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Sustainable E-Procurement Adoption and Practices in the Pandemic Era

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Abstract:

Purpose: *This research aimed to explore how to address the opportunities and challenges of sustainable e-procurement practices in the pandemic era. Particularly in developing a conceptual framework to evaluate different factors influencing sustainable e-procurement adoption in Hong Kong during the outbreak of COVID-19.*
Design/Methodology/Approach: *To test the hypotheses, data were collected from 69 members of The Institute of Purchasing and Supply of Hong Kong. Investigation was conducted to study how respondents feel about their companies' daily sustainable practices during the pandemic, the driving factors that promote adoption of e-procurement, and the effectiveness of such acts.*
Findings: *E-procurement is a way to achieve competitive advantage and sustainable business in the future. The results showed that operational efficiency, cost effectiveness and employee acknowledgment are the top three factors for the adoption. However, due to pandemic, companies need to adapt to new suppliers, and it could be hard for firms to collaborate without face-to-face communications. Companies need to prepare sustainability assessments and Environment, Social & Governance (ESG) reports according to law. Finally, strengthening the connection between e-procurement and sustainable development can improve capabilities and performance.*
Practical Implications: *The results helped provide a new insight for company performance and business sustainability.*
Originality/value: *To the extent of our knowledge, this study is the pioneer investigation into new insight about the major drivers for e-procurement adoption for e-business firms.*

Keywords: *E-procurement, Sustainability, Pandemic, Hong Kong.*

JEL classification: *O3, O31, P17.*
Paper Type: *Research study.*

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1. Introduction

Under the great pressure of the epidemic and novel coronavirus infection in the world, e-procurement becomes one of the major channels for firms to acquire suitable and real-time raw martials, parts, components and consumer products, ensuring a smooth supply chain operation. Many literatures show that e-procurement will be the trend in the future to achieve the ultimate goal of "cost effective, green and sustainable business practices" in different business industries like manufacturing, retail, hotel as well as healthcare industry. However, there is a lack of research on the adoption of e-procurement application in the business sector during the pandemic.

Humans face the challenges from environmental changes including extreme climate and virus outbreaks. These raised the awareness of live green and the need of sustainable practices. The United Nation suggested 17 sustainability development goals to achieve social sustainability (Pizzi *et al.,* 2021). The role of sustainability in business is even more crucial nowadays. Business sustainability has become a hot topic globally.

Hong Kong is closely connected with the world. Many Hong Kong firms are actively integrating sustainability principles into their business. Nevertheless, the pandemic has become a real problem for all enterprises when making their business decisions. This study would observe the business activities with adoption of e-procurement under such conditions and seek suggestions for the best practice of a sustainable business.

In this paper, a comprehensive literature study is conducted to explore how to address the opportunities and challenges of sustainable e-procurement practices in the pandemic era. Also, the conceptual framework is developed to evaluate different factors influencing sustainable e-procurement adoption in Hong Kong during the outbreak of COVID-19. Discussion and directions for future research are presented finally.

2. Literature Review

2.1 E-Procurement

Electronic procurement (so-called e-procurement) is the process of purchasing goods and services required for a company's operation electronically (Oliveira and Amorim, 2001). E-procurement is beneficial for supply chain management. As the procurement procedures are handled online and recorded in real time, it can enhance the operational transparency and efficiency through wider access to information and services (Iles, 2017; Clark, 2017).

According to European Bank for Construction and Development, electronic procurement combines the use of information technology, thereby governments could conduct their contracting of works, goods, and services as required by the needs of public sector. Furthermore, another advantage of e-procurement is that it can break through time and space, online procurement procedures have the feature of recording in real time, thus enhancing the transparency and efficiency through wide access to information and services (Are you ready for e-procurement? Guide to Electronic Procurement Reform, 2015).

IBM was the first IT company to make use of e-procurement in their business in 2000. In the early stages of e-procurement application, it functioned as a tool to reduce cost and save transaction time. Nowadays, e-procurement is widely used in different sectors of supply chain and considered as a tool to provide more functions such as achieving sustainable business development.

2.2 Sustainable Business

Sustainability is concerned with achieving economic success, ecological protection and social responsibility in the long term (Dyllick and Hockerts, 2002). It is about the company's relationship with people, its supply chain and the community (Joy, Sherry Jr, Venkatesh, Wang, and Chan, 2012). Stakeholders are driving corporate sustainability of a company and exercise direct pressure on the company to implement sustainable procurement practices.

A sustainable business requires that a firm should has a minimal impact on the global or local environment, economy, society or community. A sustainable business often involves progressive environmental and human rights policies. In general, a firm can be considered as sustainable if can meet the four criteria of applying green principles in business decisions, product and services, business operations and a shift from traditions (Cooney, 2008).

2.3 COVID-19 Pandemic

The coronavirus disease 2019 (COVID-19) has caused significant impact to global society (Khan *et al.,* 2020; Thalassinos *et al.,* 2022). Many preventive measures like social distancing, ventilating, and wearing face masks in public were being adopted to prevent infection ("Transmission of COVID-19," 2020). Several vaccines have been developed and distributed, but it is expected to take long periods of time to recover from travel restrictions and lockdowns from all over the places.

2.4 Importance and Challenges of E-procurement for Sustainable Business

A sustainable business can change the public image of entities like the government or companies. This new trend would help business partners to communicate with their customers in a transparent way because e-procurement can be an effective tool

for performance management (Clark, 2017). A sustainable business development can enhance resource efficiency of the company and improve product or service quality at the same time (Ramkumar and Jenamani, 2015).

Based on European Bank for Construction and Development, there are also challenges after business corporations have realized the importance of e-procurement. Firstly, the cost would be one concern for firms that want to invest in the e-procurement system because it counts in millions to set up and integrate with the supply chain. Secondly, a reform on the operation structure could worry the companies. They may need to adapt to the electronic procurement system and change the original way of a process. Reform strategies are needed to keep the past performance of the business. Thirdly, difficulties would show up when the firms need to define their objectives during the implementation of e-procurement to meet sustainable business (Are you ready for e-procurement? Guide to Electronic Procurement Reform, 2015).

2.5 Ways to Conduct Sustainable E-procurement

To clarify the requirements to meet sustainable business, a business model can be used as a tool and Table 1 shows six summarized features need to be taken care before the implementation of e-procurement (Bocken, Short, Rana, and Evans, 2014). To conduct e-procurement in a sustainable way, business firms should have a clear acknowledge on the target they want to achieve.

New forms of procurement are suggested by researchers to combine the process and concepts in a practical way. The term sustainable procurement refers to the pursuit of sustainable development objectives through the purchasing and supply process, incorporating social, environmental and economic aspects (Walker and Brammer, 2012).

Table 1. *Features of sustainable economy (Bocken, Short, Rana, and Evans, 2014)*

1.	A system that encourages minimizing of consumption, or imposes personal and institutional caps or quotas on energy, goods, water, etc.
2.	A system designed to maximize societal and environmental benefit, rather than prioritizing economic growth.
3.	A closed-loop system where nothing is allowed to be wasted or discarded into the environment, which reuses, repairs, and remakes in preference to recycling.
4.	A system that emphasizes delivery of functionality and experience, rather than product ownership.
5.	A system designed to provide fulfilling, rewarding work experiences for all that enhances human creativity/skills.
6.	A system built on collaboration and sharing, rather than aggressive competition.

Source: *Own study.*

2.6 Sustainable E-procurement Adoption

Sustainable e-procurement is the process of integrating requirements, criteria, and specifications that are compatible and favor environmental protection, social progress, and economic development, by locating re-source efficiency, optimizing costs, and eventually improving product and service quality (Ramkumar and Jenamani, 2015; Oxford, 2019). By utilizing e-procurement, firms can reduce the challenges faced in deploying the sustainable procurement initiative.

The outbreak of COVID-19 pandemic since early 2020 has caused a great disruption in the global supply chain. Multinational companies (MNCs) and small and medium sized enterprises (SMEs) have to secure alternative suppliers as soon as possible to maintain business operations (Transmission COVID-19, 2020; Grima *et al.*, 2020).

E-procurement has become an inevitable solution for companies to access a larger supplier base and communicate in real time to confirm their procurement requirements (Ruparathna and Hewage, 2015; Iles, 2017; Clark, 2017). The use of e-procurement can resolve companies' procurement needs, increase transparency, gain data insights throughout the purchase process and ensure that companies get the right products at a reasonable price that fits with their budget (Prier *et al.*, 2016; Clark, 2017).

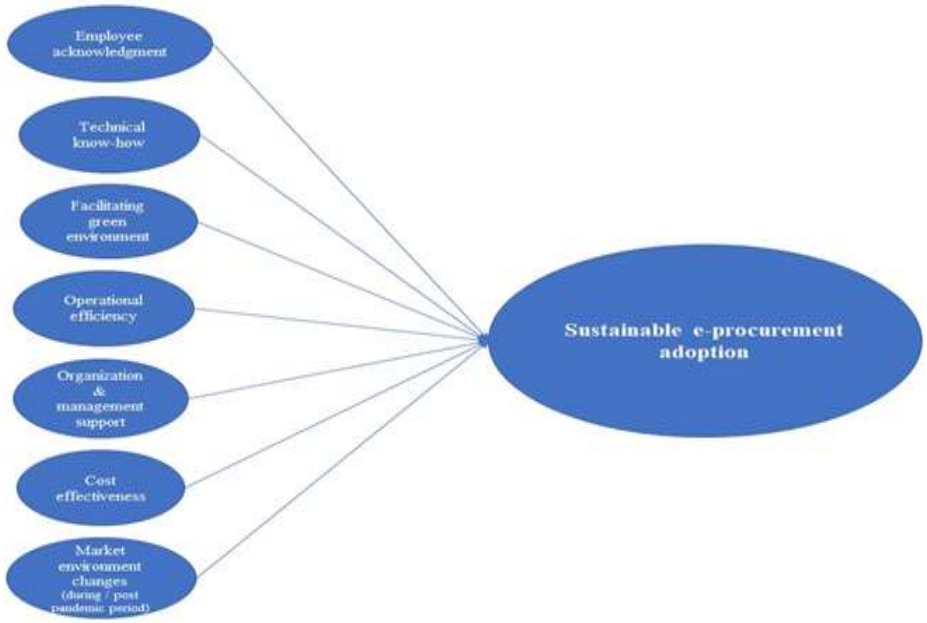
According to the survey of OpusCapita (2020), about 62% of business respondents' procurement strategies had been largely influenced by COVID-19. They were seriously rethinking their procurement strategies and the values of e-procurement.

This study contributes to companies' e-procurement adoption and implementation during and after the pandemic. Currently, there is a lack of research on factors and challenges in e-procurement adoption and practices during this time crisis across countries and industries.

Based on the EU's Sustainable Development Strategy (EU-SDS), economic, environmental and social factors should be considered when examining the influence of a sustainable business (Walker, 2013). Sustainable procurement therefore should include the environmental, social and economic dimensions of business operation.

The current study proposes a research framework (Figure 1) focusing on drives for adoption of sustainable e-procurement during pandemic, including employee acknowledgment, technical know-how, facilitating green environment, operational efficiency, organization and management support, cost effectiveness as well as market environment changes (during/post pandemic period) (Clark, 2017; Hsin, Tsai, and Hsu, 2013; Quesada *et al.*, 2010; Bhardwaj and Ditty, 2018; Kulbyte, 2020).

Figure 1. *Conceptual Model*



Source: *Own study.*

The hypotheses of the study are:

H1: Employee acknowledgement influences sustainable e-procurement adoption.
H2: Technical know-how influences sustainable e-procurement adoption.
H3: Facilitating green environment influences sustainable e-procurement adoption.
H4: Operational efficiency influences sustainable e-procurement adoption.
H5: Organizational and management support influences sustainable e-procurement adoption.
H6: Cost effectiveness influences sustainable e-procurement adoption.
H7: Market environment changes influence sustainable e-procurement adoption.

3. Research Methodology

A quantitative methodology was employed to test the hypothesis. A questionnaire in electronic format was used for the quantitative and empirical testing part. Questionnaire research is an effective way to investigate a social phenomena (Watson, 2015). It can help to collect statistical data for studying the relationships of trends and events.

The questionnaire used was developed based on different contents and information from the literature, generic observations as well as self-experience of the authors in

the sector. It consists of 13 questions with a mix of multiple-choice questions and open-ended questions.

The questions were designed to investigate how respondents feel about their companies' daily sustainable practices during the pandemic, the driving factors that promotes adoption of e-procurement, and the effectiveness of such acts. There were also questions for examining how the firms and industry adapt to the changes.

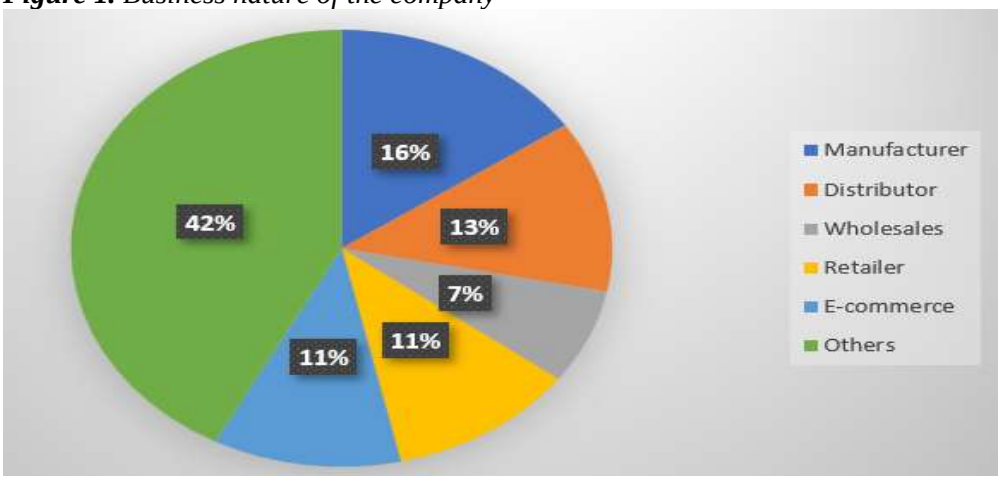
The electronic questionnaires (e-survey) were sent via e-mail in early 2022 to people drawn from the membership directory of The Institute of Purchasing and Supply of Hong Kong. There is a total of 420 members in the membership directory. Finally, 69 completed questionnaires were collected.

The response rate is 16.43% and is acceptable. After reviewing, all questionnaires were found valid and were used for data analysis.

4. Research Findings and Analysis

As shown in Figure 1, most respondents (29%) come from service industry including wholesales, retailer and e-commerce companies. 16% of respondents come from manufacturing industry and 13% come from distributors. Others include public utility and hotel industries.

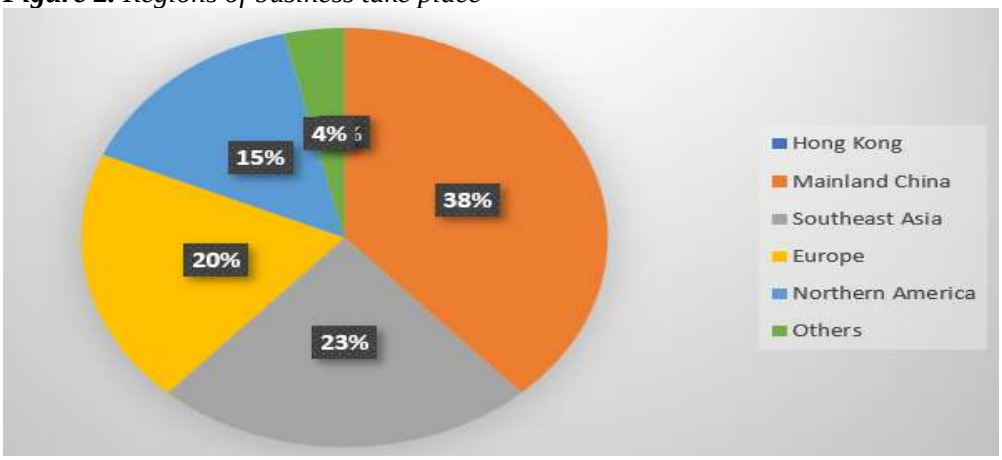
Figure 1. *Business nature of the company*



Source: *Own study.*

From Figure 2, it can be seen that most companies the respondents worked for carry out their procurement business in Mainland China (38%). The second top place is Southeast Asia (23%) and the third is Europe (20%). Hong Kong local procurement accounts for 15%.

Figure 2. *Regions of business take place*

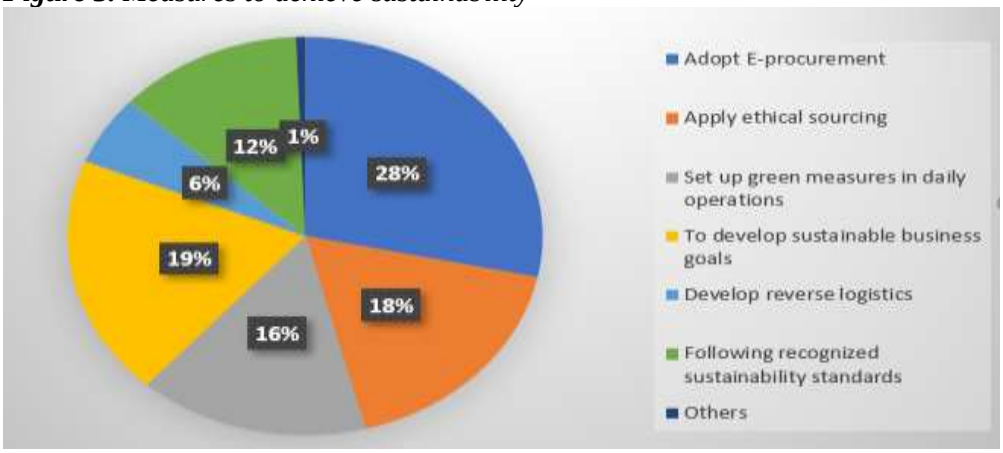


Source: *Own study.*

4.1 Sustainable Business Development

The companies the respondents worked for have adopted several measures to achieve sustainability. Figure 3 shows that most companies (28%) adopted e-procurement. 19% of companies developed sustainable business goals and 18% of companies applied ethical sourcing to achieve sustainability. The other measures include setting up green measures in daily operations (16%) and following recognized sustainable standards (12%).

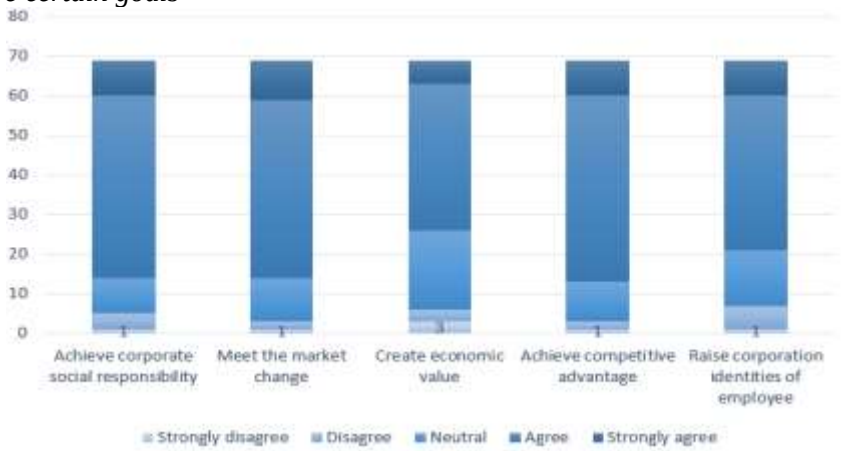
Figure 3. *Measures to achieve sustainability*



Source: *Own study.*

Moreover, majority of respondents agreed that the above measures can meet the company goals of achieving corporate social responsibility, meet the market change, create economic value, achieve corporate advantage and raise corporation identities of employee (Figure 4).

Figure 4. *To what extent do the firm agrees that sustainable procurement can achieve certain goals*

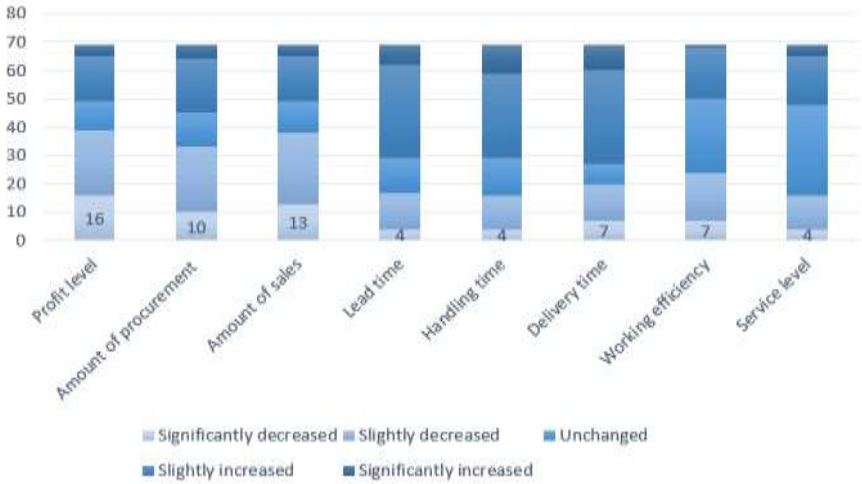


Source: *Own study.*

4.2 Impact on Business Operation and Procurement activities during pandemic

In general, the respondents revealed that the COVID-19 pandemic has a negative impact on their business operation and procurement activities. Figure 5 shows the aspects that were being affected during the pandemic period. The most affected aspects were delivery time, handling time and lead-time. Other aspects, like working efficiency, amount of procurement, amount of sales prof-it level, decreased as well. Also, 74% of respondents claimed that their companies have changed the way of procurement operation under COVID-19. Only 26% claimed that the pandemic does not have great impact on their procurement activities (Figure 6).

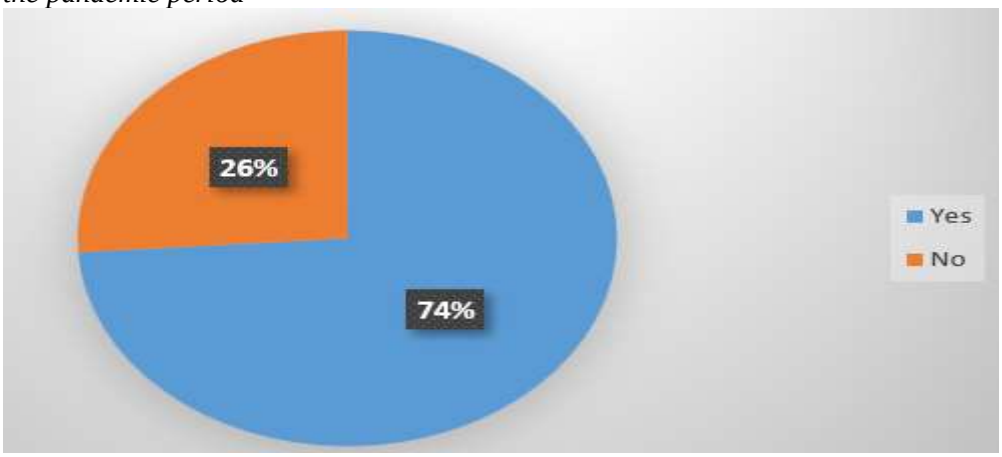
Figure 5. *Business and procurement aspects affected during the pandemic period*



Source: *Own study.*

Also, 74% of respondents claimed that their companies have changed the way of procurement operation under COVID-19. Only 26% claimed that the pandemic does not have great impact on their procurement activities (Figure 6).

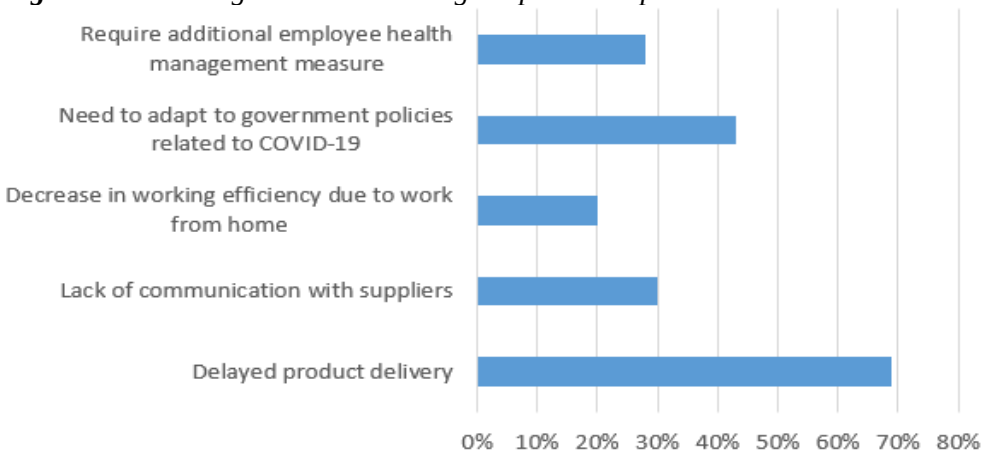
Figure 6. *Whether the way of procurement has been changed in the business during the pandemic period*



Source: *Own study.*

Among those respondents who claimed their companies' procurement operation changed during the pandemic, most of them (nearly 70%) pointed out that COVID-19 resulted in product delivery delay. 40% of them needed to adopt to government policies related to covid-19. Around 30% of them pointed out that COVID-19 led to requirement for additional employee health management measure and poor communication between suppliers. 20% found a decrease in working efficiency due to work from home measure (Figure 7).

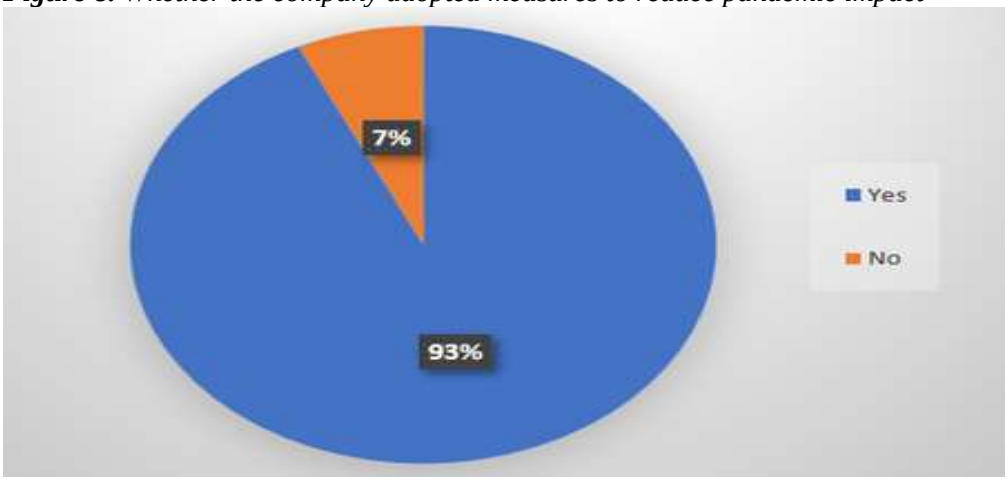
Figure 7. *The changes occurred during the pandemic period*



Source: *Own study.*

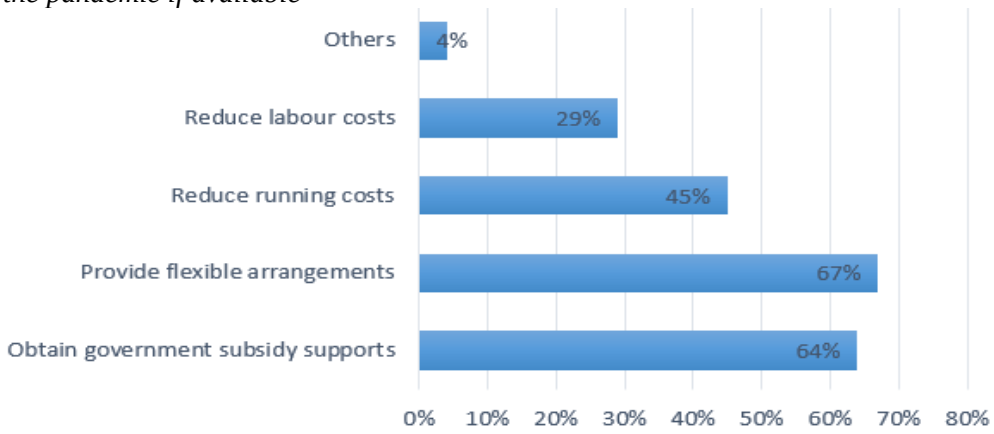
In terms of business operations, 93% of interviewers adopted measures to reduce the impact of COVID-19. Only 7% did not take any action (Figure 8). From Figure 9, it can be seen that most companies the respondents worked for (67%) chose to provide flexible arrangements in their operations. 64% obtained government subsidy supports for the business. Nearly half (45%) reduced running costs and 29% chose to reduce labour costs as a response to the changing situation.

Figure 8. *Whether the company adopted measures to reduce pandemic impact*



Source: *Own study.*

Figure 9. *Whether the company adopt the above measures to reduce the impact of the pandemic if available*



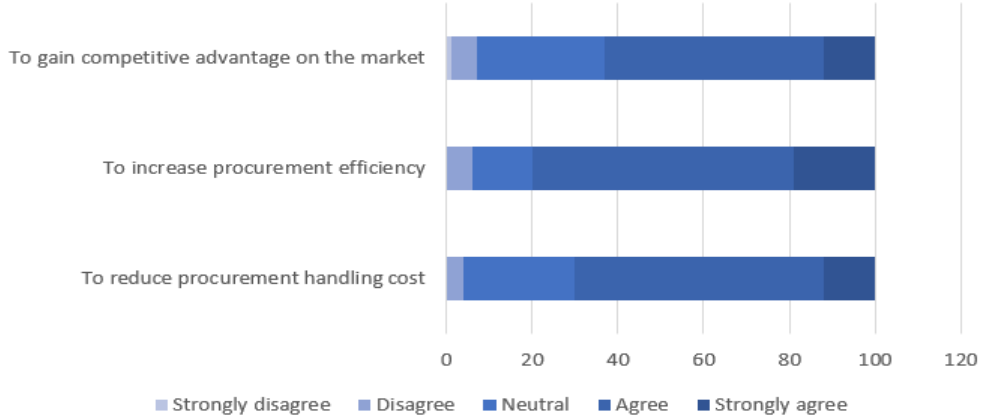
Source: *Own study.*

4.3 Adoption and Practice of E-Procurement

In order to resume the smooth business operations and procurement activities during pandemic, e-procurement is a sound solution for companies in the different sectors. As shown in Figure 10, respondents generally agreed that e-procurement has the

benefit of helping firms to gain competitive advantage, increase procurement efficiency and reduce procurement handling cost.

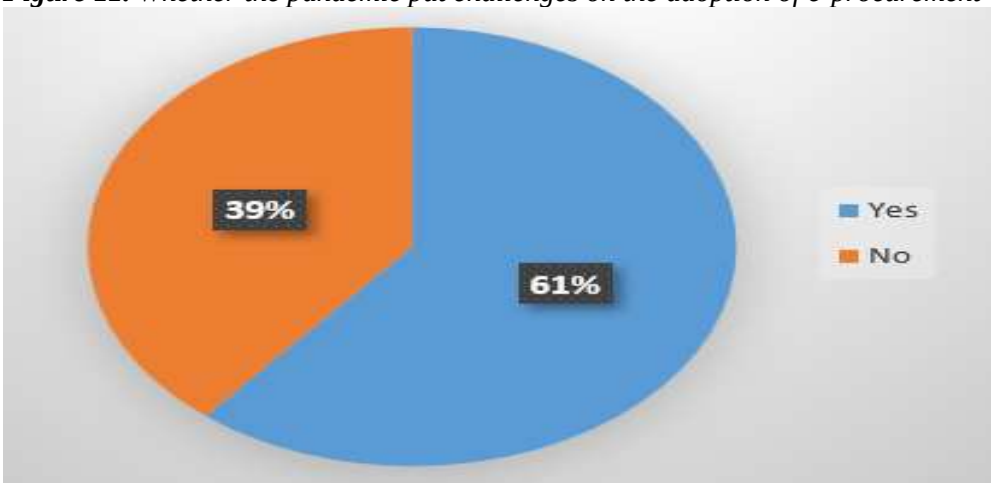
Figure 10. *To what extent do you agree that adopting E-procurement could help with the above issues*



Source: *Own study.*

Moreover, majority of respondents (61%) agreed that the pandemic put challenges on the adoption of e-procurement, while 39% has the opposite view (Figure 11).

Figure 11. *Whether the pandemic put challenges on the adoption of e-procurement*



Source: *Own study.*

For the driving factors that promote e-procurement adoption in companies (Table 2), most of the respondents agreed that operational efficiency (65.22%) are vital to achieve the business operation and sustainability. Cost effectiveness (56.52%) and employee acknowledge (49.28) are the second and third driving forces for e-procurement adoption.

Besides, respondents agreed that market environment changes (during/post pandemic period), organization and management support, technical know-how and facilitating green environment are all valid reasons for company to implement e-procurement practices in short and medium term after the new normal.

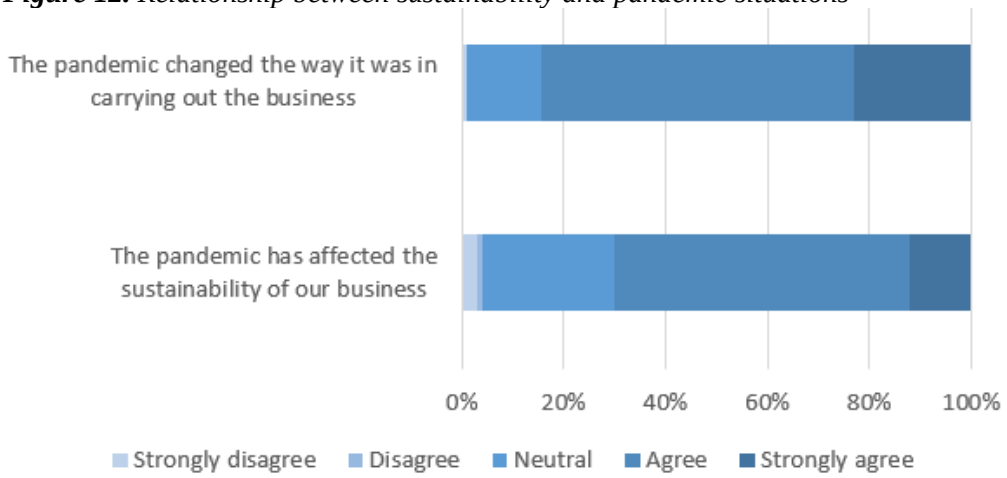
***Table 2**. Driving factors for e-adoption adoption in the company*

Driving Force	**What are the factors that drive the E-adoption practices in your company?**	**%**
1	Operational efficiency (H4)	65.22
2	Cost effectiveness (H6)	56.52
3	Employee acknowledgment (H1)	49.28
4	Market environment changes (during / post pandemic period) (H7)	44.93
5	Organization and management support (H5)	43.48
6	Technical know-how (H2)	39.13
7	Facilitating green environment (H3)	37.68
8	Others	1.45

***Source:** Own study.*

Regarding the relationship between sustainability and pandemic situation, as shown in Figure 12, more than 80% of respondents agreed that the pandemic has changed the way it was in carrying out the business. More than 90% respondents agreed that the pandemic has affected the sustainability of the business. Adoption of e-procurement is not only the way to achieve the new business practices, but also a strategy to gain the competitiveness in new normal after COVID-19.

***Figure 12.** Relationship between sustainability and pandemic situations*



***Source:** Own study.*

5. Implications and Conclusion

The objective of this study is to identify and evaluate different factors influencing sustainable e-procurement adoption in Hong Kong with the outbreak of COVID-19. The preliminary model of study framework was developed from extensive literature review. The study framework includes seven major factors that promote e-procurement adoption in companies, including employee acknowledgment, technical know-how, facilitating green environment, operational efficiency, organization and management support, cost effectiveness as well as market environment changes (during/post pandemic period).

A series of questions were designed to under-stand how respondents feel about their companies' daily sustainable practices during the pandemic and to measure the extent the seven factors promote e-procurement adoption. An e-survey was conducted among industry practitioners.

The study findings confirmed our hypothesised relationships between seven driving factors and e-procurement adoption to achieve sustainable business operations and practices. Respondents generally agreed that all seven driving factors affect the application and adoption of e-procurement by companies. Operational efficiency, cost effectiveness and employee acknowledgment are the top three factors and drivers for the adoption.

The study revealed that several business operations and procurement activities are being affected adversely by COVID-19. During the pandemic, the respondents reflected that they need to adapt to new suppliers, and it could be hard to collaborate between firms without face-to-face communications Delays and shortages became a frequent phenomenon. The delay in assembly could be as long as months to years due to shortage of part components. Inflation also increased cost on many items.

Based on estimates, the disruption in supply chain affected 30% of manufacturing firms. Any delay in single parts could affect the whole assembly process, the firms would need to hold large inventory, the increased inventory costs and handling costs affected the business operations. Many respondents agreed that the pandemic period creates a hard time for conducting procurement.

E-procurement is a way to achieve competitive ad-vantage and sustainable business in the future. The study results show that e-procurement can increase efficiency and has other positive impacts. For manufacturing industries, material and safety standards can be built in green participations. Respondents mentioned that their companies have improved in ethical standards implementation.

Companies need to prepare sustainability assessments and Environment, Social & Governance (ESG) reports according to law. Carbon peak of China 2060 became another factor that speed up the sustainable development of local firms. Overall,

there is a strong connection between e-procurement and sustainable development.

The major limitation of this research is the sample size. A small sample size means that the obtained results may not be generalised to all companies in the sector. This result can only be viewed as preliminary research. Further insights could be gained from a larger sample size.

Despite its limitation, this study provides new insight about the major elements and drivers for e-procurement adoption which contributes to company performance and business sustainability. The study could serve as a suitable starting point for further qualitative research and case study.

References:

Are you ready for e-Procurement? Guide to Electronic Pro-curement Reform. 2015. European Bank for Cooperation and Development.

Bhardwaj, G., Ditty, S. 2018. Understanding Sustainable Fashion. Chatham House. Retrieved from: https://www.chathamhouse.org/expert/comment/understanding-sustainable-fashion?gclid=CjwKCAjw3-bzBRBhEiwAgnnLCo-BgDmYm_CP_hHPeG6PsRrZ56XoMhs354bgDig6BSNG1BurjNvepxoCUr0QAvD_BwE.

Churchill, G.A. 1979. A paradigm for developing better measures of marketing constructs. Journal of Marketing Research, 16(1), 64-73.

Clark, J. 2017. Tackle Your Top 10 Procurement Priorities with one Technology Investment. NIGP: Government Procurement (February/March 2017). Retrieved from: www.govpro.com.

Cooney, S. 2008. Build a green small business: Profitable ways to become an Ecopreneur. McGraw-Hill.

Dillman, D.A. 1978. Mail and telephone surveys: The total design method. New York, Wiley.

Dyllick, T., Hockerts K. 2002. Beyond the Business Case For Corporate Sustainability. Wiley InterScience.

Grima, S., Thalassinos, I.E., Dalli Gonzi, R. 2020. The Impact of COVID-19 on Malta and its Economy and Sustainable Strategies. Available at SSRN: https://ssrn.com/abstract=3644833 or http://dx.doi.org/10.2139/ssrn.3644833.

Hsin Chang, H., Tsai, Y., Hsu, C. 2013. E-procurement and supply chain performance. Supply Chain Management: An International Journal, 18(1), 34-51.

Iles, J. 2017. How is e-procurement related to the success of US Cities' sustainable procurement - An assessment framework based on DANP and Liberatore score. IEEE Systems Journal, 9(4), 1554-1564.

Joy, A., Sherry Jr, J.F., Venkatesh, A., Wang, J., Chan, R. 2012. Fast fashion, sustainability, and the ethical appeal of luxury brands. Fashion theory, 16(3), 273-295.

Khan, S., Thalassinos, I.E., Rabbani, R.M., Atif, M. 2020. Pandemic Paving Ways to Next Generation of Learning and Teaching: Futuristic Cloud Based Educational Model. Available at SSRN: https://ssrn.com/abstract=3669832.

Kulbytė, T. 2020. 37 Customer Experience Statistics You Need to Know for 2020. Super Office. Retrieved from: https://www.superoffice.com/blog/customer-experience-

statistics/.

Oliveira, L.M., Amorim, P.P. 2001. Public e-procurement. International Financial Law Review, 43-47.

OpusCapita. 2020. Adapting your Procurement Strategy in a Pandemic. WBR Insights. Retrieved from: https://www.opuscapita.com/media/2028229/procurecon-2020-opuscapita-report.pdf.

Oxford. 2019. Corporate sustainability and profitability are interrelated. Retrieved from: https://sustaincase.com/oxford-university-corporate-sustainability-and-profitability-are-interrelated/.

Pizzi, S., Rosati, F., Venturelli, A. 2021. The determinants of business contribution to the 2030 Agenda: Introducing the SDG Reporting Score. Business Strategy and the Environment, 30(1), 404-421.

Prier, E., Schwerin, E., McCue, C.P. 2016. Implementation of sustainable public procurement practices and policies: a sorting framework. J. Public Procure, 16(3), 312-346.

Quesada, G., González, M.E., Mueller, J., Mueller, R. 2010. Impact of E- procurement on procurement practices and performance. Benchmarking: An International Journal, 17(4), 516-538.

Ramkumar, M., Jenamani, M. 2015. Sustainability in supply chain through e-procurement - An assessment framework based on DANP and liberatore score. IEEE Systems Journal, 9(4), 1554-1564.

Ruparathna, R., & Hewage, K. (2015). Sustainable procurement in the Canadian construction industry: challenges and benefits. Canadian Journal of Civil Engineering, 426, 417-426.

Thalassinos, I.E., Trung Duc, N., Hoang Le, A., Kim Trieu, L. 2022. The Impact of the COVID-19 Pandemic on Economic Growth and Monetary Policy: An Analysis from the DSGE Model in Vietnam. Economies, 10, 159. https://doi.org/10.3390/economies10070159.

Transmission of COVID-19. 2020. European Centre for Disease Prevention and Control. https://www.ecdc.europa.eu/en/covid-19/latest-evidence/transmission.

Walker, H. 2013. Sustainable supply chain management: a literature review and future research directions. In: C.M. Harland (Ed.). The Sage Handbook of Strategic Supply Management, 333-354. London, Sage.

Walker, H., Brammer, S. 2012. The relationship between sustainable procurement and E-procurement in the public sector. International Journal of Production Economics, 140(1), 256-268.

Watson, R. 2015. Quantitative research. Nursing Standard, 29(31), 44.