirical support to explain why some manufacturers have pioneered in co-locating marketing value activities alongside production value activities. The results indicate that, except for the depth of international experience, all proposed factors support a co-location decision of marketing together with production.

We offer the following plausible explanations for the lack of association between depth of international experience and marketing co-location. According to Thomas and Eden (2004), breadth may be a more important determinant of performance than the traditional depth of international experience for foreign sales. Åkerman (2015) found that non-significant results for the depth of international experience show that time in global markets may be less critical than international experience breadth. Thus, one plausible explanation is that when the theme is pertinent to marketing or international markets, the breadth of international experience is more determinant. Moreover, prior research has found that deeper and broader international experience increases the likelihood of adopting a more complicated mode elevation than simpler mode duplication (Putzhammer, Fainshmidt, Puck, & Slangen, 2018). However, there is also evidence indicating a lack of significant

relationships between the depth of international networks and the development of explorative capabilities in SMEs emerging from China (Xiao, Lew, & Park, 2020). The international network depth is more related to the search for market knowledge, and international network breadth is more correlated with the quest for technological knowledge (Prashantham, Zhou, & Dhanaraj, 2020). As such, we propose that the shared Chinese culture between China and Taiwan, plus the “fly-man” strategy because of the geographical proximity, have reduced the quest for market knowledge. Further, this reduction has affected the association between the depth of international experience and Taiwanese firms’ co-location of the marketing function in China. The “fly-man” strategy is the frequent rotation of managers between headquarters and subsidiaries or the relocation of a whole team periodically, a method employed by numerous Taiwanese MNEs to manage their subsidiaries in China (Lo, Mahoney, & Tan, 2011). Nonetheless, such a “fly-man” strategy becomes expensive in the context of breadth of internationalization for the transfer of knowledge. Future research is needed to probe this topic further using other home–host dyads. In summary, this research empirically validates several factors that influence co-locating decisions in uncertain environments. The findings provide valuable theoretical, practical, and strategic insights into how firms managed their value chains during the COVID-19 outbreak. Firms that felt COVID-19 affected their FDI plans chose to decrease co-locating the marketing function in their plant, and they should consider increasing their marketing innovation capability during the pandemic and for future crises.

### 5.1. Theoretical contributions

This study links co-location to organizational learning, KBV, and, specifically, the recent interactive and open innovation model. Previous research streams in international business have borrowed the interactive and open innovation model to study GVC concentrated on (1) global knowledge sourcing, (2) GVC governance, and (3) the co-location of R&D and production. Our study explores the barely discussed academic realm of marketing–production co-location, during a turbulent time when marketing should be embraced more (Wang et al., 2020). Through literature exploration and empirical examination, we discover that the breadth of a manufacturing firm’s international experience, dependence on the local linkage for major R&D and marketing know-how, aspirational marketing upgrades for local demand, and NPD for global supply positively impact firms’ decisions to co-locate marketing functions with production functions. Moreover, the literature implies that the local market and NPD are the two driving forces for marketing co-location, which the current study illustrates and validates. Specifically, this study uses the latest data, from December 2020, to extend the understanding of co-locating decisions during the ongoing COVID-19 pandemic. We attempt to explain that the association between the depth of international experience and marketing co-location in our culturally and geographically close context is not significant. In a different context, GVC governance for marketing co-location and global knowledge sourcing for market knowledge are directions for future research or a comparison with the current study.

### 5.2. Managerial implications

This study encourages manufacturing firms that would like to upgrade through marketing to consider the co-location of marketing and production as a low-profile strategy to cultivate flexibility, marketing capabilities, and opportunities for the future to transform into an OBM. The first step is to understand the factors that lead to the occurrence of co-location of marketing. Before its FDI decision, a firm can perform a resource check and evaluate whether it has adequate relevant international experience to conduct co-location FDI. This task requires sophisticated skills to manage a more complex subsidiary and structure abroad. The second resource check is on the chief knowledge inputs for the subsidiary in terms of R&D and marketing. If it relies on the locale

for major R&D and marketing inputs, the firm should consider co-locating marketing value activities for intra- and inter-organizational interaction and learning. The co-location of different functions promotes communication and collaboration (Kahn & McDonough, 1997; Van den Bulte & Moenaert, 1998). In recent decades, for innovation and competitiveness, the MNEs’ internationalization topic has extended to R&D internationalization. However, firms should combine internal and external R&D activities only after thoroughly examining their internal resources before external R&D links are acquired (Diéguez-Soto, Manzaneque, González-García, & Galache-Laza, 2019; Giacomarra et al., 2021). The same approach should also be applied to marketing.

The resource check should be extended to the competitors’ end. If the competitors tap into a co-location strategy, management should stay alert and be ready to decide whether and how to react. Competitors should also be more likely to adopt a marketing co-location strategy to capitalize on the host country market or NPD on a global scale. In that case, competitors that are functionally upgrading stand a higher chance of becoming OBMs in the future. If they do not have sufficient international or external networking experience, management should consider adopting marketing co-location or other organizational learning measures. Furthermore, for management looking to capitalize on the host country market or NPD at a global scale, this paper proposes marketing co-location as a flexible, springboard strategy to be taken into account. For example, YAGEO, a leading global electronics company, has enhanced its strategic partnership with major clients for local R&D advancements. The firm established local marketing linkages to expand its local market and serve the increasing demand for customized high-end specialty products for global supply. In other words, they co-located R&D and marketing value activities as an OEM upgrade strategy.

Finally, referring to related literature (Barbieri et al., 2020; Boffelli et al., 2020, 2021; McIvor & Bals, 2021; van Hoek & Dobrzykowski, 2021), we realize that COVID-19 may be related to initiating relocation decisions. During the current pandemic, some firms moved their investments out of China. Supply chains are a core concern for firms worldwide. Therefore, manufacturers who decide to relocate rather than co-locate may consider reducing their reliance on sources in a single area and increasing the resiliency of the firm’s supply chains. However, the competitiveness of a global subsidiary is determined by its capacity or the parent company’s capacity to upgrade a GVC and involves higher value-adding activities. A move from pure production to a higher value function is often seen as the peak for subsidiaries upgrading within a GVC to ensure long-term survival (Ambos et al., 2021). Due to the trade-off of relocation for reduced reliance on a single area and the co-location for increased competitiveness in a GVC or crisis, management can refer to this study’s antecedents of marketing co-location when conceiving the restructuring of their global supply chain map.

### 5.3. Limitations and future research

Given the sample size constraint, the observations are only based on FDI cases of Taiwanese manufacturers in mainland China; both sides are important players in the current GVCs. As Taiwan and China are seen as followers of GVCs, studies regarding the determining factors, moderating forces, and performance of (marketing) co-location investments in advanced countries are welcome. In addition, Taiwan and China share a similar Chinese culture; therefore, studies across different cultures or diverse host countries are encouraged for further comparison. This study adopted a cross-sectional quantitative approach. Future research can compensate by adopting a longitudinal qualitative approach and exploring alternative themes, such as how other stakeholders (e.g., governments and employees) influence (marketing) co-location decisions, or how different employees’ functions/levels support this idea throughout the process. If panel data are available, future research can also delve into how different periods along the three evolving models impact MNEs’ marketing co-location decisions and even extend the research by making comparisons before, during, and after the COVID-19



crisis. The survey inquired about the major purpose of FDI, with NPD being one of the listed options. Future research can retrieve actual patent performance and compare it to the current study results or have patent performance serve as one of the performance indicators for marketing co-location investments. Another constraint is that the official data constitute only the investments that occurred in the year in question. Future research, if without budget restraints, can survey all companies in a certain country/area to capture investment plans that were pending or abandoned during COVID-19. In addition to COVID-19, future research can examine how different events (such as a trade war between nations and geopolitical changes) affect co-location investments, or how different timings (such as the ups and downs of COVID-19 infection numbers) influence co-location/FDI decisions. Since April 12, 2020, and nearly throughout our survey period, Taiwan did not have any local coronavirus cases (BBC, 2022; Bloomberg 2020) for more than 200 days. Therefore, comparative studies from different countries are encouraged to learn about the effects of timing and fluctuations.

As a final remark, the authors would like to invite more research on co-location. It is a burgeoning field, and collaboration and competition, both features of co-location, have led to the growth of society.

### CRedit authorship contribution statement

**Yu-Yuan Shih:** Writing – review & editing, Resources, Methodology, Formal analysis, Conceptualization. **Chih-An Lin:** Writing – review & editing, Writing – original draft, Validation, Project administration, Methodology.

### Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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