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The Key Factors of Successful Cross-Border E-Commerce Advancement in Southeast Asia: Grey Relational Analysis of Sustainability

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Abstract

Taiwanese e-commerce businesses are currently accessing their expansion into Southeast Asian markets. This study analyses the key factors that cross-border e-commerce businesses must possess to achieve success in the Southeast Asian markets under the concern of sustainability. Retrieved factors were used in the formation of surveys for both Taiwanese and foreign parties in which the results will be analysed using grey relational analysis. Eventually, the findings and determined key factors from the analysis will be discussed and combined with related The New Southbound Policy and Productivity 4.0 policies of the Taiwanese government.

Keywords: *cross-border e-commerce, sustainability, grey relational analysis, new southbound policy, productivity 4.0*

1. Introduction

The Taiwan Ministry of Economic Affairs ROC reported that the country's e-commerce transactions remain a double-digit growth each year. Revenue from retail e-commerce in Taiwan reached NT\$221.2 billion in 2016, and the annual growth rate was 12.3% (Taiwan Network Information Center, 2018). However, statistics have also shown that the growth rate has significantly slowed down due to current saturation. The Taiwanese e-commerce industry has been in development for over 20 years and is now in the maturation period. Many online e-commerce platforms, such as PChome, Ruten, and Yahoo, have emerged on the island. A mixture of local retailers, such as PXMart and AMart, have also gone online in pursuit of the trend. Telecommunications industries are also booming, acting as a synergy to the progress of the Taiwanese e-commerce industry. The size of an e-commerce transaction is evaluated by the number of consumers on the internet and the amount of consumption. Mainland China has around 730 million internet population and almost 467 million online shopping population that are potential consumers, compared to Taiwan's net population of around 20 million, with an estimated 85% (17 million) of whom shop online in 2016. The difference in potential buyers between the two markets is nearly 37 times. The net population and online shoppers in Taiwan have not ceased to increase since 2013, rising from only 17.98 million to 19.93 million and 13.53 million to a total of 16.8 million, respectively, in 2016. However, the island's economic annual growth has gradually decreased from 12.42% to only 6.46%, signifying the fact that the e-commerce market in Taiwan has gradually reached saturation. This is also one of the main reasons why the Taiwanese e-commerce industry has been extremely active in seizing opportunities for outward expansion. There are still many restrictions on product imports and exports in cross-border e-commerce. These limitations are mainly established to protect local businesses, yet they create great obstacles and make it harder for foreign investors, especially smaller businesses, to gain access to the market. Logistics costs are higher; the delivery time is longer for goods that must be tested before entry, and there are many variables and additional fees in cross-border transactions and delivery. There are other issues, such as adaptation to local consumption habits, laws and regulations, business models, existing competitors, customs clearance processes, and commodity quality inspections, which must be considered. Trade agreements between countries could also be in the way of smooth cross-border e-commerce development. Cross-border e-commerce is a relatively young business in comparison to many other Taiwanese industries, which results in the limitation of relevant research, literature, and actual cases of Taiwanese cross-border e-commerce entering the Southeast Asian market. This triggered the motivation of study to determine the key factors and awaiting challenges for cross-border e-commerce to achieve success and sustainability in these regions, and to act as a

reference for local e-commerce operators that are currently assessing investing abroad. The findings of the study could also aid the internationalisation process of Taiwanese e-commerce businesses.”

This study aims to assess the key factors that current cross-border e-commerce companies should possess or improve to achieve success and sustainability in the Southeast Asian market and to determine how to maximise their benefits in coordination with Executive Yuan’s New Southbound Policy and Productivity 4.0. The literature on the characteristics of current cross-border e-commerce platforms is reviewed to shape the list of important factors, which will be later analysed using a grey relational analysis model to determine their correlation. Discussions will also focus on the current situation, potential challenges, and future predictions of the Southeast Asian market to better merge the findings with the determined key factors.

The study contributes to the literature in multiple ways. First, it provides cross-border e-commerce businesses with the top six most influential factors for advancing in the Southeast Asian market, along with their categories. The findings of the study are cross-filtered by two different groups of respondents, Taiwanese and foreigners, to enhance credibility. Furthermore, the study’s findings will aid in the discussion about the sustainability of business in the Southeast Asian market, which has rarely been addressed by the current literature. Lastly, directions and recommendations are provided for future cross-border e-commerce companies on how to cooperate with and use some items in the two freshly launched Taiwanese governmental policies, the New Southbound Policy and Productivity 4.0, to their own advantage.

2. Cross-Border E-Commerce

E-commerce businesses tend to be confronted by matters such as information flow, finance flow, logistics, online security, community management, marketing, customer service, etc. Given that the area covered by “cross-border” e-commerce is much wider than the traditional e-commerce business, it is undoubtedly impacted by even more factors, deriving from three categories—economy, society, and environment (Wang, 2016). In general, cross-border e-commerce is an international online trade that entails the sale or purchase of products via online shops across national borders, which is the narrow sense of the current definition of cross-border e-commerce. In fact, the term cross-border e-commerce has been vague for a long period, and the definition of this subject has not been agreed upon internationally until recent years. This new type of trade module is considered to be more complicated, as it is a combination of both international trade and e-commerce. One of the biggest pain points of cross-border e-commerce lies in the integration of information flow,

financial flow, logistics and networking of different borders; any flaw in the integrating process can hinder the smoothness and completion of online business transactions. Further, international trade has to deal with a non-stationary environment and factors such as political environment, foreign exchange, legal norms, tariff, and freight. As cross-border e-commerce is relatively young, regulations of this new business are still stiff in fields such as customs clearance, payment, and taxation.

2.1 Processes and Service Providers of Cross-border E-commerce

Service providers play a critical role as middlemen in charge of the whole process of cross-border e-commerce, including payment, marketing, goods delivery, and even after-sales service. A clear dissection of the process is presented to reveal the importance and role of each part. The International Post Corporation (2017) reported that the logistics industry plays one of the most important roles among the service providers of cross-border e-commerce; it is responsible for both cost-effective and quality services between the platforms and consumers. A sound logistics industry can resolve cumbersome linkages in the process, speed up the delivery of products, and contribute to consumer satisfaction. This clearly identifies the necessity of choosing the right logistics industry, as it heavily impacts the operation of cross-border e-commerce platforms. The competence and capability of a good logistics industry is usually determined by its flexibility, initiative to communicate with customers, and information management. Sheji Ho (2015), who currently owns many logistics operations in Southeast Asia, believes that there are six key elements to the creation of a successful cross-border e-commerce. The elements, named the “6 Ps of cross-border e-commerce,” are processes, platform, product, people, politics, and promotion. This mainly shows the importance of the cross-border e-commerce industry to acquire competent service providers through the six aspects for successful operations abroad. The authors also described how most issues of cross-border e-commerce can be resolved through partnership with the local logistics industry, which can greatly reduce the cost of business operations and help overcome many challenges. Thus, although cross-border e-commerce companies may be able to communicate directly with consumers in terms of merchandise, marketing, trading, etc., regarding localisation, expansion of new market, and the delivery of products in the final step, most of the companies will be in desperate need of trustworthy third-party service providers to manage the distribution overseas and other operational issues. Further, some areas only support cash-on-delivery as a payment method instead of online transactions. In this case, the significance of cooperating with the right service providers is greatly illustrated.

2.2 Types of Cross-border E-commerce

Cross-border e-commerce can be categorised based on transaction objects, trading channels, cargo flow, and customs supervision. If classified according to the difference of transaction objects, cross-border e-commerce can be divided into B2B, B2C, C2C, B2G and several other categories, such as B2B2C, which holds much resemblance to traditional e-commerce. If categorised based on trading channels, cross-border e-commerce can be divided into electronic data interchange and the internet. Based on the direction of cargo flow, there are import cross-border e-commerce and export cross-border e-commerce as categories of cross-border e-commerce. Based on customs supervision, cross-border e-commerce is separated into general cross-border e-commerce and bonded cross-border e-commerce. General cross-border e-commerce is mainly used in regular imports and exports of goods, mostly for small amounts of transactions and quotas, whereas bonded cross-border e-commerce, however, is primarily used in bonded imports and exports in which a large quantity of products goes in and out of bonded warehouses under the customs department. It is easier for online platforms to manage their products through bonded areas, which has proven to be less costly and more convenient. Therefore, the procedures of going through customs clearance and other aspects are significantly different for both cross-border e-commerce and bonded cross-border e-commerce.

In KPMG's ASPAC-E-commerce guidelines (2016), the method used to categorise the types of cross-border e-commerce is according to its operating mode. The guidelines stated that a great portion of the world's current cross-border e-commerce is still composed of small vendors through online platforms and self-run websites. Some individuals choose to open online virtual shops through big cross-border e-commerce platforms that provide them with different distribution channels: direct shipment or bonded warehouses; other individuals who choose to run their own cross-border e-commerce business through self-run sites also have the options of direct shipment or going through bonded warehouses.

2.3 Characteristics and Potential Challenges of the Southeast Asian E-commerce Market

In this section, the current situation, characteristics and potential challenges of the Southeast Asian e-commerce market are discussed, starting with background information on the top six countries in e-commerce in the region: Singapore, Malaysia, Thailand, Vietnam, Philippines and Indonesia. According to Remi (2016) and Ho (2016), the Southeast Asian market is expected to become one of the world's top emerging markets with rapid growth of e-commerce revenues, which is estimated to exceed 25 billion US dollars by the year 2020. It is also expected to climb from the seventh of the world's largest economy to number four by

2030, due to the upcoming reformation of the national tax system towards foreign investors. According to the 2016 report of the “E-Conomy Southeast Asia”, the market earned 13 billion US dollars in 2016, which is 2 billion more than the previous year’s earnings despite several new-coming foreign acquisitions and market exits. The authoritative company on world economic growth, Frost & Sullivan, is also optimistic about the potential growth of e-commerce in Southeast Asia and recommends investment. More Southeast Asian countries have been actively engaged in the signing of Free Trade Agreements (FTA) and the Comprehensive Economic Partnership Agreement with their neighbouring countries. Most countries in the region have already signed free trade agreements with countries such as China, Japan, Korea, New Zealand, Australia and India; many more are still proceeding. Therefore, it is necessary for Taiwan to bridge the relationship with these countries and have trade agreements. While the e-commerce market in Southeast Asia gradually thrives and blooms, many challenges still lie in its path to prosperity. For starters, the region’s geographical fragmentation of islands has made the market itself extremely difficult for foreign cross-border e-commerce platforms to establish a foundation and build a scale; distribution of products is also heavily dented (Meszaros, 2017). Further, the broad range of languages, races, custom regulations and consumer behaviour in these regions is a barrier. In general, the e-commerce industry in the Southeast Asian market faces three main challenges: regulations, delivery, and marketing (Herrod, 2016).

Most countries in Southeast Asia are currently developing a series of laws for their e-commerce business. While some regulations may aid in the protection of e-commerce data and online transactions, some may not be that attractive to foreign investment. Product delivery is one of the major challenges in Southeast Asia, with Singapore having a better distribution mechanism and delivery networks. Tongzon and Nguyen (2013) state that even local postal services are unreliable most of the time in the region, as most local logistics firms are costly or not ready to handle the deliveries of a large quantity of small packages. Online marketing is much trickier in Southeast Asia than in other regions. The differences in languages, traditions and cultures make it hard for the foreign e-commerce industry to establish a scale and fixed market entry. It has proven to be a great challenge to create a platform that suits so many local challenges and cultures while meeting various customs regulations.

Consumer behaviour also varies; their preference explains their shopping pattern and why they may be reluctant to purchase products from certain websites (Pavlou, 2003). This is when a degree of cultural sensitivity is required. Critical cultural insights can help smooth the process of foreign brands’ online platform entry and their e-commerce implementations (Lopez and McKevitt, 2017). Only through research and a deep understanding of the local

people's shopping behaviour and routine can a cross-border business be truly successful in Southeast Asia. Although the Southeast Asian market faces many challenges that are not easy to overcome, the potential profit that this market can generate still draws big global cross-border e-commerce players like moth to the flame.

3. Methodology

3.1 Data Source and Survey Design

This study used the framework in Figure 1 to explore the relationship between cross-border e-commerce sustainability and the current characteristics of the cross-border e-commerce industry, addressing some challenges in the Southeast Asian e-commerce market. A total of 36 economic, social, and environmental sustainability factors controlling the characteristics and challenges were identified and used to formulate a survey, the data of which were later used in a grey relational analysis.

The survey was divided into three parts. In Part 1 listed the challenges and factors in the promotion of Taiwanese cross-border e-commerce and sustainability, a total of 36 factors derived from economic sustainability, social sustainability, and environmental sustainability. Respondents evaluated the influence level of these factors on the expansion of Taiwanese cross-border e-commerce in Southeast Asia. Part 2 examined the knowledge degree of the public towards Executive Yuan's New Southbound Policy and how effective people perceive the policy will be on the development of cross-border e-commerce. The final part of the survey captured personal information and an assessment of respondents' general opinions and experiences on the topic. The survey was designed using a five-point Likert scale, in which 1 represents very insignificant (strongly disagree), 2 represents not significant (disagree), 3 stands for neutral, 4 represents significant (agree), and 5 means very significant (strongly agree).

3.2 Grey Relational Analysis (GRA)

Grey relational analysis (GRA), also known as Deng's Grey Incidence Analysis model, was developed and published by Professor Julong Deng in 1979. Concept and information used by GRA should be specific, as they are further categorised into three situations according to the perfectiveness of provided information. Situations with no information are defined as black, and situations with perfect information are considered white. However, these black and white situations are too idealised and seldom occur in real-world situations (Deng, 1982). In the real world, many systems are abstract, unclear, and lack specific mechanisms and prototypes; such situations occur between the black and white extremes and are depicted as grey (Chan and Tong, 2007).

A grey situation is like a blurred and unsure situation, which means that part of the information in this situation is known, while other parts could still remain unknown. As these situations are hard to describe accurately, people can only use logical reasoning, certain ideas and criteria to determine the structural concept of these grey situations, and to express the result with a series of models (Kung and Wen, 2007). Examples of grey situations and systems in the real world are social systems, ecosystems, economic systems, military systems, agricultural systems, and human systems. In general, the behaviour of systems and situations is mostly irregular and hard to predict. The aim and main attempt of GRA is not to find the best solution for the situation, but to supply appropriate ideas and feasible techniques to the forming of a fitting solution for the real world. To determine the connection and influence of elements to the situation (Liu, Yang and Forrest, 2017). Nowadays, GRA is widely used in many fields, such as quality control, engineering, computer science, and performance evaluation.

In this study, GRA was used to evaluate the influence, connection, and impact between the factors. The operation of GRA starts with a small amount of information and uncertain data, and gradually tries to analyse, quantify, and understand the pattern of the relationship from different angles. In conducting the GRA, the first thing is to determine the sequence that features the system. Next, the sequence is regularised before calculating the difference between the referential sequence and the comparative sequence. In this study, a 5 for each of the 36 factors of cross-border e-commerce to sustainability was identified as the referential sequence, whereas results from the survey respondents were denoted as the comparative sequences. After the calculation using the GRA formula, the final result is obtained, called the grey relational coefficient and grey relational grade, which acts as the degree of grey correlation.

To meet the conditions and conduct the GRA, the data must be normalised beforehand. The methods of normalisation can be divided into three: the Larger The Better, the Smaller The Better, and the Nominal The Best.

1. The Larger The Better (LTB)

$$x_i^*(k) = \frac{x_i(k) - \min[x_i(k)]}{\max[x_i(k)] - \min[x_i(k)]} \quad (1)$$

2. The Smaller The Better (STB)

$$x_i^*(k) = \frac{\max[x_i(k)] - x_i(k)}{\max[x_i(k)] - \min[x_i(k)]} \quad (2)$$

3. Nominal The Best (NTB)

$$x_i^*(k) = 1 - \frac{|x_i(k) - OB|}{\max\{\max[x_i(k)] - OB, OB - \min[x_i(k)]\}} \quad (3)$$

where $x_i^*(k)$ is the value generated by the grey relations.

$\max[x_i(k)]$ is the maximum value in $x_i(k)$.

$\min[x_i(k)]$ is the minimum value in $x_i(k)$.

OB is the specific value selected as the nominal.

The GRA can be applied to obtain the grey relational grade. The analysis process is as follows:

Step 1. Formation of referential sequence $x_0(k)$

$$x_0(k) = \{x_0(1), x_0(2), \dots, x_0(n)\} \quad (4)$$

Step 2. Formation of comparative sequence $x_i(k)$

$$x_i(k) = \{x_i(1), x_i(2), \dots, x_i(n)\} \quad (5)$$

Step 3. Calculation of Δ_{0i} , $\Delta(\min)$ and $\Delta(\max)$

where $\Delta(\min)$ and $\Delta(\max)$ are the minimum and maximum values of the absolute difference between the parent factor and the sub-factor at all times.

$\Delta_{0i}(k) = |x_0(k) - x_i(k)|$ is the absolute value of the difference between $x_0(k)$ and $x_i(k)$.

$\Delta_{\max} = \max_{\forall j \in i} \max_{\forall k} \Delta_{0i}(k)$ is the maximum difference between the sequences—the biggest $\Delta_{0j}(k)$ of all x_i .

$\Delta_{\min} = \min_{\forall j \in i} \min_{\forall k} \Delta_{0i}(k)$ is the minimum difference between the sequences—the smallest $\Delta_{0j}(k)$ of all x_i .

Step 4. Calculation of the grey relational coefficient (Deng, 2003)

$$\gamma(x_0(k), x_i(k)) = \frac{\Delta_{\min} + \zeta \Delta_{\max}}{\Delta_{0i}(k) + \zeta \Delta_{\max}} \quad (6)$$

$k = 1, 2, 3, \dots, n \in N$, which indicates that there are “n” factors in each of the sequences.

$i = 1, 2, \dots, m \in N$, which indicates that there are a total of “m” sequences.

ζ is called the distinguishing coefficient, and the value of ζ is usually $\in [0, 1]$;

typically, in GRA, the value of ζ is set to 0.5, but it is adjustable when bigger differences among results are being targeted. However, the alteration of the value ζ will only modify the relative value, which will not affect the sequence and degree of grey correlation.

Step 5. Calculation of the grey relational grade

The calculation of the grey relational grade measures the average grey relational coefficient (Deng, 2003).

$$\gamma(x_0, x_i) = \frac{1}{n} \sum_{k=1}^n \gamma(x_0(k), x_i(k)) \quad (7)$$

The grey relational grade can also be categorised into either localised grey relational grade or globalised grey relational grade. Localised grey relational grade involves only the use of a sequence $x_0(k)$ as the referential sequence, and the rest sequences are all comparative sequences. With globalised grey relational grade, any sequence can be used as a referential sequence. At the end, the results of the grey relational grade indicate the degree of correlation between the sequences. A grey relational grade closer to 1 indicates a higher correlation.

Step 6. Arrange the grey relational ordinal

Lastly, all the sequences are sorted in order of their corresponding grey relational grade; any sequence with a relatively larger value is denoted as a more important factor, otherwise it is less important. This order of arranged sequences is called the grey relational ordinal, which provides the correlation and importance of the factors and key elements.

Taking referential sequence x_0 and two comparative sequences x_i and x_j as example, if $\gamma(x_0, x_i) \geq \gamma(x_0, x_j)$, then the correlation between x_i and x_0 is bigger than the correlation between x_j and x_0 , which is indicated as $\gamma_{0i} > \gamma_{0j}$.

4. Results

A total of 418 participants, including 207 Taiwanese and 211 foreign respondents, were surveyed. Responses were collected between 12th May 2017 and 31st May 2017. A total of 433 surveys were handed out. The survey addressed 36 factors of the sustainability of the cross-border e-commerce industry, the New Southbound Policy, and public opinion about the Southeast Asian e-commerce market. The percentage of sampling effectiveness was around 96.54%. The survey respondents were fully aware of the definition of e-commerce and cross-border e-commerce, 100% of the 418 respondents have used and made purchases on domestic e-commerce platforms, 113 (27%) have sold something through the domestic online platform, 296 (70.8%) have made purchases on cross-border e-commerce platforms, such as Amazon, Alibaba, eBay, and the Southeast Asian e-commerce platform Lazada, and 43

(14.53%) respondents have sold products through cross-border e-commerce platforms.

4.1 Calculation of Grey Relational Analysis

According to the *Management Information Crisis* by Daniel (1961), the primary rule for determining an enterprise's sustainability and success is to make a selection of three to six key factors from within the enterprise; otherwise, the outcome is treated as invalid. The author also suggested that the number of selected factors should not bypass half the total number of factors. Therefore, of the 36 factors, the top six with the greatest were selected and discussed in this study.

The survey results were categorised into three parts: economic sustainability, social sustainability, and environmental sustainability. The first part contained 12 factors, the second part consisted of 19 factors, and the third part consisted of 5 factors. A total of 400 surveys were collected and analysed according to the criteria of Daniel (1961), and GRA was conducted to determine the most important factors for the sustainability of cross-border e-commerce. However, survey results from both Taiwanese respondents and foreign respondents were analysed separately for comparison in the later part of the study. The final data from the 207 Taiwanese respondents were used as the main reference, while data from the foreign respondents served as supporting numbers.

Prior to GRA, the survey results were calculated using the method of the Larger the Better for a more evident outcome. The factor with the largest number of grey relational grades was identified as the most correlated factor, which had the largest significance towards the sustainability of cross-border e-commerce; the factor with the lowest grey relational grade was considered the least influential.

The survey data were entered into an Excel form for a clearer inspection before the application of GRA. Respondents 1 to 207 were listed in the vertical axis, whereas factors 1 to 36 were lined up in the horizontal axis, categorised into three parts: economic, social, and environmental.

4.2 Environmental Sustainability Factors of Foreign Respondents

The results of environmental sustainability factors from the foreign respondents ranged from 0.5995 to 0.6603. Three clusters were evident in the data. The factors are designated as C1 to C5. The top three among the five factors in the category of environmental sustainability factors were eco-friendliness from Cluster 1 (C1, 0.6603), green packaging from Cluster 1 (C2, 0.6534), and geographical fragmentation from Cluster 2 (C3, 0.6341). As shown in Figure 2, eco-friendliness was the most critical element for sustainability in this category, although green packaging was almost as significant. In this case, the cluster composition was

slightly different compared to the outcome of the Taiwanese respondents in which eco-friendliness was in Cluster 1, whereas 2nd and 3rd place green packaging and geographical fragmentation belonged to Cluster 2.

4.3 Comparison of Taiwanese and Foreign Respondents

Table 1 displays a comparison of the six most critical factors of cross-border e-commerce sustainability as indicated by the responses of Taiwanese and foreign respondents.

Table 1 Comparison of the top six key factors

Nationality	Ranking	Category	Factors	Grade
Taiwanese respondents	1	Social sustainability	Ease of use	0.7581
	2	Economic sustainability	Partnership	0.7336
	3	Social sustainability	Culture and language	0.7247
	4	Economic sustainability	Logistics cost	0.7211
	5	Economic sustainability	Warehouse	0.7173
	6	Social sustainability	Cybersecurity	0.7121
Foreign respondents	1	Economic sustainability	Logistics cost	0.7651
	2	Social sustainability	Brand image	0.7523
	3	Social sustainability	Ease of use	0.7367
	4	Economic sustainability	Partnership	0.7322
	5	Social sustainability	Culture and language	0.7187
	6	Economic sustainability	Warehouse	0.7136

Based on the results of analysis of the 211 foreign respondents, logistics cost was the most crucial factor of the sustainability of cross-border e-commerce, although it ranked number 4 according to most Taiwanese. Surprisingly, brand image was listed as the second most important factor by foreigners, whereas Taiwanese respondents did not really value this factor, ranking it 22nd. Ease of use, partnership, culture and language, and warehouse were important key factors to both Taiwanese and foreigners, being ranked among the top six factors, although slightly differently by both groups. The 6th important factor to Taiwanese respondents, cybersecurity, was ranked by most foreigners as the 11th of the 36 factors. Another similarity between both Taiwanese and foreign respondents was that they both had three economic sustainability factors and three social sustainability factors as the top six crucial factors; neither group perceived the environmental sustainability factors as important.

The following table shows a comparison of the top three key factors in the category of economic sustainability, as ranked by Taiwanese and foreign respondents. Partnership was the most important factor to the Taiwanese in this category, whereas most foreigners selected

logistics cost as the most significant factor. However, the influence of warehouse was equally perceived by both parties, as it was listed as number three by both groups.

Table 2 Comparison of the three key factors of economic sustainability

Economic sustainability			
Nationality	Ranking	Factors	Grade
Taiwanese respondents	1	Partnership	0.7336
	2	Logistics cost	0.7211
	3	Warehouse	0.7173
Foreign respondents	1	Logistics cost	0.7651
	2	Partnership	0.7322
	3	Warehouse	0.7136

A comparison of the top five key factors ranked by Taiwanese and foreign respondents showed ease of use which was ranked first place by Taiwanese was ranked this factor second place by foreigners. Again, both parties had culture and language at the 2nd and 3rd place, respectively. While Taiwanese respondents tended to attach more value to the importance of cybersecurity and aftersales service, foreign respondents went for brand image and consumer behaviour. For most foreign respondents, brand image was one of the most crucial factors for enterprises to achieve success, as brand image is often equated with the reputation, prestige, and face of a company. However, most Taiwanese respondents did not recognise its importance, ranking it 22nd place, which means that they did not really agree about its influence on the topic of cross-border e-commerce. This may be related to the cultural differences between the East and the West and their business operating concept. However, the key factor efficiency showed up similarly in the 4th and 5th place by Taiwanese and foreigners, respectively.

Table 3 Comparison of the five key factors of social sustainability

Social sustainability			
Nationality	Ranking	Factors	Grade
Taiwanese respondents	1	Ease of use	0.7581
	2	Culture and language	0.7247
	3	Cybersecurity	0.7121
	4	Efficiency	0.7012
	5	After sales service	0.6869
Foreign respondents	1	Brand image	0.7523
	2	Ease of use	0.7367
	3	Culture and language	0.7187
	4	Consumer behaviour	0.6998
	5	Efficiency	0.6977

Lastly, the comparison of the responses in the environmental sustainability category showed that both Taiwanese respondents and foreign respondents agreed on eco-friendliness as the most important key factor, followed by green packaging and geographical fragmentation.

Table 4 Comparison of the three key factors of environmental sustainability

Environmental Sustainability			
Nationality	Ranking	Factors	Grade
Taiwanese respondents	1	Eco-friendliness	0.6634
	2	Green packaging	0.6345
	3	Geographical fragmentation	0.6330
Foreign respondents	1	Eco-friendliness	0.6603
	2	Green packaging	0.6534
	3	Geographical fragmentation	0.6341

The results of the GRA comparing the Taiwanese respondents and foreign respondents revealed that, although there are some differences in the rankings of key factors, the selected top six from both parties had many similarities. The outcome from both the Taiwanese respondents and foreign respondents were essentially the same in the overall ranking of the top six key factors despite the small differences in the sequence. The biggest distinction was in the ranking of the factor brand image, which stood out against the others. This not only highlights the significance of branding in the eyes of the Westerners, but also identifies the differences in the attitudes and ways of company operations between the East and the West.

Further, the results of identified key factors from both Taiwanese and foreign parties still

showed high correlation towards each other even when inspected separately in three regards: the determined three key factors were the same despite the ranking in the category of economic sustainability; the differential factors in the category of social sustainability were cybersecurity, after sales service, brand image, consumer behaviour, and the ranking; in the case of environmental sustainability, both the identified key factors and the ranking were the same. In other words, the matching of the two outcomes has also provided the study with a high degree of credibility on the final determination of the top six key factors that control the sustainability of cross-border e-commerce. The results from the Taiwanese respondents are discussed below.

5. Discussion and Conclusion

Based on the analysis of the study of the key factors of cross-border e-commerce and its sustainability, four characteristics defined the study: 1) The core of this study was not only about successful expansion of cross-border e-commerce in alien markets but also its sustainability. The factors selected were related to the business' sustainability and were later categorised into economic, social and environmental for more effective evaluation. 2) All the survey respondents possessed knowledge of the topic of the study, and 100% of the respondents had experience in the purchase of products through online platforms. Some have conducted cross-border transactions and sold goods. 3) The survey respondents were divided into two categories of Taiwanese and foreigners and analysed separately for the purpose of comparison. Although the respondents were of different cultures and languages, the results of the top six key factors from both Taiwanese and foreign respondents were similar, which enhanced the credibility and trustworthiness of the analysed results and the study itself. 4) The study provided the top six key factors for the business based on GRA and identified the important ones in each category. The rankings of key factors from the analysis of the foreign respondents can also be used as a reference for Taiwanese cross-border e-commerce companies who may be looking for foreign partners, providing them with better heads-up about factors that these new partners might consider important.

5.1 Recommendations to Cross-Border E-Commerce Companies

The number of consumers, market size, and future potential in Taiwan are very limited, and it has become inevitable for e-commerce businesses to go abroad and develop cross-border services. Thus, the study identified the top six most important factors for cross-border e-commerce to achieve success: ease of use, partnership, culture and language, logistics cost, warehouse, and cybersecurity. Therefore, the development strategy of Taiwanese cross-border e-commerce companies should be formed in consideration of these

elements in pursuit of better outcomes.

The advantages of Taiwanese cross-border e-commerce in comparison to other countries were logistics flow, finance flow and informational flow, whereas the disadvantages included labour cost, innovation and environmental sustainability. There are both good and bad aspects of these characteristics in combination with the six most crucial factors. It is encouraging that none of the three disadvantages of the current situation of Taiwanese cross-border e-commerce fit into the identified crucial factors; the labour cost disadvantage will be replaced once the trade expansion reaches Southeast Asia and new local employees are adopted. It is concerning that none of the advantages of the current situation of Taiwanese cross-border e-commerce seems to fit into the six crucial factors. Therefore, we aligned these crucial factors with the New Southbound Policy and Productivity 4.0 in pursuit of more practical and implementable recommendations and development strategies for Taiwanese cross-border e-commerce companies.

5.1.1 New Southbound Policy

As the Taiwanese government hopes to establish a win-win cooperation model and an economic community awareness through the new Southbound Policy with Southeast Asian countries, the New Southbound Policy is expected by the Executive Yuan to strengthen the relationship between Taiwan and these countries through four aspects: economic cooperation, talent exchange, resources sharing, and region linking.

(1) Economic Cooperation

- a. **Setting up Taiwan Desk:** The action of setting up Taiwan Desk in Southeast Asia as the window for Taiwanese investors in the regions to communicate with each other and create group clusters can greatly aid in the aspect of partnership. This window can assist businessmen in the collection of local resources and the development of bilateral trade opportunities.
- b. **Recommendation (partnership):** Windows set up for communication should not be limited to Taiwanese investors only, but also open to credible local investors and even other foreign businesses. Windows like this can easily aid in the discovery of new friends and potential partnerships for Taiwanese cross-border e-commerce companies abroad and provide them with great support.

(2) Talent exchange

- a. **Personnel training:** The aspect of talent exchange in the New Southbound Policy will come with the greatest help in overcoming culture and language barriers. The government is now focusing on the training of Southeast Asian language skills in Taiwan and cooperating with industries to establish classes on the studying of

“Southeast Asian knowledge,” which will support potential Taiwanese who are capable of speaking the local language and understanding the customs and culture in the Southeast Asian regions.

- b. Recommendation (culture and language): Scholarships and bonuses can also be offered to the students as a kind of incentive and to certified persons who are willing to work in Southeast Asia, as these talents will become a valuable asset during the expansion of cross-border e-commerce and respond rapidly to solve the barrier of culture and language between the companies and the locals.

(3) Resource sharing

- a. Culture promotion: In terms of resource sharing, the government has decided to dedicate itself to the promotion of Taiwanese culture through Taiwanese films, TV dramas, literature, and online games, which can also help resolve the culture and language barrier between nations. In other words, these promotions will market Taiwanese culture as a brand to Southeast Asia and may as well gain recognition from local consumers.
- b. Recommendation (culture and language): More activities on the sharing of cultural insights and experiences should be co-hosted by the government and cross-border e-commerce companies, such as the selling of Taiwanese films, books, magazines and games through these online platforms. However, these opportunities should be earned and promoted by the cross-border e-commerce companies themselves and in an active fashion.

(4) Regions linking

- a. Strategic Alliances: The core of regions linking in the New Southbound Policy is to conduct regional integration through the signing of trade agreements with partners in Southeast Asia or cooperating in economic projects. Region linking can be viewed as a kind of guarantee of local partnership from the government to Taiwanese cross-border e-commerce companies. The government has promised to help cross-border e-commerce companies reach agreement on at least 20 bilateral cooperation cases and to form strategic alliances on market entry with at least 30 foreign manufacturers.
- b. Recommendation (Partnership): To strengthen the propaganda on the New Southbound Policy to improve the participation of local e-commerce enterprises and to demonstrate its resolution in the facilitation of partnerships through real actions. Through quantitative broadcasting and life examples, the odds of attracting proper partnerships will definitely increase.

Through the four aspects of the New Southbound Policy, the development strategy of

Taiwanese cross-border e-commerce on partnership, culture and language, logistics cost and warehouse has reached the initial steps of formation. The development strategy will be further integrated with Productivity 4.0 in pursuit of a more comprehensive resolution.

5.1.2 Productivity 4.0

Taiwan's Executive Yuan has also launched its own Productivity 4.0 programme in response to the emerging trend. Productivity 4.0 aims to optimise domestic factories and improve supply chains, focusing on the promotion of new manufacturers and integrating related technologies. The Taiwanese government will also be drafting new regulations that are beneficial to the manufacturing industry. In this case, the upcoming Productivity 4.0 could be either a future threat or an opportunity for Taiwan's e-commerce industry. Cross-border e-commerce platforms in Taiwan are mostly based on B2C models, and there have not been many online windows for the exporting of machines and tools from Taiwan to the world. For example, the quality and design of Taiwanese tools has been ranked number four in the world, but due to the lack of flexible online platforms for these products, difficulties are encountered in the way of introducing them into the higher-end markets for more profitable outcomes. Therefore, the government has decided to establish new online platforms to market these tools and other products related to the manufacturing industry. Existing cross-border e-commerce companies should seize this opportunity and offer their experiences and consultancy. Such assistance will not only include them in Productivity 4.0 and the field of manufacturing but will also actuate new partnership opportunities and consumers.

As the number of working population has been on the drop since 2015, another emphasis of Productivity 4.0 is to develop intelligent robots that could be put to use in factories as a new workforce. Intelligent robots are not required to have the form of a human and possess all body parts; for example, a working robotic arm and robotic hooks are considered intelligent robots. Most of these intelligent robots are still under development, and the government has been looking for available volunteer factories or warehouses to test the robots once completed. Therefore, Taiwanese cross-border e-commerce companies that have already acquired warehouses and logistics partners in Southeast Asia should not overlook this juncture but actively seek the opportunity to have these intelligent robots tested in their facilities, as the existence of these intelligent robots will undoubtedly boost their efficiency and help reduce costs in both logistics and labour.

The application of the internet of Things (IOT) will allow network connectivity to collect and exchange data among these objects. The Taiwanese government has also proposed that some Southeast Asian countries introduce the IOT into their factories due to the promised collaboration on economic and regional support through several treaties in 2016 and 2017.

Therefore, Taiwanese cross-border e-commerce companies should actively partner with credible third-party payment companies and cybersecurity firms, informing and preparing them for the upcoming introduction of IoT, as the right use of IoT in cross-border e-commerce can greatly enlarge the profit and help enhance the cybersecurity of cross-border e-commerce.

5.2 Conclusion

The identified six factors, including ease of use and cybersecurity, will definitely play a big role and influence the expansion of Taiwanese cross-border e-commerce to the Southeast Asian market. As partnership, logistics cost, and warehouse greatly influence cross-border e-commerce in the dimension of economic sustainability, ease of use, culture and language, and cybersecurity heavily impact the business in social sustainability. Therefore, these factors should always be deeply considered and addressed during a company's foreign operation in Southeast Asia. Additionally, although none of the environmental factors was identified as one of the top six key factors, this dimension should not be overlooked, as eco-friendliness has gradually become the world's trend and many of the businesses have moved to become more green. Given that there were only five factors from the environmental category in comparison to twelve in economic and nineteen in social factors of sustainability, the number of environmental factors influencing cross-border e-commerce is estimated to increase in the future. Therefore, it is also recommended that future studies should further investigate the category as it relates to the sustainability of the business.

However, there are limitations that must be considered, as cross-border e-commerce is broad, especially in the part that involves bilateral and multilateral trade agreements or tariff barriers with other countries. In this case, factors to the successful cross-border e-commerce actions and future sustainability could easily vary or have substantial change within a short period due to the timely adjustment of these regulations. Furthermore, the amount invested by most Taiwanese e-commerce businesses in Southeast Asian markets is still comparatively low compared to other countries, such as China, the United States, and Japan. Some of these Taiwanese e-commerce businesses are still in the process of planning, proposing, and market evaluation, without any real action in the foreign market yet. Therefore, practical and real-time data on the performance of Taiwanese e-commerce business in Southeast Asia will be extremely difficult to seek and make use of. Due to the uncertainty of trends, future development, and the fast-changing nature of cross-border e-commerce, future studies on this topic should include representative real-life cases as examples and use a larger cohort of respondents with repeated analyses. Furthermore, it is also recommended that future studies include not just the B2C models in cross-border e-commerce but also other models, such as

B2C2C, O2O, and import-oriented cases.

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