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Small Firm Internationalisation and International Entrepreneurship Managing Sustainable Innovation

Editors:

Emin Akçaoğlu & Rainer Wehner

**Würzburg International Business Forum
5th International Business Conference**

CONFERENCE PROCEEDINGS

Bangkok, 1 - 2 September 2022



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'Managing Sustainable Innovation'

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Germany
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Foreword

Entrepreneurship, innovation and internationalisation are substantially interrelated. In an increasingly competitive world economy these are getting more importance.

In line with these, sustainability is another significant concept that is widely recognised in the recent years. As a result of climate change and environmental degradation; governments, companies, and other sections of the society in the world care about the sustainability-related issues in an increasing manner. To this end, innovations are also expected to be real contributors to sustainability in practice.

Moreover, international entrepreneurship and internationalisation of companies (especially SMEs) has recently gained a special role. Currently, many countries and international organisations focus on international entrepreneurship for job creation and economic growth. This is particularly important these days as the effects of the global economic crisis are still present.

Small companies are entrepreneurial in their nature. SMEs are not always growth oriented individually. Many small business owners do not aim to grow the company size at all. But since the number of SMEs in any economy is overwhelming, they contribute substantially to GNPs and also

to employment. Many of these firms are family owned. Therefore, such firms are more flexible in comparison with large companies to adapt to changing environments, to enter new markets or, to introduce new products. Perhaps because of this attribute, family firms do tend perform better in adverse economic conditions.

Increasing economic integration among nations forces companies to be involved in international business much more than earlier. In this respect, foreign direct investment (FDI) has also become as important as export business. In fact, FDI is currently has a pivotal role for international trade flows. At present two third of the world trade volume is under the control of multinational companies. Interestingly, multinational companies are not generally large or big companies as is supposed by many. They are rather smaller companies involved in FDI and other foreign operation modes.

So far, the internationalisation of SMEs and family-owned small firms and also small multinationals have been studied relatively lesser than the potential. In this respect, the WIBF's 5th International Business Conference aims to focus on international entrepreneurship and small firm internationalisation, and also on sustainable innovation management under the current societal issues.

The conference has already established itself as a global forum aiming at assessing the impact of, and generating discussion regarding, these recent developments in order to reach a deeper understanding of the topical areas.

This year's conference was organised with the partnership of

- Rajamangala University of Technology Phra Nakhon (RMUTP), Thailand
- Doğuř University, Istanbul, Turkey
- IHK Mainfranken, Germany
- GASMERC – Global Alliance SME Research & Cooperation and

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Editors & Co-Chairmen of WIBF

- TNCCS - Transnational Corporations Council of Studies, Canada

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The final acknowledgement goes to Prof. Dr. Robert Grebner, President of FHWS, and Prof. Dr. Axel Bialek, Dean of Faculty of Economics and Business Administration at FHWS. Without their support and encouragement, this year's conference would not have been possible.

Proceedings of Plenary Session I

An AHP for Prioritizing and Selecting Concrete Waste Management Method Case Study: Circular economy construction industry group (CECI)

Prin Boonkanit, Rajamangala University of Technology Phra Nakhon, Thailand
Kridchai Suthiluck, Rajamangala University of Technology Phra Nakhon, Thailand

The objective of this research is to study and consider the most suitable method for the management of concrete waste from construction. The research methods started with a study of the current status and problems of concrete waste management, a study of literature review on solving problems of concrete waste management from construction by employing an analytic hierarchy process (AHP) to prioritize factors affecting management as well as selecting the three most proper management methods, including landfill, recycled concrete aggregate (RCA) and upcycling recycled concrete. The data collection was from questionnaires and in-depth interviews with 15 experts in the Circular Economy in Construction Industry (CECI). The results of the study found that the experts attached the utmost importance to environmental criteria 33.9%, followed by social criteria 29.3%, economic criteria 25.1% and technical criteria 11.6%, respectively. The most proper concrete waste management method was upcycling recycled concrete.

Keywords: Analytic Hierarchy Process, Construction Waste Management, Circular Economy Construction Industry Group (CECI)

Introduction

Deteriorating environmental problems such as land degradation, carbon dioxide and greenhouse gas emissions, water pollution, high power consumption and loss of resources are partly from the construction industry (Akanbi, Oyedele, Akinade, Ajayi, Delgado, Bilal, & Bello, 2018). Industries use more than 50% of natural resources, causing 30% of waste and 30% of carbon dioxide emissions worldwide (Anink, Mak, & Boonstra, 1996). Most construction waste is generated by construction activities, building renovation and building demolition. The highest volume of waste compared to other activities around the world reaches 30 to 40% of the amount of trash and garbage in the city (Wang, Wu, Duan, Zillante, Zuo, & Yuan, 2018). The average composition of construction and demolition waste reaches 84% of concrete waste (Gálvez-Martos, Styles, Schoenberger, & Zeschmar-Lahl, 2018). According

to data from the statistical office of the European Union in 2018, there are approximately 924 million tons of construction waste in the European Union (Eurostat, 2017), 548 million tons in the United States of America (EPA, 2018), 2.5 billion tons per year in China (Huang, Wang, & Harnwei, 2018). In 2005, there were 1.1 billion tons of construction and demolition waste or 7.7% of trash and garbage in Thailand (Kofowoleola, & Gheewala, 2009), abandoned in public spaces and open landfills with general waste (Manowong, & Brockmann, 2010). Only 20 to 30% of construction waste is recycled (World Economic Forum, 2016).

Due to the problems and effects of industry on the environment, the concept of a circular economy is proposed to reduce waste and make the most of resources. **On the other hand, the opposite of the production model we have today is using (resources) to create products and eliminate waste** (Brown, Bocken, & Balkenende, 2019). The concept of circular economy is used to generate a great contribution to sustainability in the construction industry (Hossain, Ng, Antwi-Afari, & Amor, 2020).

Determining the best ways to manage construction waste, such as reducing waste, recycling, reusing materials, and landfilling, is still a challenge. Each management strategy has unique environmental, social, economic, and technical characteristics. Multi-Criteria Decision Analysis, or MCDA, is a useful tool for assisting stakeholders in choosing the best management strategy. To manage waste, Analytical Hierarchy Process, or AHP, is used by more than 50% (Huang, Keisler, & Linkov, 2011) as well as 49% (Cegan, Filion, Keisler, & Linkov, 2017) for diagnosis to facilitate decision-making of complex issues under the concept of pairwise comparison (Saaty, 1980). This research uses the AHP to prioritize and select the best method.

As described earlier, concrete waste management problems from CECI's construction are still operated inefficiently because of the shortage of efficient management processes for recycling as well as the relationship between the waste generator and the waste receiver for treatment, elimination and making the most of the cost-efficiency. This has led to two research questions.

1. What is the interest in the circular economy concept and the importance of each construction waste management factor?

2. What is the effective management of concrete waste from the construction industry?

The purpose of this research is to thoroughly examine and analyze the best approach for managing construction-related concrete waste while also establishing a network of cooperation in waste management.

Material and Methodology

Questionnaires crafted from pertinent concepts, theories, and research were used as the research instrument for data collection. The sample group for in-depth interviews and online questionnaires was 27 related experts, only 15 of the experts responded, including 5 groups of the CECI: 3 people from the architect and project consultant group, 2 people from the property development group, 5 people from the contractor group, 3 people from the manufacturing and building material distributor group and 2 people from the waste management group. The questionnaire response rate was 55.6%, which was good (Berdie, Anderson and Niebuhr, 1986) and (Baruch, 1999). The research Framework was shown in Figure 1.

The methodology of research is as follows:

1. Study the current status and problems of concrete waste management as well as a literature review to question and set the research objectives.

2. Collect specify criteria from literature review studies, such as Khoshand, Khanlari, Abbasianjahromi, & Zoghi (2020), which examined the management of construction waste in Iran, and Mdallal, & Hammad (2019), which examined construction waste from a project in the United Arab Emirates. A hierarchy structure can then be made from the results of the assessment, as shown in Figure 2, by first creating a questionnaire for the experts to evaluate pertinent factors and take into account the consistency of specific waste management strategies. Create a questionnaire that was used to guide the analytical hierarchical decision-making process after that. According to the pair-wise comparison theory, each factor on the questionnaire was prioritized. Table 1 displays the scores for the significance of comparing two factors, which range from 1 to 9. Additionally, the computation of the AHP followed the method of Saaty (1990) and Boonkanit, & Kengpol (2010).

3. Submit the questionnaire via an online system to the related experts to rate before finding the mean of the value of the main and sub-criteria. Then, consider the suitable methods of concrete waste management. Next, analyze score data from the experts' assessment by Microsoft Excel to get the results in matrix form and the value of each factor in the eigenvector of each matrix by comparing pairs one by one following the structure of the hierarchical chart.

4. Verify the consistency of the data with the consistency ratio (CR). If $CR < 0.1$, the significance score data obtained

from comparing pairs is consistent.

5. Prioritize the main-criteria and sub-criteria from the results of the score value to get the results for selecting the most suitable method for concrete waste management.

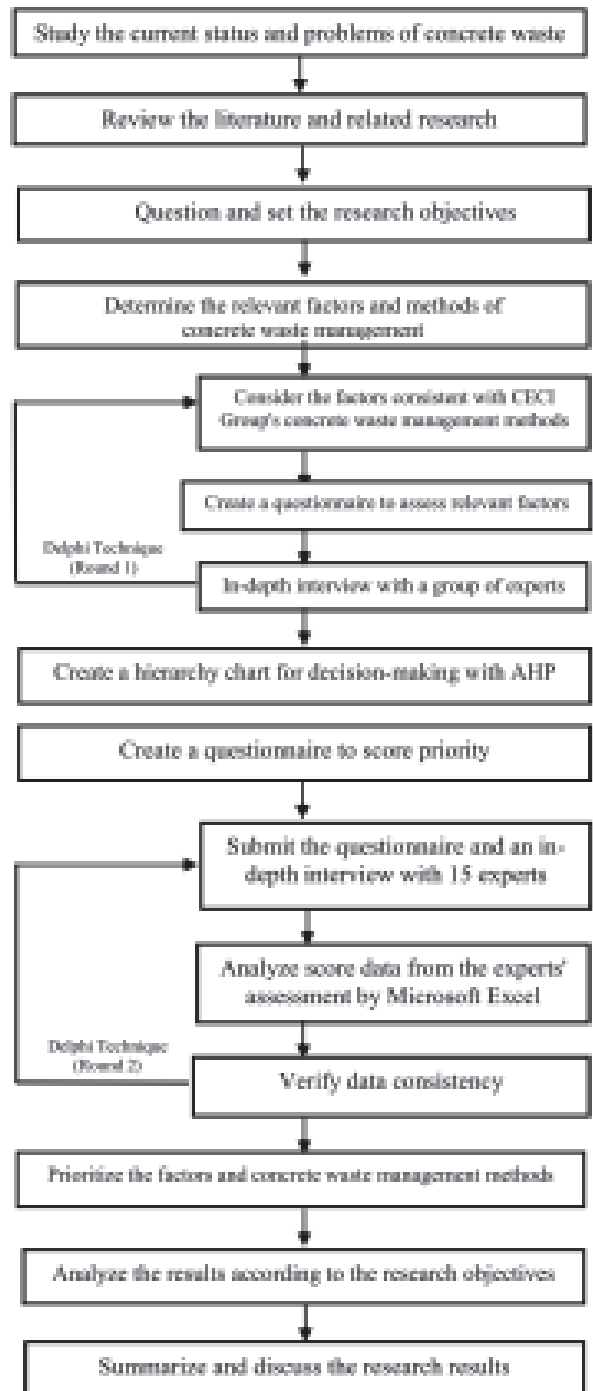


Figure 1: Research Framework

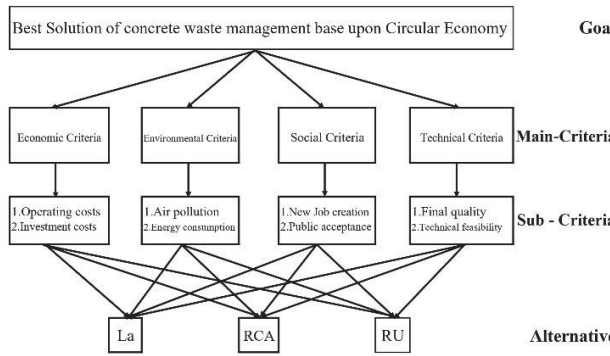


Figure 2: General Hierarchy Structure of Concrete Waste Management Alternative in Terms of Main-criteria and Sub-criteria

Locations: La = Landfill
: RCA = Recycled Concrete Aggregate
: RU = Recycled Concrete to Upcycling

Table 1. Fundamental Scale in Calculating AHP

Verbal Judgment of Preference	Numerical
Rating	
Equal importance	1
Moderate importance	3
Strong importance	5
Very strong importance	7
Extreme importance	9
The intermediate value between the two adjacent judgments	2, 4, 6, 8

An Example of Priority Analysis

Create a matrix table with the scores from the AHP questionnaire using a pair-by-pair comparison from the experts as in Table 2 to calculate the priority of the factors.

Table 2. An Example of the Questionnaire for the Pair-By-Pair Comparison

Criteria	9	7	5	3	1	3	5	7	9	Criteria
Economic						X				Environmental
Economic							X			Social
Economic				X						Technical
Environmental				X						Social
Environmental			X							Technical
Social			X							Technical

Matrix A

$$A = \begin{bmatrix} a_{11} & a_{12} & a_{13} & a_{1j} \\ a_{21} & a_{22} & a_{23} & a_{2j} \\ a_{31} & a_{32} & a_{33} & a_{3j} \end{bmatrix}$$

Table 3. An Example for Evaluating Concrete waste management under main Criteria

Criteria	Economic	Environmental	Social	Technical	Eigenvector
Economic	1	1/3	1/3	3	0.15
Environmental	3	1	3	5	0.49
Social	3	1/3	1	5	0.29
Technical	1/3	1/5	1/5	1	0.07

For example, if $a_{42} = 5$ then objective Environmental is slightly more important than objective Technical then $a_{24} = 1/5$ (Table 3). Then the corresponding normalized matrix is Example $a_{11} = 1/(1+1/3+1/3+3) = 0.14$,

$$A_{\text{Normalized}} = \begin{bmatrix} 0.14 & 0.18 & 0.07 & 0.21 \\ 0.41 & 0.54 & 0.66 & 0.36 \\ 0.41 & 0.18 & 0.22 & 0.36 \\ 0.05 & 0.11 & 0.04 & 0.07 \end{bmatrix}$$

Eigenvector = $(0.14+0.18+0.07+0.21)/4 = 0.151$, $(0.41+0.54+0.66+0.36)/4 = 0.491$, $(0.41+0.18+0.22+0.36)/4 = 0.291$, $(0.05+0.11+0.04+0.07)/4 = 0.067$

After that we compute Consistency Index (C.I.) by calculating λ_{max} , where λ_{max} is the largest or principal eigenvalue of Matrix $A' = (a'_{ij})$, the perturbed value of $A = (a_{ij})$ with $a'_{ji} = 1/a'_{ij}$, forced. (Saaty, 1996) It is interesting to note that $(\lambda_{max} - n)/(n-1)$ is the variance of the error incurred in estimating a_{ij} . This can be shown by writing $a_{ij} = (w_i/w_j)\varepsilon_{ij}$, $\varepsilon_{ij} > 0$ and $\varepsilon_{ij} = 1+\delta_{ij}$, $\delta_{ij} > -1$ and substituting in the expression for λ_{max} . It is δ_{ij} that concerns us as the error component and its value $|\delta_{ij}| < 1$ for an unbiased estimator. The measure of inconsistency can be used to successively improve the consistency of judgments.

$$\begin{bmatrix} 1 & 1/3 & 1/3 & 3 \\ 3 & 1 & 3 & 5 \\ 3 & 1/3 & 1 & 5 \\ 1/3 & 1/5 & 1/5 & 1 \end{bmatrix} \times \begin{bmatrix} 0.15 \\ 0.49 \\ 0.29 \\ 0.07 \end{bmatrix} = \begin{bmatrix} 0.603 \\ 1.964 \\ 1.165 \\ 0.268 \end{bmatrix}$$

$$\lambda_{max} = ((0.603/0.15) + (1.964/0.49) + (1.165/0.29) + (0.268/0.07))/4 = 4.199$$

$$C.I. = (\lambda_{max} - n) / (n-1)$$

$$C.I. = (4.199-4) / (4-1) = 0.066$$

$$C.R. = C.I./R.I. = 0.066/0.90 = 0.07 < 0.1$$

The consistency ratio (C.R.) is obtained by comparing the C.I. with the appropriate one of the set of RI numbers shown in Table 4. (R.I. in Table 4 N=4, RI=0.90) each of which is an average random consistency index derived from a large sample of randomly generated reciprocal matrices using the scale 1/9, 1/8, ..., 1, ..., 8, 9. The resulting vector is

accepted if C.R. is about 0.10 or less (0.20 may be tolerated, but not more). For $n = 3$, it is 0.05, and for $n = 4$, it is 0.08. If it is not less than 0.10, study the problem and revise the judgments. In this decision, we accepted this decision-making because CI/RI ratio is less than 0.10.

Table 4. Table of Random Inconsistency for Different Size Matrix

N	1	2	3	4	5	6	7
R.I.	0.00	0.00	0.58	0.90	1.12	1.24	1.32

Results

The experts attached the utmost importance to environmental criteria 33.9%, followed by social criteria 29.3%, economic criteria 25.1% and technical criteria 11.6%, respectively. The most proper concrete waste management methods were upcycling recycled concrete, reaching 45.7%, followed by recycled concrete aggregate (RCA), reaching 36.6% and landfill, reaching 17.6%, respectively. For sub-factors affecting construction concrete waste management, the experts attached the utmost importance to the three first factors including air pollution factor, which reached 24.6%, public acceptance, which reached 22.1%, and operation cost, which reached 15.8%, respectively. The score value for concrete waste management methods in terms of principle criteria and sub-criteria was shown in Figure 3.

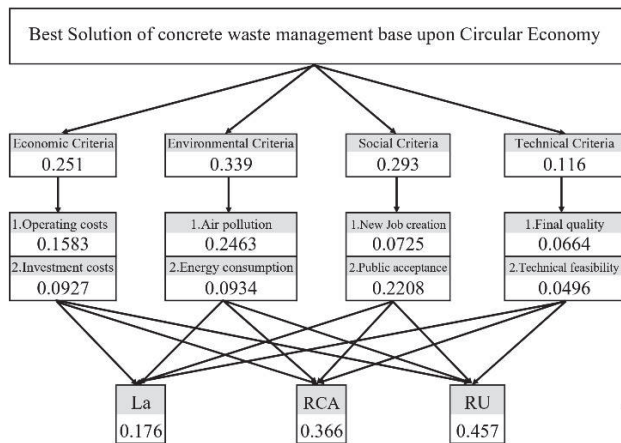


Figure 3. The Score Value for Hierarchy Structure of Concrete Waste Management Alternative in Terms of Criteria and Sub-criteria

Conclusion

The results showed that the Circular Economy concept for construction concrete waste management was greatly interesting because CEI attached the utmost importance to environmental criteria. Furthermore, CEI is expected to generate effective concrete waste management methods with

a management system such as regulatory balance, technology system, people management and economic management. It was highly likely to develop the system, mainly to support matching waste on an online form, to create mutual benefits in economics and sustainability because the construction industries involve the government sectors, educational institutions, professional organizations and other industry sectors. The results of this research can be a reference and guidance for further sustainable operations in many sectors related to the construction industry.

Further Research

For further research in the future, the technology system should be developed reasonable match waste with a social network.

References

- Akanbi, L.A., Oyedele, L.O., Akinade, O.O., Ajayi, A.O., Davila Delgado, M., Bilal, M., Bello, S.A. (2018). Salvaging building materials in a circular economy: A BIM-based whole-life performance estimator. *Resour Conserv. Recycl.* 129, 175-186.
- Anink, D., Mak, J., and Boonstra, C. (1996). *Handbook of Sustainable Building: An Environmental Preference Method for Selection of Materials for Use in Construction and Refurbishment*. London: James and James.
- Baruch, Y. (1999). Response rates in academic studies—a comparative analysis. *Human Relations*. 421-434.
- Berdie, D.R., Anderson J.F., & Niebuhr MA. (1986). *Questionnaires: design and use*. Metuchen, N.J.: Scarecrow Press.
- Brown, P., Bocken, N., Balkenende, R., Brown, P., Bocken, N., Balkenende, R., 2019. Why Do Companies Pursue Collaborative Circular Oriented Innovation?. *Sustainability* 11, 635.
- Cegan, J. C., Filion, A. M., Keisler, J. M., & Linkov, I. (2017). Trends and applications of multi-criteria decision analysis in environmental sciences: Literature review. *Environment Systems and Decisions*, 37, 123–133.
- Eurostat (2017). *Generation of Waste by Waste Category, Hazardousness and NACE Rev 2 Activity*.
- Gálvez-Martos, J.-L., Styles, D., Schoenberger, H., & Zeschmar-Lahl, B. (2018). Construction and demolition waste best management practice in Europe. *Resources, Conservation and Recycling*, 136, 166–178.
- Huang, I. B., Keisler, J., & Linkov, I. (2011). Multi-criteria decision analysis in environmental sciences: Ten years of applications and trends. *Science of The Total Environment*, 409(19), 3578–3594.
- Huang, B.J., Wang, X.Y., Harnwei, K., et al., 2018b. Construction and demolition waste management in China through the 3R principle. *Resour. Conserv. Recycl.* 129, 36–

44.

Khoshand, A., Khanlari, K., Abbasianjahromi, H., & Zoghi, M. (2020). Construction and demolition waste management: Fuzzy Analytic Hierarchy Process approach. *Waste Management & Research: The Journal for a Sustainable Circular Economy*, 38(7), 773–782.

Kofoworola, O.F.; Gheewala, S.H. Estimation of construction waste generation and management in Thailand. *Waste Management*. 2009, 29, 731–738.

Manowong E, Brockmann C. (2010). Construction waste management in newly industrialized countries. In: W107-Special Track 18th CIB World Building Congress May 2010 Salford, United Kingdom.

Mdallal, A. and Hammad, A. (2019), “Application of fuzzy analytical hierarchy process (FAHP) to reduce concrete waste on construction sites”, Canadian Society for Civil Engineering (CSCE) Annual Conference, Montreal, Canada.

MU Hossain., ST Ng., P Antwi-Afari., B Amor. (2020). Circular economy and the construction industry: Existing trends, challenges and prospective framework for sustainable construction. *Renewable and Sustainable Energy Reviews*.130, 109948.

P. Boonkanit, A. Kengpol. (2010). The Development and Application of a Decision Support Methodology for Product Eco-Design: A Study of Engineering Firms in Thailand, *International Journal of Management*. 27 185-201.

Saaty TL (1980) *The Analytic Hierarchy Process*. New York: McGraw-Hill, p. 324.

Saginova, O., Tsennina E., Saginov Y. (2020). Sharing economy: Users’ motivations from the sustainable

development perspective, EWürzburg International Business Forum Proceedings of the International Business Conference. WIBF2020.25-28.

T.L. Saaty (1990), “How to make a decision: the analytic hierarchy process,” *European Journal of Operational Research*, vol.48, on.1, pp., 9-26.

U.S. EPA, 2018. Construction and Demolition Debris Generation in the United States, 2015. U.S. Environmental Protection Agency Office of Resource Conservation and Recovery.

Wang, J., Wu, H., Duan, H., Zillante, G., Zuo, J., Yuan, H. (2018). Combining Life Cycle Assessment and Building Information Modelling to account for carbon emission of building demolition waste: a case study. *J. Clean. Prod.* 172, 3154–3166.

World Economic Forum, 2016. Shaping the Future of Construction, World Economic Forum (WEF) Web site: http://www3.weforum.org/docs/WEFShaping_the_Future_of_Construction_full_report.pdf.

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Cultural Impact on Entrepreneurial Expectations

Tiina Brandt, Haaga-Helia University of Applied Sciences, Finland

Isaac Wanasika, University of Northern Colorado, USA

Mikus Dubickis, RISEBA University of Applied Sciences, Latvia

Stephen Treacy, University College Cork, Ireland

Hanna Pihlajarinne, Tampere University of Applied Sciences, Finland

Rocco Acocella, University of Malta, Malta

Andreea Militaru, University Politehnica of Bucharest, Romania

Diederich Bakker, Hanze University of Applied Sciences, Netherlands

J. Liu, Hanze University of Applied Sciences, Netherlands

Rong Liu, Hubei University of Economics, China

Yukie Tsuzuki, Seijo University, Faculty of Social Innovation, Japan

Thu Vo, University of Applied Sciences Vaasa, Finland

The purpose of this study is to evaluate qualities that are needed for effective entrepreneurship in a variety of national cultures. The sample represents 731 business students from several countries from Asia, Baltics, USA, Nordic, Middle, South and East Europe. College students completed a questionnaire that identified qualities they would need to start their own entrepreneurial business. Results indicated statistically significant entrepreneurial qualities between cultures. Starting a business in a specific cultural environment requires unique entrepreneurial qualities. Our results also found support for universally endorsed entrepreneurial qualities. Country-specific strategies for enhancing entrepreneurship are discussed at the end of the paper.

Introduction

There has been increased attention in understanding how national culture affects different aspects of entrepreneurship and the entrepreneurship process. Entrepreneurial career choices are impacted by entrepreneurial drive (Florin et al., 2007) and cultural values (Dahles, 2005). Culture has direct and indirect effects on different dimensions of entrepreneurship. Culture appears to play an important role in the business process, as cultural diversity can influence the predominant characteristics of entrepreneurship and thus moderate the effects of economic conditions on entrepreneurship (Jaén et al., 2017). Cultural values determine the degree to which a society views entrepreneurship as an attractive or unattractive professional outlet (Liñán et al., 2013). Thus, the level of entrepreneurship varies widely from country to country based on culture (Hunt and Levie, 2003).

Studies on national culture have found interrelationships between national culture and entrepreneurship (Hofstede, 1980; 2000; House et al., 2004). The description of culture as “the collective programming of the mind that distinguishes the members of one group or category of people from another” (Hofstede, 2001, p. 5), implies that cultural norms are manifested in individuals’ values, norms, cognitions, motivations, beliefs and behaviors. Scholars have identified culture as a moderating factor in career choice to be an entrepreneur and start a new business (Moriano et al., 2012; Thornton et al., 2011), theory of planned behavior constructs (Hagger et al., 2007), and entrepreneurial intentions (García et al., 2018). Multiple studies have shown that the country’s culture has an impact on students’ entrepreneurial intentions (Liñán et al., 2013; Pruett et al. 2009; Sánchez, 2010; Varamäki et al., 2013).

In this study we widen the area of cultural knowledge in relation to entrepreneurship, to provide more culturally specific knowhow of students’ entrepreneurial needs, tendencies and possible limitations. This knowledge is especially useful for entrepreneurial educators and aspiring entrepreneurs. Our goal is to compare respondents from selected countries from a perspective of entrepreneurial intentions, knowhow and relevant attitudes required to become entrepreneurs. To our knowledge, no other study has examined attributes of potential entrepreneurs from eight different cultural clusters.

Background

Theory of Planned Behavior

The Theory of Planned Behavior (TPB) (Ajzen, 1991) is one of the models in the study of entrepreneurial intent in

different countries (Autio et al., 2001; Moriano et al., 2012). Ajzen (1991) postulates that behaviour is a function of beliefs that influence a certain behaviour. These beliefs are considered important premises that determine 1) personal attitude, 2) intention and 3) perceived behaviour control. Personal attitude is the favourable or unfavourable assessment that a person makes on the behaviour in question. The second predictor of perceived behaviour is a social factor referred to as subjective norms. Subjective norms refer to the perceived social pressure to perform or not perform a certain action from people in the immediate environment who exert that influence and pressure. The third antecedent of intention is the degree of perceived behaviour control (PBC) over behaviour, which is the perceived ease or difficulty of the subject in performing an action based on past experiences, as well as difficulties and obstacles perceived by the subject.

The more favourable the subjective norms and attitudes towards behaviour, the greater the perceived degree of control of the individual, leading to a stronger intention to perform a certain behaviour (Ajzen, 1991). However, one of the unresolved issues is the role of subjective norms. Some studies have shown a direct influence of subjective norms on the intentions to undertake a behaviour, while others have not (Fayolle and Gailly, 2004; Krueger et al., 2000). Certain authors have found a direct influence of subjective norms through personal attitude and perceived control of behaviour (Meek et al., 2010; Moriano et al., 2012).

Previous studies have used TPB to predict certain variables that are related to entrepreneurship. These variables include entrepreneurial intentions, entrepreneurial behavior, entrepreneurial skills and entrepreneurial attitudes. Entrepreneurial skills and attitudes are necessary antecedents in the process of effective entrepreneurship. Skills and attitudes are developed through learning, experience and environmental factors. Intention plays a central role in TPB by connecting norms, attitudes and behavioral control with enacted behaviors. Entrepreneurial intention is the “self-acknowledged conviction by a person that they intend to set up a new business venture and consciously plan to do so at some point in the future” (Thompson, 2009, p. 676). Entrepreneurial intention is the first step towards taking entrepreneurial action such as contemplating a startup. The second variable of interest is entrepreneurial behavior. Based on the TPB, intentions are correlated with behavior and linked to behavioral control. Entrepreneurial behavior refers to entrepreneurial actions such as recognizing and exploiting opportunities by reconfiguring existing and new resources in ways that create an advantage” (Zahra, 2005, p. 25). Entrepreneurial behavior is a necessary action that puts entrepreneurial intentions into play.

Culture

Previous studies have found associations between culture and entrepreneurship. Specific cultural dimensions

are likely to strengthen or weaken the relationship between individual factors and entrepreneurial intent (Schlaegel and Engle, 2013). Looking at each of the relevant dimensions, we can identify theoretical and empirical support for this assertion. Commonly used cultural dimensions in entrepreneurship research include four Hofstede’s dimensions, which are power distance (PDI), individualism (IDV), masculinity (MAS) and uncertainty avoidance (UAI). Although Hofstede’s original formulation has six dimensions, the four dimensions have the greatest effect on entrepreneurship.

Power distance (PDI) dimension expresses the degree to which the less powerful members of a society accept and expect that power is distributed unequally. Societies exhibiting a large degree of PDI accept a hierarchical order, control and obedience to those with power (Hofstede, 1980). Everybody has a place that needs no further justification. There are contradictory studies of power distance, some studies indicate that high PDI promotes entrepreneurial activity (Busenitz and Lau, 1996) while low PDI relates to entrepreneurs (Mueller et al., 2002). Studies have also shown that risk-taking propensity in entrepreneurship is moderated by PDI (Antoncic et al., 2018).

Individualism (IDV) refers to societies that prefer a social framework in which individuals are expected to take care of themselves and their immediate families. On the other hand, collectivist societies take care of the larger extended family in exchange for loyalty. According to Hofstede (1980), IDV culture that emphasize “I” rather than “we” are more likely to demonstrate entrepreneurship. This is supported Lee and Peterson (2000) who found that countries with high levels of individualism develop a greater entrepreneurial spirit. Interestingly, Pinillos Costa and Reyes Recio (2007) also note that the entrepreneurial activity rate of a nation is positively associated with individualism when the country’s income level is high; however, when the level of income is low, collectivist culture predicts a high ratio of business creation. Additionally, Mueller et al. (2002) indicated that entrepreneurs tend to have high IDV. High IDV is also related to venture-capital investments (Gantenbein, et al., 2019).

Uncertainty avoidance (UA) dimension expresses the degree to which the members of a society feel uncomfortable with uncertainty and ambiguity. High uncertainty avoidance implies that the society exhibits strong beliefs and norms of behavior and is uncomfortable with new ideas and the unknown. Studies have found a negative relationship between UA and different attributes of entrepreneurship such as innovation (Shane, 1993), risk-taking (Kreiser et al., 2010) and early-stage entrepreneurship (Arrak et al., 2020). Accordingly, Mueller et al. (2002) found that low UA was positively related to entrepreneurship.

Masculinity (MAS) represents a preference for achievement, heroism, assertiveness, and material rewards for success. MAS has also been associated with traditional

male values such as compensation, recognition and career advancement (Hofstede and Hofstede, 2005). These traits are somewhat perceived to be necessary in entrepreneurship. Numerous studies found support for this perception (Heilman, 2001). However, recent studies have pointed to sociocultural biases (Pecis, 2016) and gender blindness in research may conceal the gendered nature of innovation processes (Dheer et al., 2019).

Thomas and Mueller (2000) conclude that cultural values such as individualism and uncertainty avoidance are significantly related to traits such as internal locus of control, risk taking, and innovativeness, which are associated with entrepreneurship. Some authors (Del Junco and Brás-dos-Santos, 2009) have emphasized that a country's cultural and social values impact personal values of entrepreneurs. However, Hofstede et al. (2004) add a psychological perspective, stating that when individuals are dissatisfied, they tend to become self-employed even when the country's culture of entrepreneurship is not favourable.

According to Triandis (2004), collectivists view behaviour as a result of external factors, such as norms and roles, while individualists relate it to leadership, high educational attainment and mobility on the social scale. According to Soares et al. (2007), this theory is useful for formulating hypotheses in comparative studies at an intercultural level. Based on previous studies between cultural dimensions and entrepreneurial activity, we are able to develop specific propositions. High individualism and high masculinity appear to be highly correlated to entrepreneurship. High power distance promotes certain aspects of entrepreneurial activity such as risk-taking. Low uncertainty avoidance is likely to be associated with entrepreneurship. High masculinity, low uncertainty avoidance and high individualism are related to entrepreneurship.

Entrepreneurship and culture

Gonzales-Serrano et al. (2018) compared entrepreneurial attitudes of eastern and western parts of Europe comparing Lithuanian and Spanish students. Lithuanian students had higher predictor variables for entrepreneurship having higher entrepreneurial intentions and perceived behavior control as well as personal attitude, compared to Spanish students.

Earlier studies indicate that Danish and Finnish nationals have positive attitudes towards entrepreneurship (Amway Global Entrepreneurship Report, 2013), especially with population categories under 30 years. Most Europeans have a more positive attitude towards entrepreneurship than US nationals, but interestingly, the US has a higher entrepreneurial rate. Additionally, Finnish and Danish nationals are among the lowest to actually become entrepreneurs. One reason for this has been speculated that only 37% of US people say that they do not have fear of failure when at Europe the fear of failing rate is 73%

(Amway Global Entrepreneurship Report, 2013).

In the USA, small businesses and start-ups play an instrumental role in the economic and cultural environments, and account for two-thirds of net employment (Dilger, 2018). A significant part of the US cultural heritage that has been linked to entrepreneurship includes the protestant work ethic, freedom and independence (Morris et al., 1994). Lee and Peterson (2000) found that weak uncertainty avoidance, low power-distance, masculinity, individualism, achievement orientation and universalism were conducive to entrepreneurship. Based on a US sample, Mueller and Thomas (2000) found evidence of high individualism and high uncertainty avoidance as being supportive to entrepreneurship. Finally, while comparing the US culture to nine other countries, McGrawth et al. (1992) concluded that regardless of culture, individualism, high power-distance, low uncertainty avoidance and masculinity were common attributes among entrepreneurs.

Methodology

Sample

The sample represents 817 business students, but not all of them completed background information. For country comparison, we used a sample of 731 business students with complete background information. The data was gathered from various countries in higher education (universities of applied sciences and universities) during the 2020-2022 academic years. Completion of background information was voluntary, information concerning gender, age and area of study was only provided by some respondents. The most represented cultures were Asia, Baltic and USA. There were students who had lived for more than one year in at least two countries. This category was represented as a separate group, called "lived in many countries". Below are specific cultural clusters by area:

- Asian, China, n=180
- Asian, Japan, n=133
- Baltic, Latvia, Lithuania, n=103
- Lived in many countries, n=103
- USA, n=73
- Middle Europe (mostly Netherlands and Germany), n=52
- East Europe (Romania, Bulgaria), n=44
- Nordic, Finland, n=43
- All together= 731

The questionnaire

Skills and attitudes needed for becoming entrepreneur were measured with the following questions: What would you need to become an entrepreneur in future (Scale 1= I would not need at all.... 7=I would need a lot). Items were:

- Courage
- Willingness to take risks
- Motivation

- Self-esteem
- Optimism
- Resilience
- Persistence
- Decisiveness
- Innovativeness
- Mentor to help me
- Team to build up the business
- More knowledge of entrepreneurship
- Good business idea

Method

Statistical analyses conducted with Anova and Tukey-B was used for post-hoc test, to determine statistically significant differences between the cultural areas, and differences among the cultures.

Results

Overall results

The means by countries and Anova results comparing cultures are presented in Table 1. Overall, the respondents thought that if they start business they would need mostly: Good business idea (mean=6,03), secondly motivation (mean=5,95) and thirdly persistence (mean=5,88). Having mentor to help (5,25) and optimism (5,32) had the lowest means.

Table 1. Means of items by country and statistically significant results between national cultures and clusters

Needed quality for entrepreneurship	1	2	3	4	5	6	7	8	9
Courage	5,7	5,9	6,1	5,7	5,7	5,5	6,2	5,4	5,7
Take Risks	5,7	5,8	5,8	5,9	5,8	5,5	5,8	5,3	5,6
Motivation	6,0	5,8	6,2	6,3	5,7	5,6	6,3	5,7	6,0
Self-esteem	5,6	6,0	5,7	5,8	5,2	5,5	5,8	5,2	5,3
Optimism	5,3	5,9	4,7	5,2	5,5	5,3	5,5	4,9	5,3
Resilience	5,7	6,1	5,9	5,5	5,6	5,4	5,6	5,1	5,6
Persistence	5,9	6,1	6,2	5,9	5,7	5,8	6,2	4,9	5,9
Decisiveness	5,8	5,9	6,2	5,8	5,7	5,4	6,0	5,0	5,7
Innovativeness	5,6	5,8	5,9	5,6	5,8	5,4	5,8	5,3	5,3
Mentor to help me	5,3	5,6	5,8	5,0	5,2	4,9	4,8	4,9	5,1
Team to build up the business	5,7	5,9	6,0	5,9	5,6	5,4	5,7	4,7	5,6
More knowledge of entrepreneurs	5,7	5,7	6,0	5,8	5,5	5,4	5,7	5,0	5,5
Good business idea	6,0	6,1	5,9	6,3	6,1	6,1	6,2	6,2	5,8
Mean of items 1-13	5,7	5,9	5,9	5,8	5,6	5,5	5,8	5,2	5,6

1 = Mean ALL (N=817); 2=Asian, China; 3=Asian, Japan; 4=Baltic; 5=USA; 6=Middle Europe; 7=Eastern Europe; 8=Nordic, Finland; 9=International

Table 2. Anova results and Post hoc test (Tukey B)

	F-value	Sig.	Post-hoc test (Tukey b)
1. Courage	2,189	0,03*	Japan vs. Finland*
2. Take Risks	1,387	0,21	-
3. Motivation	3,021	0,00**	-
4. Self-esteem	4,393	0,00***	China > Finland, USA
5. Optimism	8,056	0,00***	China > USA, East Europe > Japan
6. Resilience	3,781	0,00***	China, Japan > Finland
7. Persistence	4,177	0,00***	Others > Finland
8. Decisiveness	4,706	0,00***	Japan, East Europe > Middle Europe, Finland
9. Innovativeness	2,268	0,03*	-
10. Mentor to help me	6,869	0,00***	Japan, China > International, Baltic > Middle, Finland, East Europe
11. Team to build up the business	4,807	0,00***	Others > Finland
12. More knowledge of entrepreneurs	3,134	0,00*	Japan, China, Baltic > Finland
13. Good business idea	1,765	0,10	-
Mean of items 1-13	-	-	-

**it should be noted that courage was highly appreciated in both countries, but Finnish people had the tendency to give low ratings for all items.*

Ranking order by culture

The ranking of the countries in relation to entrepreneurial qualities is presented in Table 3. Asian countries had the highest means in overall ratings. East European and Baltic countries had high means as well. According to Hofstede, highly individualistic countries have a higher tendency towards entrepreneurship. This might explain why Asian countries had higher values. The communist past of Eastern Europe and Baltic countries may impact entrepreneurial attitudes and knowhow in these regions.

While exploring specific cultures, more specifically the USA, the country rated highest with those qualities that have been recognised as typically entrepreneurial. Respondents perceived they would need Good business idea, Risk-taking ability, and Innovativeness. No other country mentioned Innovativeness in their top three requirements. The US sample did not be Motivated in their top three requirements. Motivation was also lacking among the top three needs for China. Both cultures are regarded as diligent and industrious, which might explain the scores. At the lowest needs, the US respondents had Self-esteem, Need for mentor and Optimism. USA citizens are generally regarded as having high optimism and self-esteem, thus negating the need for those qualities.

Finland was the only country emphasizing Courage in the top three needs. It may be due to the Finnish culture, which has always been regarded as modest and low-profile. The results support the Amway Global Entrepreneurship Report (2013) which indicated that 73% of Finnish

respondents had fear of failure concerning entrepreneurship, while the rate was only 37% in the US. Finnish people have been regarded as independent and introverted, and it may be the reason they did not need either mentor or team for starting a business.

When looking the international students, they thought that they would not need innovativeness or self-esteem when starting a business, a significantly different results compared to other cohorts. It is possible that living at a youthful age in different cultures enhances innovativeness, and different cultural perspectives from those of the home country. In addition, having the courage to embark on a student exchange for one year enhances self-esteem.

Table 3. Ranking order of qualities for entrepreneurship

Asian China Mean of all = 5,91(1)	1)Persistence (6,08) 2)Good business idea (6,08) 3)Resilience (6,06)	10) Innovativeness (5,83) 11) Motivation (5,83) 12) Taking risks (5,82) 13) Mentor to help me (5,63)
Asian Japan Mean of all = 5,87 (2)	1)Motivation (6,23) 2)Decisiveness (6,22) 3)Persistence (6,17)	11) Mentor to help me (5,83) 12) Self-esteem (5,74) 13) Optimism (4,67)
Baltic Mean of all=5,75 (4)	1)Good business idea (6,31) 2)Motivation (6,25) 3)Taking risks (5,86)	11) Resilience (5,54) 12) Optimism (5,15) 13) Mentor to help me (4,99)
USA Mean of all = 5,62 (5)	1)Good business idea (6,10) 2)Taking risks (5,82) 3)Innovativeness (5,75)	11) Optimism (5,49) 12) Mentor to help me (5,19) 13) Self-esteem (5,19)
Middle Europe Mean of all= 5,48 (7)	1)Good business idea (6,12) 2)Persistence (5,82) 3)Motivation (5,58)	11) Team to build up the business (5,35) 12) Optimism (5,29) 13) Mentor to help me (4,92)
East Europe Mean of all=5,81 (3)	1)Motivation (6,28) 2)Persistence (6,24) 3)Good business idea (6,21)	11) Resilience (5,57) 12) Optimism (5,47) 13) Mentor to help me (4,84)
Nordic, Finland Mean of all=5,20 (8)	1)Good business idea (6,22) 2)Motivation (5,74)3 3)Courage (5,36)	11) Mentor to help me (4,88) 12) Optimism (4,88) 13) Team to build up the business (4,73)
Lived in many countries Mean of all= 5,56 (6)	1)Motivation (5,99) 2)Persistence (5,88) 3)Good business idea (5,81)	11) Self-esteem (5,31) 12) Innovativeness (5,30) 13) Mentor to help me (5,05)

Conclusions

Overall, business students thought that if they started a business they would need: A good business idea, Motivation and Persistence. The variables that were not needed were Mentor and Optimism. There were country-specific differences, but overall, it is important that students are offered entrepreneurial classes and knowhow with skills to recognize and evaluate good business ideas. They could also study businesses and firms from a perspective of business idea formation. Courses and knowhow of psychological qualities such as motivation, decisiveness, persistence, and resilience would be a good addition to existing entrepreneurial courses. This would serve a key role of understanding how to keep one going even when there are some obstacles. Entrepreneurship is regarded as an independent and hands-on individual mission, and respondents indicated they did not need a Mentor to help or

Optimism to start their own business.

Statistical differences occurred in all qualities other than Taking risks and Good business idea. It is possible that these are basic qualities that are evaluated by respondents in every culture prior to starting their own business.

National culture impacted the results in many ways. Asian countries had the highest means in overall ratings, indicating that they would need entrepreneurial qualities the most. Also, respondents from East Europe and Baltic countries had high ratings. Finnish, Middle Europe and International respondents indicated lowest values. This might imply that their education, cultural background, and attitudes are supportive factors in relation to entrepreneurship.

There are some weaknesses in the study that should be noted. The sample sizes by country are in some cases quite low. This study focuses on the self-ratings; thus it would be interesting to gain the information from students' professors regarding their students' needed qualities for entrepreneurship.

References

- Ajzen, I. (1991). The theory of planned behavior", *Organizational Behavior and Human Decision Processes*, 50 (2), 179-211.
- Amway Global Entrepreneurship Report 2013. Encouraging Entrepreneurs—Eliminating the Fear of Failure. GFG, Nuremberg, Germany.
- Antoncic, J. A., Antoncic, B., Gantar, M., Hisrich, R. D., Marks, L. J., Bachkirov, A. A., & Kakkonen, M. L. (2018). Risk-Taking Propensity and Entrepreneurship: The Role of Power Distance. *Journal of Enterprising Culture*, 26(01), 1-26.
- Arrak, K., Kaasa, A., & Varblane, U. (2020). Regional Cultural Context as a Determinant of Entrepreneurial Behaviour: The Case of Germany. *The Journal of Entrepreneurship*, 29(1), 88-118.
- Autio, E., Keeley, R.H., Klofsten, M., Parker, G.G.C. and Hay, M. (2001), "Entrepreneurial intent among students in Scandinavia and in the USA", *Enterprise and Innovation Management Studies*, 2 (2), 2145-2160.
- Busenitz, L.W. & Lau, C.M. (1996). A cross-cultural cognitive model of new venture creation. *Entrepreneurship Theory and Practice*, 20(4), 25–39.
- Dahles, H. (2005). Culture, capitalism, and political entrepreneurship: Transnational business ventures of the Singapore-Chinese in China. *Culture and Organization*, 11(1), 45–58.
- Del Junco, J.G. and Brás-dos-Santos, J.M. (2009). How different are the entrepreneurs in the European Union internal market? – An exploratory cross-cultural analysis of German, Italian and Spanish entrepreneurs", *Journal of International Entrepreneurship*, 7 (2), 135-162.
- Dheer, R. J., Li, M., & Treviño, L. J. (2019). An

integrative approach to the gender gap in entrepreneurship across nations. *Journal of World Business*, 54(6).

Dilger, R. J. (2018). Small Business Administration and job Creation (CRS Report R41523). Washington, D.C.: Congressional Research Service.

Fayolle, A. and Gailly, B. (2004). Using the theory of planned behaviour to assess entrepreneurship teaching programs: a first experimentation. Paper presented at International Entrepreneurship Conference, Naples, 5-7 July.

Figueiredo, R. and Liñán, F. (2017). Individual and cultural values as psychosocial cognitive antecedents and moderators of entrepreneurial intentions. In Santos, S., Caetano, A., Mitchell, C., Landstrom, H. and Fayolle, A. (Eds), *The Emergence of Entrepreneurial Behaviour: Intention, Education and Orientation*, Edward Elgar Publishing, Cheltenham, pp. 66-88.

Florin, J, Ranjan K., & Rossiter, N. (2007). Fostering entrepreneurial drive in business education: An attitudinal approach. *Journal of Management Education*. 31(1): 17–42

Gantenbein, P., Kind, A., & Volonté, C. (2019). Individualism and Venture Capital: A Cross-Country Study. *Management International Review*, 59(5), 741-777.

García, J. C. S., Ward, A., Morúa, G. V., Daza, J. L. F., & Sánchez, B. H. (2018). How does cultural norms influence entrepreneurial intention? A cross cultural study. *Journal of Business*, 10(1), 52-69.

González-Serrano, M.H., Valantine, I., Pérez-Campos, C., Aguado, S., Calabuig, F. and Crespo-Hervás, J. (2016). The influence of gender and academic training in the entrepreneurial intention of physical activity and sport sciences students. *Intangible Capital*, 12(3), 759-788.

González-Serrano, M.H., Valantine, I., Crespo-Hervás, J. , Pérez-Campos, C, Calabuig, F. (2018). Sports university education and entrepreneurial intentions: A comparison between Spain and Lithuania, *Education + Training*, 60 (5), 389-405

Gupta, V.K., Turban, D.B., Wasti, S.A., & Sidkar, A. (2009). The role of gender stereotypes in perceptions of entrepreneurs and intentions to become an entrepreneur. *Entrepreneurship Theory and Practice*, 33(2), 397–417.

Hagger, M. S., Chatzisarantis, N. L. D., Barkoukis, V., Wang, J. C. K., Hein, V., Pihu, M., & Karsai, I. (2007). Cross-cultural generalizability of the theory of planned behavior among young people in a physical activity context. *Journal of Sport & Exercise Psychology*, 29, 1-20.

Heilman, M.E. (2001). Description and prescription: How gender stereotypes prevent women's ascent up the organizational ladder. *Journal of Social Issues*, 57, 657–674.

Hofstede, G. (1980). *Culture's consequences: International differences in work related values*. Beverly Hills, CA: Sage.

Hofstede, G., Hofstede, G. J., & Minkov, M. (2005). *Cultures and Organizations: Software of the Mind*. McGraw-Hill. New York, NY.

Hofstede, G., Noorderhaven, N., Thurik, A.R., Uhlaner,

L.M., Wennekers, A.R.M. and Wildeman, R.E. (2004), "Culture's role in entrepreneurship: self-employment out of dissatisfaction", in Brown, T.E. and Ulijn, J.M. (Eds), *Innovation, Entrepreneurship and Culture*, Edward Elgar, Cheltenham, pp. 162-203.

Hunt, S. and Levie, J. (2003). *Culture as a Predictor of Entrepreneurial Activity*, Babson College, Wellesley, MA.

Jaén, I., Fernández-Serrano, J., Santos, F.J. and Liñán, F. (2017), "Cultural values and social entrepreneurship: a cross-country efficiency analysis", in Peris-Ortiz, M., Teulon, F. and Bonet Fernández, D. (Eds), *Social Entrepreneurship in Non-Profit and Profit Sectors*, Springer International Publishing, Gewerbestrasse, pp. 31-51.

Kreiser, P.M., Marino, D.L., Dickson, P., & Weaver, K.M. (2010). Cultural influences on entrepreneurial orientation: The impact of national culture on risk taking and proactiveness in SMEs. *Entrepreneurship Theory and Practice*, 34(5), 959–983.

Krueger, N.F., Reilly, M.D. and Carsrud, A.L. (2000), "Competing models of entrepreneurial intentions", *Journal of Business Venturing*, 15(5/6), 411-432.

Lee, S. and Peterson, S. (2000). Culture, entrepreneurial orientation, and global competitiveness. *Journal of World Business*, 35 (4), 401-416.

Liñán, F., Nabi, G. and Krueger, N. (2013). British and Spanish entrepreneurial intentions: a comparative study. *Revista de Economía Mundial*, 33, 73-103.

Liñán, F. and Fayolle, A. (2015). A systematic literature review on entrepreneurial intentions: citation, thematic analyses, and research agenda. *International Entrepreneurship and Management Journal*, 11(4).

McGrath, R., MacMillan, I., & Scheinberg, S. (1992). Elitists, risk-takers, and rugged individualists? An exploratory analysis of cultural differences between entrepreneurs and non-entrepreneurs. *Journal of Business Venturing*, 7(2), 115-135.

Meek, W.R., Pacheco, D.F. and York, J.G. (2010). The impact of social norms on entrepreneurial action: evidence from the environmental entrepreneurship context. *Journal of Business Venturing*, 25(5), 493-509.

Moriano, J.A., Gorgievski, M., Laguna, M., Stephan, U. and Zarafshani, K. (2012). A cross-cultural approach to understanding entrepreneurial intention. *Journal of Career Development*, 39 (2), 162-185.

Morris, M., Davis, D. & Allen, J. (1994). Fostering corporate entrepreneurship: Cross-cultural comparisons of the importance of individualism versus collectivism. *Journal of International Business Studies*, 25(1): 65–89.

Mueller, S.L., Thomas, A.S. and Jaeger, A.M. (2002). National entrepreneurial potential: the role of culture, economic development and political history, in Hitt, M.A. and Cheng, J.L.C. (Eds), *Managing Transnational Firms: Resources, Market Entry and Strategic Alliances*, JAI Press, Amsterdam, pp. 221-257

Mueller, S. & Thomas, A. (2000). Culture and

Entrepreneurial Potential: A Nine Country Study of Locus of Control and Innovativeness. *Journal of Business Venturing*, 16: 51–75.

Pinillos Costa, M.J. and Reyes Recio, L.E. (2007), “Influencia de la cultura individualista-colectivista en la creación de empresas”, available at: <https://dialnet.unirioja.es/servlet/articulo?codigo=2487541>.

Pruett, M., Shinnar, R., Toney, G., Llopis, F. and Fox, J. (2009). Explaining entrepreneurial intentions of university students: a cross-cultural study. *International Journal of Entrepreneurial Behavior & Research*, 15 (6), 571-594.

Sánchez, J.C. (2010). Social learning and entrepreneurial intentions: a comparative study between Mexico, Spain and Portugal”, *Revista Latinoamericana de Psicología*, 41(1), 109-120

Soares, A.M., Farhangmehr, M. and Shoham, A. (2007). Hofstede’s dimensions of culture in international marketing studies. *Journal of Business Research*, 60(3), 277-284.

Strazdienė, G. and Garalis, A. (2008). Identification of college students’ entrepreneurship qualities, *Socialiniai Tyrimai: Mokslo Darbai*, 4(14), 132-140.

Taramaa, R. (2009). Sisu as a central marker of Finnish-American culture: Stubbornness beyond reason. *American Studies in Scandinavia*, 41(1), 36-60.

Thomas, A.S. and Mueller, S.L. (2000). A case for comparative entrepreneurship: assessing the relevance of culture. *Journal of International Business Studies*, 31(2),

287-301.

Thompson, E. R. (2009). Individual entrepreneurial intent: Construct clarification and development of an internationally reliable metric. *Entrepreneurship Theory and Practice*, 33(3), 669-694.

Triandis, H.C. (2004), “The many dimensions of culture”, *Academy of Management Executive*, 18 (1), pp. 88-93.

Varamäki, E., Tornikoski, E., Joensuu, S., Ristimäki, K., Blesa, A. and Ripolles, M. (2013), Entrepreneurial intentions among higher education students in Finland and Spain: developing and piloting a survey instrument, *International Journal of Information Systems in the Service Sector*, 5 (4), 1-16.

World Bank (2011), “How we classify countries”, available at: <http://data.worldbank.org/about/country-classifications> (accessed 20 December 2011).

World Bank (2017), “World bank country and lending groups”, available at: <https://datahelpdesk.worldbank.org/knowledgebase/articles/906519-world-bank-country-and-lending-groups> (accessed 20 December 2017).

Zahra, S. (2005). Entrepreneurial risk taking in family firms. *Family Business Review*, 18(1), 23–40.

The Effect of Marketing Factors on Decision to Use Domestic Airlines Service at Suvarnabhumi Airport by Thai Passengers

Thanakon Ratchatakulpat, Rajamangala University of Technology Phra Nakhon, Thailand
 Rattanavalee Maisak, Rajamangala University of Technology Phra Nakhon, Thailand
 Khanittha Khamwilai, Rajamangala University of Technology Phra Nakhon, Thailand
 Maneerat Ratchatakulpat, Rajamangala University of Technology Phra Nakhon, Thailand
 Thanaphon Ratchatakulpat, Rajamangala University of Technology Phra Nakhon, Thailand

The aviation industry plays an important role in tourism in contributing to the development of the country's economy. These because the aviation business has provided services to bring Thai tourists and foreign tourists entering the country and spreading to different regions of the country as well as being a source industry for other businesses, such as travel agencies, accommodation service, restaurant and souvenir shop.

Air travel in terms of tourism clearly popular both in terms of speed and there are various prices compared to traveling by car or train. Suvarnabhumi Airport is an airport that popular for passengers. because traveling to the airport is convenient compared to Don Mueang Airport (Civil Aviation Authority of Thailand, 2018).

Currently, there are many domestic airlines when compare to the past that only Thai airlines serving. As full airlines and low-cost airlines are tended to have similar flight routes. The factor that passengers use to decide when choosing a service is the ticket price, ground service model, inflight service and promotions during the festival (Civil Aviation Authority of Thailand, 2018).

Researcher has seen the problems and opportunities therefore studies the marketing mix factors (7Ps) that affect the decision to use the domestic airline of Thai passengers at Suvarnabhumi Airport in order to understand the needs of passengers and improve the service of the airline to have better respond to the needs of passengers.

Research objectives are firstly study demographic characteristics that affecting Thai Passengers' Decision to Use Domestic Airlines Service at Suvarnabhumi Airport. Secondly, study the marketing mix factors (7Ps) that affecting Thai Passengers' Decision to Use Domestic Airlines Service at Suvarnabhumi Airport. Research hypothesis considering first Demographic factors affecting Thai Passengers' Decision to Use Domestic Airlines Service at Suvarnabhumi Airport. Secondly, Marketing mix factors (7Ps) affecting Thai Passengers' Decision to Use Domestic

Airlines Service at Suvarnabhumi Airport. Research benefit consider the awareness importance of the marketing mix factor (7Ps) that affects Thai passengers choose to use domestic routes at Suvarnabhumi Airport and airlines can bring the research outcome to develop an airline business strategy to meet the needs of passengers more effectively.

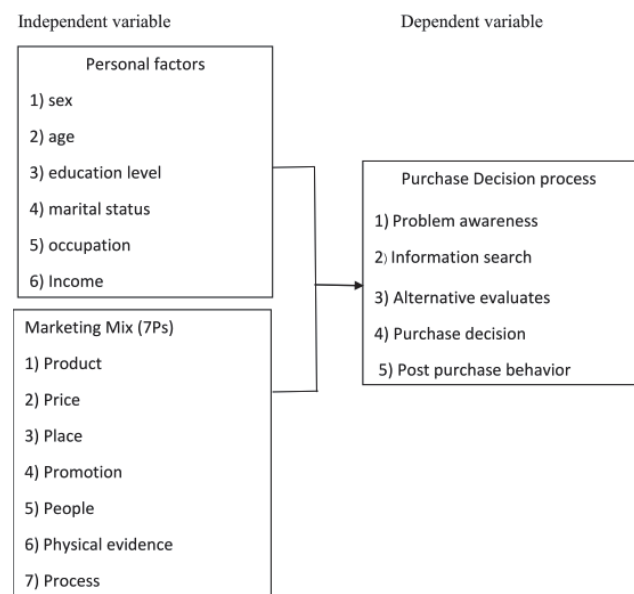


Figure 1. The Research framework

Research consider literature review on conception of personal factors, marketing mix and Decision process. Sereerat (2007) explained that different demographic characteristics influence different purchasing decisions. The demographic factors that are commonly used in market segmentation include age, gender, family characteristics. and the factors linked to the lifestyle such as income, education, occupation. Kotler (1998) stated that Marketing Mix means variables or marketing tools that can be controlled.

Companies are often used to meet the satisfaction and needs of their target customers. Originally, the marketing mix consisted of only 4 variables (4Ps), namely Product, Price, Place and Promotion. Later, 3 more variables were invented, namely People, Physical Evidence, and Process as concern an important concept of modern marketing especially service business. Schwartz (2020) said that if studying consumer behavior in purchasing products It can be separated into steps. This makes it possible to consider the purchasing decisions of consumers in a process manner. When marketers are able to separate the steps, It could be analyzed and come up with strategies for use in each step in order to make consumers decide to buy a product. There are 5 steps which are problem awareness, information search, alternative evaluation, purchase decision and post purchase behavior.

Phuket and Chiang Mai are two provinces in Thailand that are very popular in terms of tourism due to a variety of tourist attractions and convenient transportation (Civil Aviation Authority of Thailand, 2018). Those 2 provinces have generated income for the country and people in the community enormously. Phuket Province is the only province that has an island topography and it is a world-famous tourist attraction especially tourists who love white sand beaches, crystal clear waters (Civil Aviation Authority of Thailand, 2018). Chiang Mai Province is a province that receives many millions of tourists, both Thais and foreigners a year. This because of beautiful nature mixed with Lanna culture and experience the local way of life (Civil Aviation Authority of Thailand, 2018). There are many shops for stylish handmade products at Tha Phae Walking Street as well as see various plants at the Queen Sirikit Botanical Garden.

The research methodology considers a quantitative with statistical analysis by SPSS program software. Regarding to research population, The sample population was Thai customers or passengers who use domestic airlines at Suvarnabhumi Airport who travel with Thai Airways, Thai Smile Airways, Bangkok Airways and VietJet Air from origin are Bangkok to Phuket and Chiang Mai as the destination. According to the exact number of people who use all 4 airlines is unknown therefore, the sample size can be calculated from W.G. Cochran's unknown sample size formula with 95 percent confidence level and 5% error level (Wanichbuncha, 2006). This result to collect 384 samples and for convenient and efficient therefore used a total sample size of 400. The sample collection was used the quota sampling method and select the samples by considering the proportion of the population composition hence 100 samples per airline with totaling 400 samples. A questionnaire was the tool to gather the respondents' data. The data were analyzed by using frequency, percentage, mean, and standard deviation, t-test (Independent samples), One-Way ANOVA, and Multiple Regression at the 0.05 significance level.

The research results revealed that most of the samples

were male (59.50%), aged 25 - 34 years (54.50%), single status (63.50%), bachelor's degree (57.00%), self-employed (percent 29.00) and the average monthly income is less than 15,000 baht (27.00 percent).

The outcome of data on Marketing mix factors (7Ps) found that overall the average score was at a high level. when considering each aspect, found that the people aspect had the highest average score followed by the physical environment and the process aspect. Those 2 aspects have the same average score. The aspect with the least average score was products and prices which are the same average score.

Product with a high average score when considered on a case-by-case basis, found that The airline's on-demand direct flights had the highest average score, followed by the airline's reputation and reliability. The airlines are punctual. Both ground and in-flight services are of high quality, respectively.

In terms of price, it has a high average rating. which, when considered on a case-by-case basis, found that Fares and other expenses are specified. The details have the highest average score, followed by the price is suitable for the service received. The price is reasonable for the distance. The price is reasonable compared to competitors in the same route respectively.

Place with a high average score which, when considered on a case-by-case basis, found that Able to pay for tickets in many ways, with the highest average score, followed by convenience in booking tickets. It is convenient to service In the event that the ticket has a problem Location of the sales office It is convenient to use the service, respectively.

Promotion with a high average score which, when considered on a case-by-case basis, found that The promotion of the ticket had the highest average score, followed by the airline's public relations campaign through various media both offline and online. Provide proper service on board Organizing frequent flyer activities / membership cards or marketing activities respectively

People aspect, the average score was at a high level. which, when considered on a case-by-case basis, found that The service personnel were dressed neatly, good-natured, and spoke politely, and the service of the after-sales service staff was of the same average with the highest average score. service staff Caring for the customers of the staff serving the aircraft, respectively.

Physical evidence with a high average score which, when considered on a case-by-case basis, found that The symbols of the aircraft are in beautiful condition. And the service has the highest average score, followed by the check-in counters in the airports with modern design. It is located in an easy-to-find area and the seats on the plane are spacious and comfortable. which have the same mean The aircraft's equipment and appliances are of standard, in good condition, respectively.

Process with a high average score which, when considered on a case-by-case basis, found that There is a

process of checking in and checking documents conveniently and quickly. Hassle-free, has the highest average score, followed by the process of checking baggage is fast. The ticket booking system is convenient and the process is not complicated. There is a good system for checking flights and seats, respectively.

The result of purchase decision making factors founded that overall were at a high average score. When considered on a case-by-case basis, found that You will always choose the airline that best meets your needs, has the highest average rating, followed by paying the price of a more expensive airline in order to get better service and lastly, you will choose to use the airline that is Full Service rather than limited.

problem awareness with a high average score when considered on a case-by-case basis, found that Do you think traveling by plane It is more convenient than other forms of transport with the highest average score, followed by traveling to Suvarnabhumi Airport is more convenient than Don Mueang Airport. Lastly, do you think that domestic airlines at Suvarnabhumi Airport have more flight options than Don Mueang Airport, respectively.

information search with a high average score when considered on a case-by-case basis, found that You will study the information of the airlines before deciding to use that airline with the highest average score, followed by you often ask for opinions of people who have used various airlines. Lastly, in order to make decision normally do the information searched through Online (Social Media) or Offline.

Alternative Evaluates with a high average score when considered on a case-by-case basis, found that You will consider the conditions in different periods of the airline for your evaluation have the highest average score, followed by you will evaluate the advantages and disadvantages then choose the airline with the least disadvantage. Lastly, you will choose to travel on holidays rather than weekdays because there are more flight options.

Purchase decision with a high average score when considered on a case-by-case basis, found that You will always choose the airline that best meets your needs, has the highest average rating. Followed by paying the price of a more expensive airline in order to get better service. last You will choose to use the airline that is provide full Service rather than limit service.

Post purchase behavior with a high average score When considering each item, it was found that you would recommend people around you to Use the airline that impressed you with the highest average score. Followed by You will consider to use another airline if you were advised by someone who you are close. Last, you always continue to use the same airline when traveling.

The hypothesis testing on first Hypothesis show that Passengers using domestic airlines at Suvarnabhumi Airport with different gender, age, status, educational level and

average monthly income affects the selection of domestic airline services of Thai passengers at Suvarnabhumi Airport differently was accept hypothesis (H0) (Sig. >0.05) however, the different occupations aspect of personal factor was rejected hypothesis. The results of the second hypothesis testing indicate that marketing Mix Factors (7Ps) on product, physical evidence and process environment affects the selection of domestic airlines of Thai passengers at Suvarnabhumi Airport with a statistical significance of 0.05, with a forecasting power of 76.00 percent therefore the hypothesis was accepted. However, price, place, promotion and people aspects of marketing mix factors were reject for the hypothesis.

Summary of hypotheses testing

Hypothesis	Statistics Analysis	Sig	result
Hypothesis 1: Demographic factors affecting Thai Passengers' Decision to Use Domestic Airlines Service at Suvarnabhumi Airport			
sex	t-test	.001*	Accept Hypothesis
age	F-test	.028*	Accept Hypothesis
educational level	F-test	.050*	Accept Hypothesis
status	F-test	.009*	Accept Hypothesis
occupation	F-test	.861	Reject Hypothesis
income	F-test	.000*	Accept Hypothesis
Hypothesis 2: Marketing mix factors (7Ps) affecting Thai Passengers' Decision to Use Domestic Airlines Service at Suvarnabhumi Airport			
product	MRA	.029*	Accept Hypothesis
price	MRA	.123	Reject Hypothesis
place	MRA	.691	Reject Hypothesis
promotion	MRA	.222	Reject Hypothesis
people	MRA	.800	Reject Hypothesis
Physical evidence	MRA	.000*	Accept Hypothesis
process	MRA	.000*	Accept Hypothesis

References

Civil Aviation Authority of Thailand. (2018). Report on the state of the aviation industry in Thailand. Retrieved from <https://www.caat.or.th/wp-content/uploads/2020/06.pdf>.

Kotler, P. (2018). Marketing Management: Analysis, Planning, Implement, and Control. (9th ed.), Prentice-Hall, Inc Kotler

Schwartz. A. (2020). Organizational behavior: Human behavior at work. New York: McGraw-Hill.

Sereerat, S. (2007). Demographic characteristics. Bangkok: Thira Film and Scitax.

Wanichbancha, K. (2006) Statistics for Research (2nd edition). Bangkok: Chulalongkorn University Printing.

Maintaining balance for learners with diverse educational background and progression in a virtual teaching and learning environment

Dominik Winkler, University Applied Sciences Würzburg-Schweinfurt, Germany
Markus Engert, University Applied Sciences Würzburg-Schweinfurt, Germany

The ongoing digital transformation is causing radical changes in many areas, accompanied by as many advantages as disadvantages. The Covid-19 pandemic accelerated this process tremendously and confronted unprepared educators with new challenges. The authors also encountered a challenging scenario in which the already existing dynamic of international students with their different cultural and educational backgrounds became aggravated by a virtual environment that was unfamiliar to all parties. The Universal Design for Learning Framework was utilised to maintain the balance for this diverse audience, but also to support the process of course design.

The illustrator George Evans once said, 'Every student can learn. Just not on the same day or in the same way.' This statement illustrates in a very picturesque way that humans always want to learn more, but often are held back from doing so due to various barriers. Simultaneously, it poses a challenge to mentors, teachers, trainers, as well as lecturers in institutions of higher education to address the reality of different learning styles. A learning style is not a competence in itself, but rather a preferred method of using one's own competences (Sternberg, 1994). This very influential concept of teaching and learning theory has exercised lecturers for many years and describes how individuals develop different approaches of learning due to their preferred way of absorbing, processing and internalising knowledge. Although these styles are not static and students can learn new approaches, it is very important to understand how the gap between the prepared teaching material and the approach of the students can negatively influence the learning success (Sarvenaz, 2013).

These challenges are already not to be underestimated under purely local conditions, but have been taken to the extreme within the scope of the ERASMUS+ Strategic Partnership 'New Modes of Mobility' as part of a Europe-wide experiment. The authors of this article were involved in this initiative and on the following pages, they share the measures used to address the related challenges in both the design and the implementation of their module 'International

Marketing'.

Overview of the relevant conditions

To better understand the nature of these measures, a brief outline of the learning scenario within the initiative 'New Modes of Mobility' is given next. The ERASMUS+ Strategic Partnership was originally designed with the objective of developing and testing alternative mobility concepts in the sense of virtual as well as blended mobility. As a response to the outbreak of the pandemic, it was necessary to translate this goal into a fully virtualised semester abroad. This 'Abroad@home' called programme consisted of six courses, each facilitated by one of the involved partner universities. Located in different European countries, the partner university contributed not only by providing the lecturers for these modules, but also by recruiting the target audience. Similar to traditional student exchange programmes, these international students came with a range of differences, not only in terms of culture, but also in terms of study programmes and progress. To manage this heterogeneous audience in a virtual environment, the authors looked for methods to proactively counteract the additional challenges for his module 'International Marketing'. The module had the scope of five ECTS and was integrated into the regular Bachelor's degree programme International Management at the University of Applied Sciences Würzburg-Schweinfurt in Germany. In addition to the students from the 'Abroad@home' programme, the regular local students and other on-site exchange students were brought together in this virtual classroom. By doing so, the number of participants rose to around 100. In order to cope with this amount of students within the unfamiliar virtual setting, the authors opted for a mixed concept of live video lectures, which were common at that time, with additional asynchronous components for the students to work independently.

Challenges of a diverse, international and virtual educational environment

The teaching constellation described so far is a combination of international education, students with diverse backgrounds and a virtual environment and comes with very specific challenges. To justify the decisions made, here is a short selection of the key challenges experienced within the scope of this ERASMUS+ experiment. Of course, this list could be extended further, but was reduced to the observations that are meaningful for this investigation.

1. Reduced social exchange among students diminishes the effectiveness of routine teaching behaviour (Ghosh et al., 2020) and can result in mental problems (Liang et al., 2020).
2. Amplifying effects on cultural distance due to social distance (Ghosh et al., 2020) and a technological gap (Dwivedi et al., 2020).
3. Amplifying effects on the different levels of education: due to the learners' different educational backgrounds and level of progression.
4. Limited mentoring options due to the purely virtual teaching environment (García-Morales et al., 2021).
5. Increasing self-organisation and self-learning among students can make students feel lost and overwhelmed (García-Morales et al., 2021)

The Universal Design for Learning Framework (UDLF)

To make the teaching within the scope of the 'Abroad@home' programme successful despite the challenges described, appropriate measures were necessary. The Universal Design for Learning Framework (UDLF) has proven to be a valuable tool for this purpose. The UDLF is a resource to design lessons in a way to activate and engage a diverse audience (Meyer et al., 2000). The UDLF was developed by the Center of Applied Special Technology (CAST), which was founded in 1984, and has been optimised over the years for a variety of teaching areas (For more detailed information about CAST and the UDLF, visit <https://www.cast.org/>). The framework has also been widely adopted in literature, including identifying its value for better working with culturally diverse students who are equally diverse in their academic progress (Chita-Tegmark et al., 2012). In addition other research has proven the added value to our third dimension, the virtual learning environment (Rogers-Shaw et al., 2018). The CAST members provide comprehensive guidelines and support for the implementation of the UDLF on their open access online platform.

The main goal of the UDLF is to transform novice learners into expert learners who not only know how to use the knowledge they have already acquired, but are also able to develop independent learning strategies and are highly motivated. To achieve this aim, the framework relies on three key principles (CAST 2011):

1. Provide Multiple Means of Representation (the 'what' of

learning). Different students need different options materials to learn successfully and efficiently.

2. Provide Multiple Means of Action and Expression (the 'how' of learning). Students' interaction and navigation behaviour with the content provided can also vary significantly.
3. Provide Multiple Means of Engagement (the 'why' of learning). Engagement and motivation is a success factor for a teaching scenario that should not be underestimated and is very dependent on the students involved.

Each of these principles is based on the individual personality of the students, but can also be influenced by their academic progress, cultural background or any potential handicaps they might have. The realisation of these principles takes place through the elimination of 'disabilities' within a teaching scenario. These 'disabilities' are ultimately the barriers that prevent students from participating successfully within an educational scenario.

To conclude the introduction of the UDLF, Figure 1 shows the graphical organiser of the UDLF framework, which serves as an overview of the elements to be considered while designing a course.

Figure 1: Adapted Universal Design for Learning Framework (CAST, 2018)



Applying the UDLF in the specific scenario of 'Abroad@home'

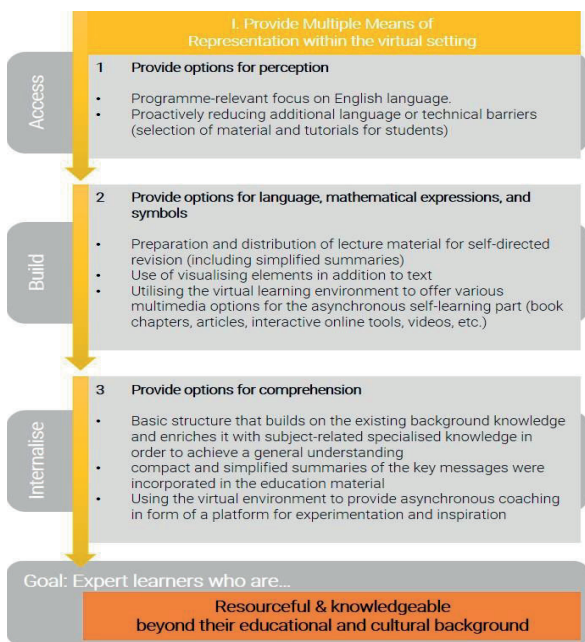
This section provides the author's assessment of the components of the UDLF and the measures derived from it. Whenever possible, descriptive examples are also mentioned to make the topics more tangible. At this point, it is important to mention, that this is done exclusively in the context of the educational environment realised within the 'Abroad@home' programme. This was already characterised as a trinity of cultural diversity and different levels of progress on the side of the students, as well as a virtual teaching and learning

environment. In addition, it must be made clear that the components relating to physical, sensory (e.g. blindness or deafness) and learning disabilities (e.g. dyslexia) have been intentionally excluded from this analysis. However, this is not to diminish the relevance of these elements in the least. Depending on the type of students involved, they can be of utmost importance. This decision merely reflects the focus that had to be taken under the circumstances of this project. The central object of consideration was the student diversity due to the aspects of culture and study background, which required an adequate selection in the implementation of the UDLF.

Provide multiple means of Representation

At the beginning of the design process for this specific educational scenario was the fact that there is no single form of representation, which is equally effective for all students. The different preferences for absorbing information range from printed text to video presentation. This becomes even more complex by the wide range of linguistic and cultural backgrounds of the students. Consequently, it was necessary to use a variety of different forms of representation in order to ensure sustainable learning progress for all students involved.

Figure 2: Abroad@home implementation of the first pillar of the UDLF



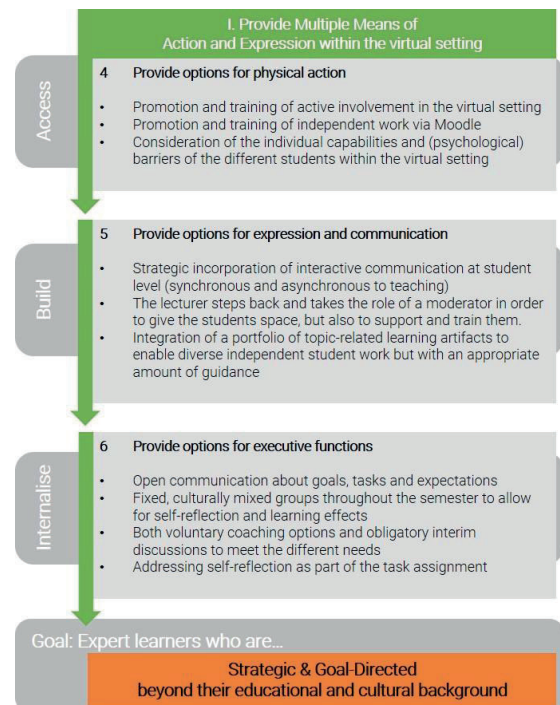
In general, it should be noted that the use of different forms of representation also promotes the learning process and the transfer of acquired knowledge on an individual level, as the learner is enabled to independently establish links between the different perspectives (CAST, 2011).

Apart from that, Figure 2 shows how the first pillar of the UDLF was realised in such a way that the representation was tailored to the virtual scenario. In addition, the goal of resourceful and knowledgeable learners was taken further in the sense that students should also acquire these skills beyond their regular cultural and educational environment.

Provide Multiple Means of Action and Expression

Providing knowledge in an appropriate way is only the first step in a healthy teaching environment. The next step should be to reflect on which entry points can be created to enable students to participate with actions and expressions in order to enrich the classroom experience for all participants. Capabilities and preferences to participate actively vary again greatly on an individual level. One learner may be better at producing text, while another may favour spoken language (CAST, 2011). In addition, the active participation requires a certain amount of experience, which naturally is heavily determined by the academic progress of each student. Because of these circumstances, regular on-site teaching already shows how language barriers and different cultural habits within an international setting lead not only to a great variation in the activation potential of students, but also in the pedagogical effect on them.

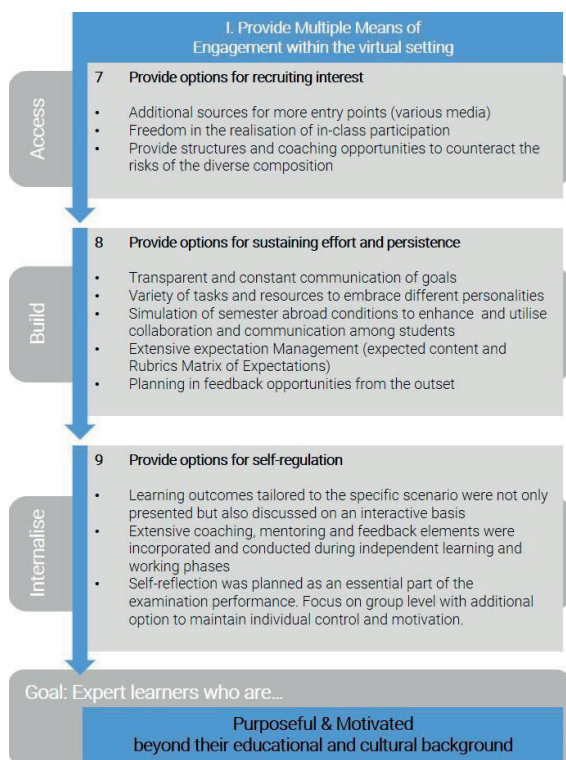
Figure 3: Abroad@home implementation of the second pillar of the UDLF



In order not to allow the stated challenges to escalate

further due to the seemingly limited possibilities of a virtual scenario, it was of utmost importance for 'Abroad@home' to exhaust the inclusion opportunities of the setting and to identify possibilities, which go beyond the usual classroom scenario. To ensure this, the trinity of the virtual setting, cultural differences and a diverse educational background affected the realisation second pillar of the UDLF. Figure 3 shows the raise of the goal of strategic and goal-directed learners in a sense that the involvement of the audience was not only designed to deepen knowledge on an individual level. Instead, the simulation of a semester abroad was aimed at the students to support each other and to compensate for educationally or culturally related gaps in a collaborative way. The training of independent work within a virtual environment furthermore seeks to prepare the students for the rapidly changing work environment of the future.

Figure 4: Abroad@home implementation of the third pillar of the UDLF



Provide Multiple Means of Engagement

No matter how much effort went into organising different forms of representation and interaction, without a sufficient level of engagement on the side of students, they become ineffective and, in the worst case, even obsolete. Every teacher who has ever tried to enthuse a larger group of listeners for the presented topic knows this challenge, which has its source in various factors. Besides the neurological determinants, the individual personality and subjectivity, the

cultural origin and the already existing background knowledge and experiences have to be considered (CAST, 2011). Especially the latter represent the special scenario of teaching in 'Abroad@home'. Unfortunately, the virtual teaching environment does not make this situation any easier. The social distance tempts even intrinsically motivated students to withdraw. Similarly, students tend to accept technical problems instead of seeking help, which again erodes their engagement potential (García-Morales et al., 2021). The aforementioned variety of factors for student engagement make at the same time clear that measures taken unfortunately cannot have the same effect on all learners. Once again, it is of high importance to identify and use different resources to meet the diverse range of requirements. Again, the same trinity described earlier affected the final pillar of the UDLF. Similar to the previous pillar, the scenario of a simulated semester abroad turned out to be a powerful tool to keep the diverse audience involved and engaged. Besides the strong compensation potential to close the gap between students and the additionally acquired competences and experiences, the collaborative interaction between students also proved to be an incredibly effective motivator. Yet, as can be seen in Figure 4, this also requires some preparation and sensitivity to prevent this motivation from turning into demotivation.

Conclusion

The 'Abroad@home' programme was an enlightening experience for both the students and the lecturers involved and concluded with the clear realisation that this journey is worthwhile but far from complete. As many obstacles as possibilities accompanied the unfamiliar virtual space as a learning environment. A seemingly endless portfolio of resources to support knowledge transfer (e.g., podcasts, videos, virtual and augmented reality) contrasts with the elimination of established and practiced methods. The unconventionality of the virtual setting and the additional challenge it places on all participants has an even greater impact in the context of international teaching. The diverse audience due to their different cultural and educational backgrounds already requires a great deal of adaptability and sensitivity from the responsible lecturers, even under familiar conditions. In order to meet this demand in the virtual space as well, it is recommended to use supporting methodologies. The Universal Design for Learning Framework (UDLF) has proven to be a potent tool for the author. The focus on the human being, the expert learner, is of central importance in order not to lose sight of the human dimension in such a technical environment. The UDLF helps understand and optimally use technology as a powerful tool to meet the various needs of the participants. The right implementation by the teacher ultimately provides the basis for more accessible, open, international teaching that actively brings people together all over the world, regardless

of their current circumstances. This is true, not only for different learning styles and cultures, but also for people who face other barriers of a physical, health or even political nature.

References

CAST (2011). *Universal Design for Learning Guidelines version 2.0*. Wakefield, MA: Author.

CAST (2018). *Universal design for learning guidelines version 2.2 [graphic organizer]*. Wakefield, MA: Author.

Dwivedi, Y., Hughes, L., Coombs, C., Constantiou, I., Duan, Y., Edwards, J., et al. (2020). Impact of COVID-19 pandemic on information management research and practice: Transforming education, work and life. *Int. J. Inf. Manag.* Retrieved March 22, 2022: <https://doi.org/10.1016/j.ijinfomgt.2020.102211>

García-Morales, V. J., Garrido-Moreno, A., Martín-Rojas, R. (2021) The Transformation of Higher Education After the COVID Disruption: Emerging Challenges in an Online Learning Scenario. *Frontiers in Psychology* 12. Retrieved March 22, 2022: <https://www.frontiersin.org/article/10.3389/fpsyg.2021.616059>

Ghosh, R., & Jing, X. (2020). Fostering Global Citizenship Through Student Mobility, *Beijing International Review of Education*, Retrieved March 22, 2022: <https://doi.org/10.1163/25902539-02040009>

Liang, S. W., Chen, R. N., Liu, L. L., Li, X. G., Chen, J. B., Tang, S. Y., et al. (2020). The psychological impact of the COVID-19 epidemic on Guangdong College students: the difference between seeking and not seeking psychological help. *Front. Psychol.* Retrieved March 22, 2022: <https://doi.org/10.3389/fpsyg.2020.02231>

Meyer, A., Rose, D. H. (2000). Universal design for individual differences. *Educational Leadership*, 58, 39-43.

Chita-Tegmark M, Gravel JW, Maria De Lourdes BS, Domings Y, Rose DH. (2012). Using the Universal Design for Learning Framework to Support Culturally Diverse Learners. *Journal of Education*. 2012;192(1):17-22.

Rogers-Shaw C, Carr-Chellman DJ, Choi J (2018). *Universal Design for Learning: Guidelines for Accessible Online Instruction*. *Adult Learning*. 2018;29(1):20-31.

Sarvenaz Hatami (2013). Learning styles. *ELT Journal*, Volume 67, Issue 4, 488–490. Retrieved March 21, 2022: <https://doi.org/10.1093/elt/ccs083>

Sternberg R. J. (1994). Allowing for thinking styles. *Educational Leadership*, 52/3, 36–40.

Decision-making model for participating in food safety production groups: a case study of Urban-Agricultural Plantations groups in Thailand

Weerakaset Suanpagaa, Kasetsart University, Bangkok, Thailand

Kamolbhan Sangmahachaib, Kasetsart University, Bangkok, Thailand

To solve middle-income trap problems and adapt to food safety trends, The Thai government encourages farmers to produce safe agricultural products that can be traced to each step of the food production process. Hence, we constructed an empirical model (Ordered Probit model) to explore the factor effect of participation in a food safety group in Thailand. The data collected from farmers consists of 3 types of data: 1. Basic socio-economic data 2. Farmer's behavior data related to crop/fruit cultivation and 3. Information on the importance of transport and marketing factors affecting fruit and vegetable cultivation. A total of 400 farmers from 22 provinces of Thailand were collected who live in the city or urban community of that province. Inquiries during January - April 2022. The result of this study was shown that: the most important factors affecting the level of farmer decision-making to join the group included: Farmer Training experience, efficient logistics system capable of delivering products to customers on time, farmers with experience dealing with sales or delivery to large shopping malls/department store, and the production cost has the greatest impact on the decision-level change.

Keywords: Food safety Standard, Ordered Probit, farmer participation model, Agricultural Plantations, decision making

Introduction

To raise the middle-income trap for Thai people. The Thai government has set up many mega-projects, such as the policy to encourage farmers to produce safe agricultural products by raising the quality of agricultural produce to meet food safety standards. This project will help farmers earn more income from selling domestically and internationally products [1-2]. The demand for hygienic and safe food is growing locally and globally. According to an analysis by Kunal Ahuja (2021), the key competitive factor in the global food export industry is food safety. The food exported to destination countries must be complete with food safety standards. And must be able to trace the source of food

production. Figure 1 shows the growth rate of demand for food safety testing between 2021 and 2027, which expect to grow by more than 8.5 percent. Food safety testing represents an increasingly competitive global trade trend in food quality, standards, and safety. Furthermore, the global food demand will exceed US\$16.5 billion in 2020, and a compound annual growth rate (CAGR) expect to be more than 8.0% from 2021 to 2027.

Thailand is estimated to be one of four Asian-Pacific countries with the largest growing food safety testing market. For this reason, Thailand needs to have the mechanisms or incentives to encourage the farmers to focus on improving the quality of agricultural products, which meet the international standards and support more farmers' production to enter the system of certification of Good Agricultural Practices (GAP)

Many in-depth studies related to implementing the food safety system, but because of significant differences in the scale of agricultural production, market structure, and other factors. Popular studies are often related to traceable system operators of food enterprises. The relevant research consists of the following. The theoretical model to explore the effect of incentives in a food traceability system was proposed by [3]. The field survey is based on the willingness of vegetable growers to participate using a vegetable traceability system in Beijing. This model could improve food safety levels. Not only those were obtained: enhancing the effectiveness of a food traceability system, increasing the payment to farmers who supply safe agricultural products, and gathering the penalty for unsafe food supply actions are necessary conditions to improve food safety. But also, this study shows how encouraging farmers to use food traceability systems is another problem explored in our investigation.

Starbird (2005) [4] proposed the principal-agent model, which is an effective tool for policymakers who wish to improve food safety. This model examined the sampling inspection policies in the 1996 Pathogen Reduction/Hazard Analysis Critical Control Point Act. Also, the sampling inspection policy, the internal failure cost, and the external

failure cost have a significant impact on the price that the buyer is willing to offer for safer food and, therefore, on the supplier's willingness to exert the effort required to deliver safe food.

Vegetable producers' perceptions of food safety hazards in the Midwestern USA considered themselves familiar with national Good Agricultural Practices (GAPs). They agreed that implementing GAPs could reduce the risk of product contamination, but they were not consistently practicing GAPs. Vegetable producers did not declare an immediate need for more food safety information. Still, they did indicate that they would like more information on the sources of produce contamination, how contamination occurs, and GAPs guidelines. [5]

Wiwat Kaewduanglek (2019) [6] proposed the definition of food safety, food processing and manufacturing, the role of food safety, and especially environmental management. By limiting the number of pesticides (or hazardous substances) in the production process, good ecological management will help control or reduce the impact directly on humans and natural resources. This research also shows that, in the production process/cultivation. The farmers should undertake activities with minimal environmental effects, such as applying GAP principles in the cultivation and management of organic waste by making fertilizers as one way to reduce unnecessary chemicals.

Food Safety Standards adopted in Thailand

The food safety standards which were popularly adopted in Thailand were as below.

- Participatory Guarantee Systems (PGS)
- Good Agricultural Practice (GAP)
- Good Manufacturing Practice (GMP)
- Organic Thailand
- Quality (Q)
- Earth Safe Standard.
- International Federation of Organic Agriculture Movements (IFOAM)

Empirical Analysis of the necessity for farmers to participate in food safety production groups

Data Collection

The data collected from farmers consists of 3 types: 1. Basic socio-economic data, 2. Farmer's behavior data related to crop/fruit cultivation, and 3. Information on the importance of transport and marketing factors affecting fruit and vegetable cultivation.

A total of 400 farmers from 22 provinces of Thailand were collected who live in the city or urban community of that province Inquiries during January - April 2022.

Empirical Model

A farmer's decision to participate in a food safety production group can be viewed as the activity choice models in consumer theory guide such decision models Ben-Akiva, et al. (2002) [7]. For example, [8] Bagi and Reeder (2012) have developed a model of decision-making in participating in agritourism activities to select new or old-style tourism activities (mode choice). Based on the theory of consumer behavior based on the principles of economics through the theory of maximum utility by developing a logit model.

In our framework, the farmer chooses whether to participate in the food safety production group based on the maximum utility function.

Statistical data of decision-making can be classified into an alternative level called ordinal scale data, for example, levels 0 to 3, divided into not interested in joining group, interested in joining at a low level, moderate in and immediately in joining the food safety production group, respectively. Also, in this case, the ordinal scale data is classified as a discrete choice.

The statistical modeling to describe the decision-making behavior can be divided into two steps: 1. Developing the utility function from the data of various factors affecting the level of choice in the decision to join the group of food safety producers. 2. To determine the relationship between the utility value and the level selection behavior in the decision-making process.

Each farmer's decision-making level, which links the utility function, can be expressed in Equation (1). The farmer will select that the decision level (y_i) equals 0 (not participating in the activity/joining food safety production groups) only if his utility value (y_i^*) is lesser than k_0 .

And farmers will select that the participation level (y_i) is equal to 3 (join the activity immediately, only if his utility value (y_i^*) is more excellent/greater than k_2

$$\begin{aligned}
 y_i &= 0 && \text{if } y_i^* \leq k_0 \\
 &= 1 && \text{if } k_0 \leq y_i^* \leq k_1 \\
 &= 2 && \text{if } k_1 \leq y_i^* \leq k_2 \\
 &= 3 && \text{if } y_i^* \leq k_2 \\
 &&& (0 \leq k_0 < k_1 < k_2)
 \end{aligned}
 \tag{1}$$

Where k_i = The cutting point value at decision level i , where $i = 0, 1$ and 2

There are two types of factors in the development of the level of participation models. The researchers could observe some factors correlated with assessing the decision-making

level to participate in food safety production groups. Therefore, the utility function (y_i^*) is divided into two parts which combine observable utility value (Observed factors, $x_i'\beta$) and non-observable utility value (Unobserved factors, ε), those are as shown in Equation (2).

The utility value influences the measure of a participation level of decision-related to an observable factor (ε), considered a random factor. Determining the distribution of error (ε) will depend on the researcher's hypothesis. The following section describes the Ordered Logit Model in terms of random variables, those are as shown in Equation (3).

$$y_i^* = \beta x_i' + \varepsilon \quad (2)$$

$$\varepsilon = y_i^* - \beta x_i' \quad (3)$$

- where
- y_i^* = The utility value of the level of decision to participate food safety production group.
 - x_i' = Factor i affects the choice of the participation level of y_i .
 - β = Parameter values of x_i'
 - ε = Error or unobserved utility value.

Ordered Probit Model [8]

This model is distributed error or uncertainty (ε) as a probability distribution function (PDF) as the ordered probit distribution $\Phi(\varepsilon)$ shown in Figure 4 and can be written as Equation (4-5). Figure 4 shows that the participation level, if divided into four classes, consists of not interested, low interest, moderate interest, and very interested. It can be assigned a level from 0-3 according to the ordered probit model probability distribution.

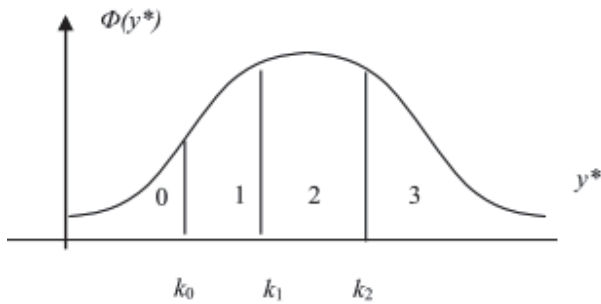


Figure 4. Sequencing decision-making under the ordered probit distribution.

$$P(y_i = 0(\text{not interested}) | \beta x_{ij}, k) = \Phi(k_0 - \beta x_i') \quad (4)$$

$$P(y_i = 1(\text{low interest}) | \beta x_{ij}, k)$$

$$= \Phi(k_1 - \beta x_i') - \Phi(k_0 - \beta x_i')$$

$$P(y_i = 2(\text{moderate interest}) | \beta x_{ij}, k)$$

$$= \Phi(k_2 - \beta x_i') - \Phi(k_1 - \beta x_i')$$

$$P(y_i = 3(\text{very interested}) | \beta x_{ij}, k)$$

$$= 1 - \Phi(k_2 - \beta x_i') \quad (5)$$

where $\Phi(\cdot)$ = Cumulative distribution function of error (ε)

$$P(X \leq x) = \frac{1}{\sqrt{2\pi}} \int_{-\infty}^x e^{-\frac{u^2}{2}} du \quad (6)$$

$$F_X(x) = P(X \leq x) \quad (7)$$

$$= P(\sigma Z + \mu \leq x) \quad \text{where } X \sim N(\mu, \sigma^2), \quad (8)$$

$$= P(Z \leq \frac{x - \mu}{\sigma}) \quad (9)$$

$$= \Phi\left(\frac{x - \mu}{\sigma}\right) \quad (10)$$

If Z is a standard normal random variable and $X = \sigma Z + \mu$ then X is a normal random variable with mean μ and variance σ^2 , $X \sim N(\mu, \sigma^2)$.

$$fX(x) = \frac{1}{\sqrt{2\pi}} \int_{-\infty}^x e^{-\frac{(x-\mu)^2}{2\sigma^2}} \quad (11)$$

$$= P(X \leq x) = \Phi\left(\frac{x-\mu}{\sigma}\right) \quad (12)$$

$$= P\left(Z \leq \frac{x-\mu}{\sigma}\right) \quad (12)$$

$$P(a \leq X \leq b) = \Phi\left(\frac{b-\mu}{\sigma}\right) - \Phi\left(\frac{a-\mu}{\sigma}\right) \quad (14)$$

Determining the probability of which level of decision to participate in a farmer's activity will be in order can represent equations as in equations (15).

$$P(y_i = j | \beta x_{ij}, k) = \Phi(k_i - \beta x_i') - \Phi(k_{i-1} - \beta x_i') \quad (15)$$

and

$$P(y^* \leq M) = P(y^* \leq k_M - \beta x_i') = \Phi(k_i - \beta x_i') - \Phi(k_{i-1} - \beta x_i') \quad (16)$$

where y_i^* = The utility value of the level of decision to participate food safety production group

x_i' = Factor i affects the choice of the participation level of y_i .

β = Parameter values of x_i'

ε = Error.

M = Decision level.

k_M = Cutting point of each decision levels

Parameters can be determined by adopting the probability function using the Maximum Likelihood Estimation (MLE) principle, as shown in equations (16). And the Process for Solving Problems for Nonlinear Equations. The optimization process can obtain the parameter.)Optimization)

And the Process for Solving Problems for Nonlinear Equations. The optimization process can obtain the parameter that causes the objective function $f(\beta)$ to have a maximum or minimum. Iterations until the values of the previous and last parameters differ within the acceptable range defined by the objective function. There are three steps: 1. Initialization for variables 2. Iteration until the value is suitable for the objective function, solving the equation according to the method of Newton-Rafson. 3. repeated many times until the last value is close to the previous value. Currently, the equation can be solved using the SPSS program to help find the solution to various variables.

Descriptive Statistics

This study collected data from 400 samples of farmers who grow vegetables and fruits for sale. They live in urban areas of 24 provinces in Thailand. The information collected consists of 3 parts: 1. Information on the socio-economic conditions of farmers, 2. The information related to the production factors, and the result of the decision to join the food safety group in urban areas. Various data are shown in Table 1.

From Table 1, 52.00 percent of the farmers were male, 45.75 percent female, and 2.25 percent from another gender. The age of farmers was 50-59 years old, representing 33.75 %, followed by 40-49 years old (33.25 percent), 30-39 years old (16.75 percent), greater than or equal to 60 years old (10.00 percent), and over 30 years old. (6.25 percent), respectively. For the educational level, it was found that the farmers graduated with 75.50 percent with secondary education, followed by bachelor's degrees with 20.50 percent, master's degrees with 2.50 percent, and doctoral degrees with 1.50 percent, respectively.

Consider the plantation areas in doing the agricultural activity. It found that the farmer uses own or leased land 29.25 percent, 2.75 percent leased land, and 1.00 percent of own farmland. Most farmers used family labor for farming by 68.50 percent, employed support workers by 11.75 percent, and used both families and employed support workers by 19.75 percent. Farmers received their farming knowledge through training 29.5 percent, and 18.5 percent received knowledge from government officers.

From table 2, the majority of farmers engaged in chemical farming (42.00 percent), followed by mixed-use (24.75 percent), non-chemical (24.25 percent), and organic (9.00 percent) yields. Most farmers grow 53.75 percent, followed by fruit, 28.75 percent, and vegetables and fruits, 17.50 percent.

The majority of the farmers' yields were certified to the 72.00 percent standard, with only 28.00 percent of the non-

standard products. Most vegetable production meets PGS, GAP, Organic, and IFOAM standards by 71.2 percent. Most fruits do not meet agricultural standards, with a total of 80.50 percent of which have the food safety standards GAP, Organic, and PGS, with only 13.50, 3.50, and 2.25, respectively.

Farmers have a no experience with selling in a department store, 87.80 percent. And have the experience of only 12.30 percent. Compare the farmer's proportion between the farmer who has experience joining the production group and no experience as follows: 54.25 and 45.75 percent.

Farmer considered the factors affecting the decision to join the food safety group. Farmer valued transportation costs at the most moderate level (38.5 percent), followed by high and low (20.5 and 18.8 percent). Farmer prefers the delivery time at a moderate level of 37.3 percent, followed by high and lowest levels of 30.3 and 12.8 percent.

Table 1 Socio-economics Variables

Variable	Unit	Class	Frequency	Percent
Gender		Male	208	52.00
		Female	183	45.75
		Other	9	2.25
Age	years	<=30	25	6.25
		30-39	67	16.75
		40-49	133	33.25
		50-59	135	33.75
		>=60	40	10.00
Education	Level	High school	302	75.50
		Bachelor	82	20.50
		Master	10	2.50
		PHD	6	1.50
Agricultural area	Owner Rent land Owner Or rent Other		4	1.00
			11	2.75
			117	29.25
			268	67.00
Agricultural labor		Family	274	68.50
		Wage	47	11.75
		Both	79	19.75
Information source		From Training	118	29.5
		From Officer	74	18.5

Table 2 Farmer's behavior and Information data

Variable	Class	Frequency	Percent
Agricultural type	Chemical	168	42.00
	Organic	36	9.00
	Non-chemical	97	24.25

Product type	Mix	99	24.75	Low	4	1.0	
	Vegetable	215	53.75		Medium	82	20.5
Standard	Fruit	115	28.75	High	187	46.8	
	Both	70	17.50	Highest	120	30.0	
Vegetable Standard	YES	288	72.00	PRODUCT-CONSISTENT	Lowest	2	0.5
	NO	112	28.00	Low	11	2.8	
Fruit Standard	PGS	14	3.50	Medium	131	32.8	
	GAP	68	17.00	High	183	45.8	
Fruit Standard	Organic	14	3.50	Highest	73	18.3	
	IFOAM	10	2.50	JOIN-FOOD-SAFETY	Not all Interested	4	1.0
Fruit Standard	None	179	44.75	Not very Interested	11	2.8	
	total	285	71.25	Interested	117	29.3	
Fruit Standard	PGS	9	2.25	Neutral	268	67.0	
	GAP	54	13.50	Interested			
Fruit Standard	Organic	14	3.50				
	Other	1	0.25				
Training	None	322	80.50				
	total	400	100.00				
Training	YES	118	29.50				
	NO	282	70.50				
Product Consistency	YES	114					
	NO	286					
Product Consistency type	COST	2	0.50				
	VOLUME	11	2.75				
Product Consistency type	QUANTITY	131	32.75				
	SOURCE	183	45.75				
Sale-grouped	Etc.	73	18.25				
	No experience	217	54.25				
Sale-grouped	Have experienced	183	45.75				
	No experience	351	87.80				
Sale on department store	Have experienced	49	12.30				
	Lowest	66	16.5				
TRP-COST-LEVEL	Low	75	18.8				
	Medium	154	38.5				
TRP-COST-LEVEL	High	82	20.5				
	Highest	23	5.8				
ON-TIME-LEVEL	Lowest	51	12.8				
	Low	30	7.5				
ON-TIME-LEVEL	Medium	149	37.3				
	High	121	30.3				
ON-TIME-LEVEL	Highest	49	12.3				
	Lowest	5	1.3				
DEMAND-LEVEL	Low	11	2.8				
	Medium	117	29.3				
DEMAND-LEVEL	High	146	36.5				
	Highest	121	30.3				
PRICE-LEVEL	Lowest	7	1.8				

Table 3 Model results

		Estimate	Std. Error	Sig.
Threshold*	Not all Interested	-3.585	0.621	0.000
	Not very Interested	-3.022	0.600	0.000
	Neutral	-1.594	0.585	0.006
	TRAINED	-0.492	0.168	0.003
Paramer	ON_TIME	0.555	0.199	0.005
	PRICE	-0.996	0.360	0.006
	SALE DEP STORED	0.972	0.268	0.000

Link function: Probit.

* Relative with Interested level

Results and Discussion

Empirical Model Results

The maximum-likelihood estimates associated standard errors based on the jackknife variance method, odds ratios, and test statistics for the goodness-of-fit measures generated by the model are presented in Table 3. The chi-squared statistic (for the log-likelihood test) for the estimation that.”

Table 2 shows the estimate results of the level of farmer participation model in terms of the Ordered Probit model. The decision of farmer participation was classified into the 4 category’s level (0:Not all interested, 1:Not very Interested, 2:Neutral and 3: Exactly interested in joining food safety group).The threshold values of all cases were relative with Exactly interested level.

The important factors affecting the level of decision-making to join food safety groups, such as training farmers (TRAINED), will increase the utility level by 0.492 units. The efficient freight system, which can deliver the product to customer on time (ON_TIME), it will increase the utility level by 0.555 units. If the farmers have an experience selling or delivering products to large department stores.

(SALE_DEP_STORED) such as (Big C, Makro, Lotus, etc), it will increase the utility level by 0.972 units. and on the contrary, if the production cost is higher, the utility level will be reduced by 0.996 units. and on the contrary, if the production cost which has the greatest effect on the change in decision-making level, that is increase, the utility level will be reduced by 0.996 units.

The model was tested the accuracy using the 80 remain segmented data. When testing the forecast, the accuracy was 70 %. Due to the behavior of plantation vegetables and fruits in the urban areas of the seven regions of Thailand, (namely, The upper north, the lower north, the central region, the east, the northeast, the west, and the south) has different characteristics , to get the higher accuracy of this model, data collection should be surveyed cover all provinces of Thailand, and try to develop the model classified belong to the 7 regions as mentioned above.

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References

[1] Department of Agriculture extension, Ministry of Agriculture and Cooperative Thailand, “Guidelines for

- the operation of the Department of Agricultural Extension for the fiscal year 2020.”
- [2] Brock, W. J., Rodricks, J. V., Rulis, A., Dellarco, V. L., Gray, G. M., & Lane, R. W. (2003). Food Safety: Risk Assessment Methodology and Decision-Making Criteria. *International Journal of Toxicology*, 22(6), 435-451.
<https://doi.org/10.1177/109158180302200605>.
- [3] Zhao, R., & Chen, S.-z. (2012). Willingness of farmers to participate in food traceability systems: improving the level of food safety. *Forestry Studies in China*, 14(2), 92-106.
- [4] Starbird, S. A. (2005). Moral hazard, inspection policy, and food safety. *American Journal of Agricultural Economics*, 87(1), 15-27.
- [5] Ivey, M. L. L., LeJeune, J. T., & Miller, S. A. (2012). Vegetable producers’ perceptions of food safety hazards in the Midwestern USA. *Food control*, 26(2), 453-465.
- [6] Wiwat Kaewduanglek (2019) วิจัยพัฒน แกว่ดวงเล็ก (2019) Food Safety And Environmental Management
- [7] Ben-Akiva, M., McFadden, D., Train, K., Walker, J., Bhat, C., Bierlaire, M., Bolduc, D., Boersch-Supan, A., Brownstone, D., Bunch, D. S., Daly, A., De Palma, A., Gopinath, D., Karlstrom, A., & Munizaga, M. A. (2002). Hybrid Choice Models: Progress and Challenges. *Marketing Letters*, 13(3), 163-175.
<https://doi.org/10.1023/A:1020254301302>
- [8] Ivey, M. L. L., LeJeune, J. T., & Miller, S. A. (2012). Vegetable producers’ perceptions of food safety hazards in the Midwestern USA. *Food control*, 26(2), 453-465.

Proceedings of Plenary Session II

The Measurement Savings Cooperatives Performance Efficiency as the Source of Funds for SMEs in Thailand

Anucha Wittayakorn-Puripunpinyoo, School of Agricultural and Cooperatives, Sukhothai Thammathirat, Parkkred, Nonthaburi Province, Thailand

Over the last 20 years. For Small and medium-sized firms (or SMEs) operations in Thailand required the source of funds for their operations, Savings cooperatives is one of the funds for them. Over 80 percent of SMEs entrepreneur acquired financial support from savings cooperatives as the micro financial institutes especially in the rural area like Kalasin province located in the North East of Thailand. With the 3-State Data Envelopment Analysis (3-stage DEA), There were 6 out of 9 savings cooperatives have performed themselves with their own performance efficiency for 30 years. There were 3 out of 9 savings cooperatives performed themselves with their own performance inefficiency which require to improve their performance since savings cooperatives is an autonomous association of persons united voluntarily to meet their common economic, social and cultural needs and aspirations through a jointly owned and democratically controlled enterprise and its operations as the source of funds for SMEs in Thailand.

Introduction

Thailand is a country whose economy is heavily reliant on commodities and services exports. Industrial products made for more than 70% of overall export sales over the last 20 years. Since then, the country has been revitalized by the industrial sector, which is supported by domestic supporting industries. Small and medium-sized firms (or SMEs) are important components of the supporting industries. Thai SMEs have evolved in response to national development objectives and the global economy.

Thailand has seen a rise in foreign investment since 1993. Following the development of the petrochemical sector along the Eastern seaboard, more industrial estates were built to utilize the output of these upstream industries. Various companies, particularly the automobile, electronics, and electrical appliance industries, began to invest in Thailand. These three primary industries spawned a slew of supporting industries, and SMEs were a crucial component of the country's transition from agriculture to manufacturing and services. SMEs are now widely acknowledged as playing a key part in the country's economy. They are seen to be the most effective engine for economic progress.

Furthermore, when compared to other business units, SMEs generate the highest profit margins for the government.

For Small and medium-sized firms (or SMEs) operations in Thailand required the source of funds for their operations, Savings cooperatives is one of the funds for them especially in the areas of Thailand that far away from the capital city which is the financial center for their funds. The rural area in Thailand as one of the focused area to establish the SMEs as area base economic drivers for the long terms development. According to the statistics of department of Cooperatives Promotion, ministry of agriculture and cooperatives, 2022, over 80 percent of SMEs entrepreneur acquired financial support from savings cooperatives as the micro financial institutes especially in the rural area.

In Thailand, The savings cooperative is a type of financial institution whose members are people having the same occupation or living in the same community. Its purpose is to promote savings among members and provide loan funds for productive investment. Cooperative are registered under the Cooperative Act B.E. 2511 (1968). Present-day circumstances are such that people are constantly faced with an increasing cost of living. Low income people especially suffer because they never seem to earn enough to cover their daily needs. They tend to deal with this problem by turning to illegal moneylenders, who charge them very high rates of interest. By so doing their indebtedness is increased even more and the situation becomes more serious for themselves and their families.

The savings cooperative is set up to help deal with members' socio-economic problems. It is a type of financial institution promoting savings as well as providing loans, using principles of self-help and mutual help. Specifically, this cooperative's objectives are as follows 1) to encourage thrift among members. To encourage the habit of savings, the cooperative currently offers two types of savings, 2) Shares the cooperative sets that members must pay monthly shares at rates set by themselves. These may be deducted directly from monthly salaries. Dividends are paid to members at rates specified according to cooperative law, without tax deductions. When resigning from a cooperative, the member can withdraw his/her shares, 3) Deposits. Both savings and fixed deposits are offered to cooperative members. Interest

on these deposits may be equal to or higher than commercial bank rates depending on the financial status of each cooperative, 4) to provide loan services to members. Members' shares and deposits comprise the loan funds made available to members in need. Interest on these loans are usually at rates lower than that of the prevailing market. There are currently three types of loans available. Emergency loans. In crisis or emergency situations, a member may borrow up to one half of his/her monthly income, depending on the financial status of the cooperative. Repayment is normally made in two installments, without collateral. Ordinary loans. The cooperative can provide an ordinary loan up to a maximum of one-half of a member's monthly income, again depending on the financial status of the cooperative. These can be between 4 to 15 times, or within the range of Baht 40,000 to 300,000. Normal repayment is from 24 to 72 installments, with one other member acting as guarantor. The maximum amounts allowed for emergency and ordinary loans are based on the average amount of members' incomes. Special loans. When the cooperative services can be made available to members for housing and investment purposes. A member may borrow the actual amount required for investment or to purchase house and/or land, not exceeding the ceiling amount of between Baht 400,000 to 1,000,000. Repayment period is between 10 to 15 years, using real property as collateral.



Figure 1 Map of Kalasin Province, Thailand
Source: www.pinterest.com/pin

After a savings cooperative is formed, members' representatives are elected to form Board of Directors to administer cooperative operations. Elections are held at annual general meetings. The highest responsibility of the individual member is attendance at the annual general meeting (AGM). The AGM gives him/her the opportunity to protect membership rights as well as the means to monitor cooperative operations and a fair sharing of benefits. It is also a forum to determine general policies, elect Committee members, and assign tasks to further benefit all the members. Within the framework of cooperative principles, laws and regulations and procedures, members must discuss problems

together, share ideas, and exercise the right to vote on Committees and meeting resolutions.

The savings cooperatives performed as the source of funds for SME in Thailand especially in rural area of Thailand which people who really want to set up their own business acquired the financial supports as their loans. In this research, the research attempted to measure the savings cooperatives performance efficiency in Kalasin province located in the North East of Thailand classified as the rural area. The research work attempted to measure all of 10 savings cooperatives who continue performed their loan business for SMEs in Kalasin province over 10 years.

Research Objectives

To measure the savings cooperatives performance efficiency as the source of funds for SME in Kalasin province, Thailand.

Materials and Methods

The population numbers of savings cooperatives in Kalasin province, Thailand were considered as 12 individuals who still have their business operation from 1991 to 2021. The purposive technique was applied as the sampling with 2 conditions of purposive technique 1) all outcome of savings business cooperatives are positive, and 2) all savings cooperatives still continuously operate their own business from 1991 to 2021. To meet these 2 purposive conditions, it turned out of 9 savings cooperatives as sample size. (Guzman, I. and Arcas, N., 2008). (Maltz, Alan C., 2000). (Onnwan, D., et al., 2021).

The secondary data were collected from the database of the Cooperative Auditing Department from 1991 to 2021 accounted for 30 years of 9 samples. The cooperative's financial status was collected which was composed of assets, debts, and capital. Also, the cooperatives' business operation outcome was collected included income, expenditures, profits, and operation capitals. (Guzman, I. and Arcas, N., 2008). (Maltz, Alan C., 2000). (Onnwan, D., et al., 2021). Following the studies of Maltz, Alan C., (2000), and Onnwan, D., et al., (2021), they applied both financial status and business operational performance in terms of money unit to identify the cooperatives inputs and outputs. Panel data statistical model was utilized as the data analysis. To meet its acquirement, both time series and cross-sectional data were collected. For the times series data, the financial status and the cooperative business operation data were collected from 1991 to 2021 accounted for 30 years while the cross-sectional data were collected from 9 savings cooperatives. The total number of observations was 270 observations collected.

The technical efficiency analysis of savings cooperatives in Nonthaburi province was applying the 3-state Data Envelopment Analysis (3-stage DEA). The

efficiency of the production unit can be assessed as follows. (Guzman, I. and Arcas, N., 2008). (Maltz, Alan C., 2000). (Onnwan, D., et al., 2021).

$$\text{Efficiency} = \frac{\text{output}}{\text{input}} \text{-----(1)}$$

According to equation (1), the outputs were defined as the total amount of income and profit of savings cooperatives while the inputs were defined as the total amount of assets debts, capital, expenditures, and operation capitals respectively. Theoretically, the popular method of benchmarking technique to measure the performance of savings cooperatives' business operations. This is a comparison of the efficiency value calculated in each production unit. The benchmark is the best practice compared to the total number of units as a study unit. The technical efficiency can be assessed as follows: (Paradi, J.C., & Scahffnit, C., 2004). (Guzman, I. and Arcas, N., 2008). (Uraporn, Ng., 2020).

$$\text{Technical efficiency} = \frac{\sum_j \mu_r y_{rj}}{\sum_i \omega_i x_{ij}} ; i=1, \dots, m, r=1, \dots, s, j=1, \dots, n \text{-----(2)}$$

Where: x_{ij} is the number of inputs i th of production j
 y_{rj} is the number of output at r of production j .
 μ_r is the weight of the product r .
 ω_i is the weight of the input i
 n is the number of production units
 s is the number of output
 m is the number of inputs

Results and Discussion

The Measurement Savings Cooperatives Performance Efficiency of the 9 savings cooperatives in Kalasin province, Thailand could be expressed in Table 1. From Table 1, the results of the Technical Efficiency of the 9 savings cooperatives in Kalasin province, it was found that 6 out of 9 savings cooperatives in Kalasin province had the technical efficiency with the value of 1.00 which were 1) Kalasin Public Health Savings Cooperative Limited, 2) Sema Kalasin Savings Cooperative Limited, 3) Kalasin Local Government Savings Cooperative Limited, 4) Kalasin Hospital Savings Cooperative Limited 5) Kalasin Establishment Savings Cooperative Limited, and 6) Non Sung Community Savings Cooperative Limited. There were 3 out of 9 savings cooperatives had the technical efficiency score smaller than 1.00 expressed that all of them performed their own business with inefficiency which were: 1) Kalasin Teacher Savings Cooperative Limited, 2) Kalasin Provincial Police Savings Cooperative Limited, and 3) Kalasin Private School Teacher Savings Cooperative Limited with their technical efficiency score of 0.913, 0.976, and 0.972 respectively meaning that

these savings cooperative had to improve themselves to meet the requirement of technical efficiency. By doing that, the result from Data Envelopment (DEA) expressed in table 1 showed some suggestions which was IRS (Increasing return to Scale).

This meant that when Kalasin Teacher Savings Cooperative Limited and Kalasin Provincial Police Savings Cooperative Limited decreased their input usage by 1 percent for their business operation then their outputs would be increased greater than 1 percent. It is the way to increase its technical efficiency. By doing that, Kalasin Teacher Savings Cooperative Limited and Kalasin Provincial Police Savings Cooperative Limited would decrease their input usage such as assets, debts, capital, expenditures, and operation capitals respectively.

Table 1. The Measurement Savings Cooperatives Performance Efficiency of the 9 savings cooperatives in Kalasin province, Thailand

Savings Cooperatives of Nonthaburi Province, Thailand	Crste ¹	Vrste ²	Scale ³	Explanation
1 Kalasin Teacher Savings Cooperative Limited	0.913	1	0.913	drs ⁴
2 Kalasin Provincial Police Savings Cooperative Limited	0.879	0.901	0.976	drs ⁴
3 Kalasin Public Health Savings Cooperative Limited	0.974	0.974	1	-
4 Sema Kalasin Savings Cooperative Limited	1	1	1	-
5 Kalasin Local Government Savings Cooperative Limited	1	1	1	-
6 Kalasin Hospital Savings Cooperative Limited	1	1	1	-
7 Kalasin Establishment Savings	1	1	1	-

Cooperative Limited				
8 Kalasin Private School Teacher Savings Cooperative Limited	0.963	0.99	0.972	irs ⁵
9 Non Sung Community Savings Cooperative Limited	1	1	1	-
Operating efficiency average	0.97	0.985	0.985	

objectives and the global economy. Financial support as funds for SMEs start up is very crucial for SMEs entrepreneurs. SMEs) operations in Thailand required the source of funds for their operations, There were many types of financial instructions to help SMEs as loan providers. One of them is savings cooperatives especially in the rural area like Kalasin located in the North east of Thailand. With the main objective of savings cooperatives, it is set up to help deal with members' socio-economic problems. It is a type of financial institution promoting savings as well as providing loans, using principles of self-help and mutual help. The Measurement Savings Cooperatives Performance Efficiency as the Source of Funds for SMEs in Kalasin, Thailand emerged as the main source of Funds for SMEs. With the DEA measurement efficiency score, it found that there were 6 out of 9 savings cooperatives in Kalasin province performed their own business as loan providers for SMEs with their efficiency. There were 3 out of 9 savings cooperatives performed their own business with inefficiency. They had to improve themselves to meet their efficiency. The savings cooperative is an autonomous association of persons united voluntarily to meet their common economic, social and cultural needs and aspirations through a jointly owned and democratically controlled enterprise and its operations as the source of funds for SMEs in Thailand.

Source: Calculated from the database of the Cooperative Auditing Department, 2021.

crste = technical efficiency from CRS DEA

vrste = technical efficiency from VRS DEA

scale = scale efficiency = crste/vrste

Kalasin Private School Teacher Savings Cooperative Limited increased their input usage by 1 percent for their business operation then their outputs would be increased greater than 1 percent. It is the way to increase its technical efficiency. By doing that, Kalasin Private School Teacher Savings Cooperative Limited would increase their input usage such as assets, debts, capital, expenditures, and operation capitals respectively. The 9 savings cooperatives efficiency score in Kalasin province of Thailand showed in figure 2 below:



Figure 2. The 9 savings cooperatives efficiency score in Kalasin province, Thailand

Conclusion

In Thailand, Small and medium-sized firms (or SMEs) are important components of the supporting industries. Thai SMEs have evolved in response to national development

Acknowledgement

I would like to thank my host university to give me the research fund. Thank to my Father and mother who gave me their endless love. Without them, I cannot stand here.

References

Cooperative Auditing Department. (2021). Performance Evaluation of Agricultural Cooperatives. Retrieved January 12, 2021 from <http://www.cad.ac.th/203.154.183.18/ewt/statistic/main.php?>

Cooperative Promotion Department. (2021). Technical Efficiency of Agricultural Cooperatives in Thailand. Retrieved January 12, 2021 from <http://www.cpd.ac.th/statistic/main.php?03.154.183.18/ewt/statistic/main.php?> Economics Help. (2021).

Technical Efficiency Definition. Retrieved February 10, 2021 from <https://www.economicshelp.org/blog/glossary/technical-efficiency/>

Guzman, I. and Arcas, N. (2008). The Usefulness of Accounting Information in the Measurement of Technical Efficiency in Agricultural Cooperatives. *Annals of public and cooperative Economics*. 79 , (2): 107 – 131.

Maltz, Alan C. (2000). Defining and Measuring Organizational Success: A Multidimensional Framework. A Doctoral dissertation of Business Administration. Stevens Institute of Technology.

Map of Kalasin Province. (2021). February 10, 2021,

from <http://www.distantias.com/distance-from-bangkok-thailand-to-nonthaburi-thailand.htm>

Onnwan, D., et al. (2021). Factors affecting the success of community businesses in Thailand, Sub-Project, and Factors affecting the success of community businesses in the Northern Region. Research report of Rajamangala Institute of Technology. Retrieved January 2, 2021 from <http://www.rmutt.ac.th>.

Paradi, J.C., & Scahffnit, C. (2004). Commercial Branch Performance Evaluation and Results Communication in a Canadian Bank – a DEA Application. *European Journal of Operation Research*. 156, (2): 719 – 735.

Rangkakulnuwat, P. (2021). Technical Performance of Thai Commercial Banks. *Academic Journal University of the Thai Chamber of Commerce*. 27, (1): 129-138.

Skevas, T. & Grashuis, J. (2020). Technical efficiency and spatial spillovers: Evidence from grain marketing cooperatives in the US Midwest. *Agribusiness*, 36,111–126.

Uraporn, Ng. (2020). Factors Affecting Success of Agricultural Cooperatives in the Upper North Region. A thesis for the degree of Master of Agricultural Economics. Chiang Mai University.

W. Krasachat & K. Chimmkul. (2020). Performance Measurement of Agricultural Cooperatives in Thailand: An Accounting Based Data Envelopment Analysis. Productivity, Efficiency, and Economic Growth in the Asia-Pacific Region. New York: Springer Publisher.

Worthington, A.C. (2004). Determinants of Merger and Acquisition Activity in Australian Cooperative Deposit-taking Institutions. *Journal of Business Research*. 57, (10): 47-57.

Status and Prospect of BCG in Electrical and Electronics Industry: A Case Study of Printed Circuit Boards Manufacturing in Thailand

Suwat Paengteerasukkamai, Rajamangala University of Technology Phra Nakhon, Bangkok, Thailand
Prin Boonkanit, Rajamangala University of Technology Phra Nakhon, Bangkok, Thailand

The aim of this research was to investigate the status and prospects of the value chain of the Printed circuit boards (PCB) manufacturing industry, which is one part of the S-Curve group that the government of Thailand is supporting for the implementation of the Green Economy using the Bio, Circular and Green Economy Model (BCG). The research process was divided into two parts comprising the review of the important literature such as Thai government agencies, associations and the companies involved in the supply chain along with in-depth interviews with experts on the issues concerned with the concept of creating new businesses related to PCB management in order to maximize value with the circular economy concept and analyze it to create business ideas using the SCAMPER technique. The benefits that will be gained from the results of this study can be demonstrated as the guidelines for the development of management systems, the expectations of the industry in the future, and new business opportunities to drive the industry towards sustainable development.

Keywords: Electrical and Electronics Industry, Bio Circular and Green Economy Model (BCG), Printed circuit boards (PCB), Sustainability

Introduction

Modern technology has rapidly changed the manufacturing industry's structure. Digital technology enhances the manufacturing sector's value while promoting sustainable business growth. The stability throughout the supply chain is covered by technological processes from upstream to downstream, especially in the electronic manufacturing industry, which is the base for national economic development and is expected to grow continuously (Eksangri & Jaiwang, 2014) For this aspect, the government has tried to promote and establish guidelines for implementing projects to support Thailand's potential to become the electronic hub of Asia (Sophonthummapharn, 2009) to support the digital economy and intelligent technology in the system using sustainable operations. The operation emphasizes developing a green electronic product

design and efficient electronic waste management while circulating as raw materials for recycling. Therefore, studying the concept of creating a new business for producing electrical and electronic equipment to enhance value, A case study of Printed Circuit Boards (PCBs) manufacturing in Thailand is essential for sustainable production. The researcher used BCG Model as a guideline for this study to consider the current operating situation of the PCBs manufacturing industry in Thailand. After that, analyze the expectations of those involved in the production supply chain and set priority to apply designed guidelines to develop sustainable PCBs manufacturing process and the management of electronic waste.

Research Questions

RQ1: How is the operating status of the PCBs manufacturing industry in Thailand?

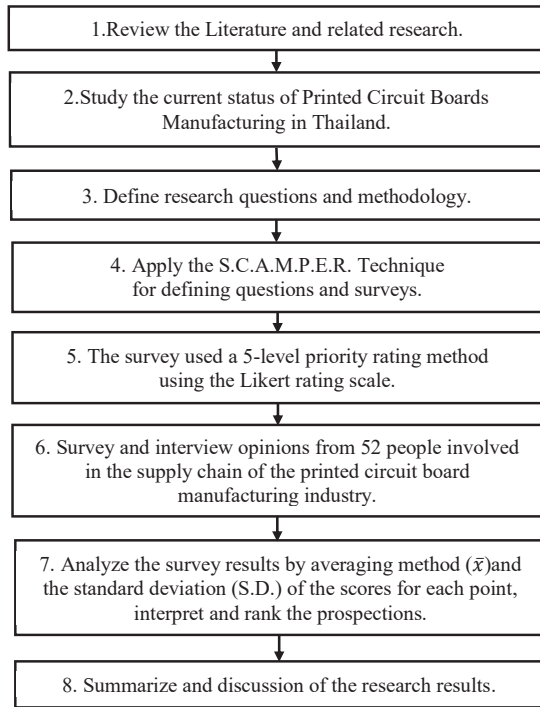
RQ2: What are the Prospections for the PCBs manufacturing industry in Thailand if BCG Model guidelines are considered?

Methods

The researcher has studied the literature review and operation status of the manufacturing industry and life cycle of PCBs in Thailand from related agencies such as the Institute of Electrical and Electronics. After that, the survey was conducted to prioritize new business designs for PCBs manufacturing. According to the operating guidelines of BCG Model with S.C.A.M.P.E.R. Technique, BCG Model is a concept for designing PCBs manufacturing business. Research outcomes from the survey were prioritized using 5 Levels Likert Rating Scale to interpret data for displaying prospctions of the PCBs manufacturing industry in Thailand. This research methodology is illustrated in Figure 1. It can be divided in 8 stage. Starting from review the literature and related research. After that study the current status of Printed Circuit Boards Manufacturing in Thailand. Then, define research questions and methodology and apply

the SCAMPER method respectively. Finally, It is summarized and discussed of the research results

Figure 1. Research methodology

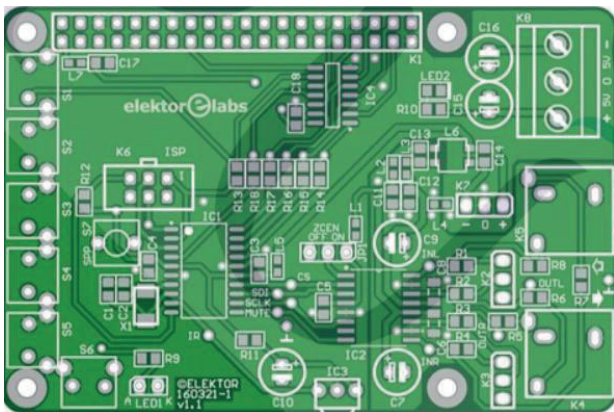


Literature review

Printed Circuit Boards (PCBs)

PCBs is a module that used to connect electrical devices. PCBs use conductive strips and other copper-etched properties to facilitate electrical equipment operation (Wutthiphat Suebsinchai, 2019), as shown in Figure 2.

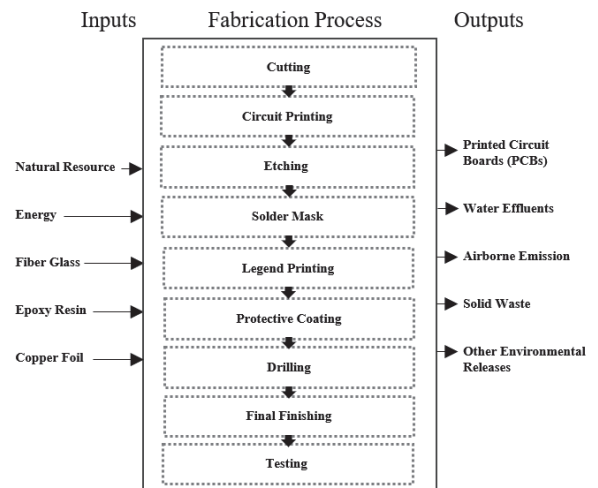
Figure 2. Printed Circuit Boards



PCBs Manufacturing

The production process consists of 9 steps (Ozkan et al., 2018) (Wan, 2017), as shown in Figure 3.

Figure 3. The production process consists of 9 steps



Bio-Circular-Green Economy Model (BCG)

BCG is a new economic model concept identified in Thailand's long-term strategic plan. The BCG National Industrial Development Goals (PALAPLEEVALYA & Poboorn, 2022) consist of Bio-Economy, Circular Economy, and Green Economy. These industries are linked by sustainability policies (D'Amato et al., 2017) and take advantage of Thailand's strengths in terms of biodiversity and culture, including technology and innovation, to enhance Thailand's transformation with value added following the United Nations Sustainable Development Goals (SDGs) and Sufficiency Economy Philosophy (SEP) (Mahanakornpartners, 2021)

S.C.A.M.P.E.R. Technique

S.C.A.M.P.E.R. Technique has been used as a concept in questioning for in-depth interviews with relevant industry experts. S.C.A.M.P.E.R. consists of 7 techniques below:

1. Substitute: to replace any part of the product or process (Serrat, 2017)
2. Combine: to combine two or more products or processes to create something new (Serrat, 2017)
3. Adaptive: to adapt to the situation or different usage (Serrat, 2017)
4. Modify: to fix or reduce for better outcome (Serrat, 2017)
5. Put to other uses: to use in different usage from its functions (Serrat, 2017)
6. Eliminate: to reduce the feature or components for better properties (Serrat, 2017)

7. Reverse: to operate development process with Reverse operation (Serrat, 2017)

Likert Rating Scale

Likert Rating Scale allows respondents to rate their opinions on a 5 points scale which indicates Most Favorable to Most Unfavorable as follows: 5 Strongly Agree, 4 Agree, 3 No Opinion, 2 Disagree and 1 Strongly Disagree (Robbins & Heiberger, 2011) Then, the researcher used result from the Likert Scale to calculate Mean (\bar{x}), which can interpret the satisfaction or opinion of respondents according to the Likert Rating Scales concept, as shown in Table 1.

Table 1. Interpretation of Opinion Level Results from the Average of 5 levels

Scales	Level
4.50 - 5.00	Very important
3.50 - 4.49	Important
2.50 - 3.49	Neutral
1.50 - 2.49	Fairly important
1.00 - 1.49	Not at all important

Source: Ritthikrai Chaingam, 2019

Result and Discussion

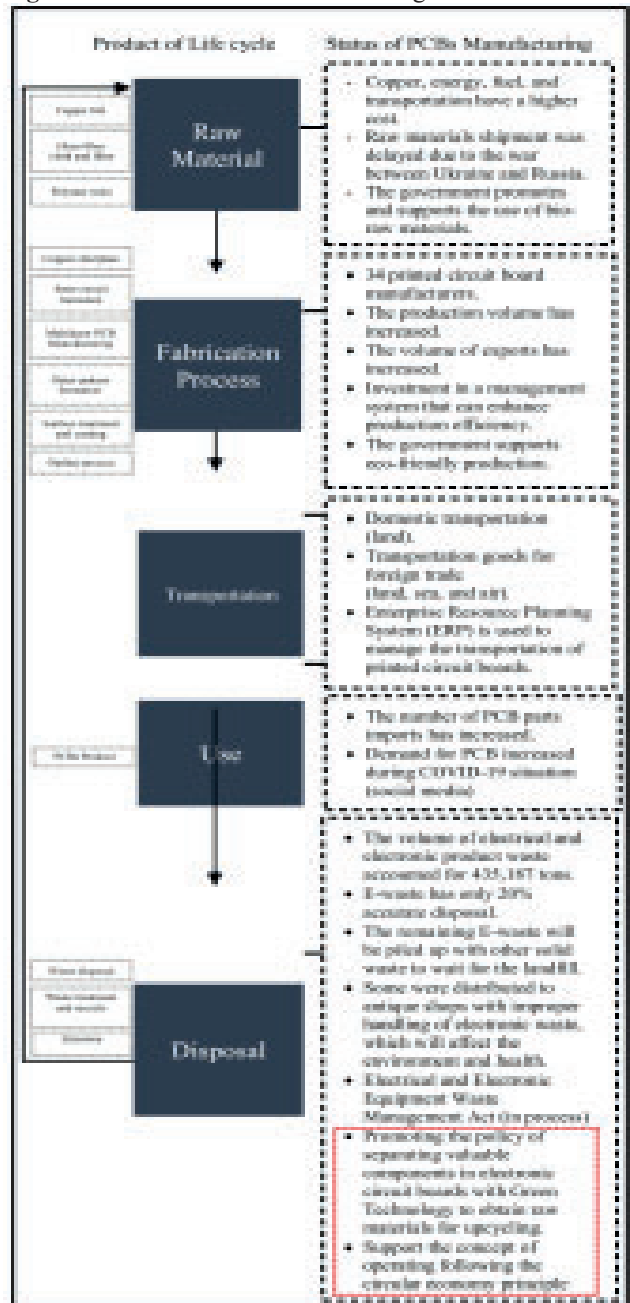
From the literature review and study of the operating status of PCB manufacturing industry in Thailand, the evolution of new technologies has proliferated, resulting in a shorter lifespan of electronic equipment (Irimia-Vladu et al., 2012) and obsolete faster, which causes massive electronic waste around the world (Ceballos & Dong, 2016) Especially PCBs in electronic products' components (Duan et al., 2011) After PCB usage is finished, these PCBs will become waste (Misra et al., 2021) Currently, the government and the private sector have promoted guidelines for the most efficient electronic waste management regarding technology, economic investment, environmental impact, and regulations of electronic products (Boonkanit & Kantharos, 2016). The product life cycle of PCB is divided into 5 phases, including Raw material, Fabrication process, Transportation, User, and Disposal management (Liu et al., 2014) The current situation in the PCB manufacturing industry throughout the supply chain is shown in Figure 4.

Raw Material

Education and development of biodegradable raw materials for PCB are encouraged to replace the new natural resources in production. Including supporting the use of raw materials obtained from recycling and reuse in the production system. When considered raw material. The cost of energy, and fuel, especially copper, is expected to increase, which is relevant to the global commodity price analysis that outlines the direction of sustainable

development by reducing the burning of fossil fuels and zero carbon dioxide (CO₂) emissions policy. Copper is one of the essential minerals in innovation; therefore, the price of copper is expected to be higher (Bangkokbiznews, 2021) In addition, higher shipping costs are affected by the conflict between Russia and Ukraine, including problems with raw materials shipment or components from international partners that have been delayed due to the current global war.

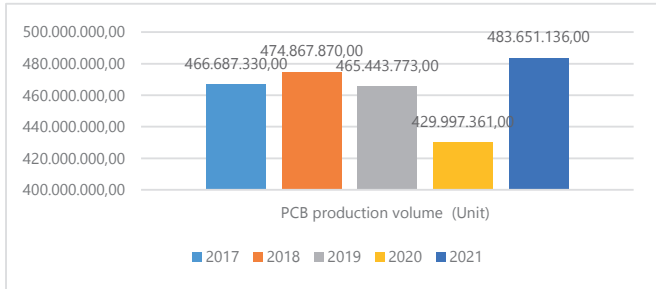
Figure 4. Status of PCBs Manufacturing



Fabrication Process

Presently, Thailand has 34 PCB manufacturing establishments registered with the Electrical and Electronics Institute, categorized as 14 small industrial plants, 7 medium-sized, and 13 large-sized factories during the year 2017-2021 as shown in Figure 5.

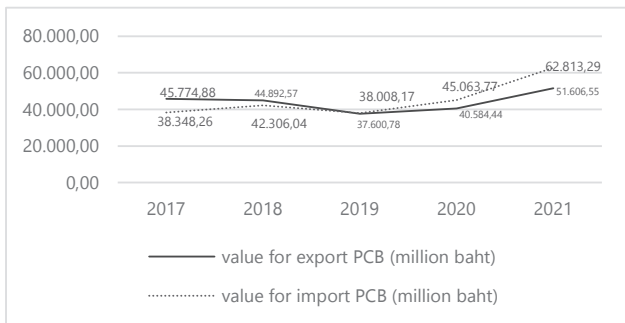
Figure 5. The comparison of PCB production volume during 2017-2021.



Source: Electrical and Electronics Institute. (2022)

The value of production for export and import products is shown in Figure 6.

Figure 6. The comparison of production value for export and import PCB in Thailand during 2017-2021



Source: Electrical and Electronics Institute. (2022)

According to Figure 5, the comparison of PCB production volume during 2017-2021 and Figure 6, the comparison of production value for export and import PCB in Thailand during 2017-2021 are showed an increasing trend. Entrepreneurs have the potential to invest in management systems that can enhance production efficiency and automation for research and development to support new technologies

Transportation

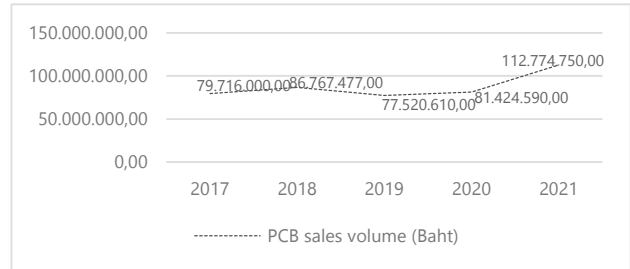
The transportation of PCB is divided into 2 types: 1. Domestic trade transportation, including land transport by large trucks that can deliver products on time and have a higher cost compared to other modes of transport (Hsieh &

SOO, 2019). This transportation type also uses an Enterprise Resource Planning System (ERP). This transportation type also uses an Enterprise Resource Planning System (ERP) to manage the logistic operation. 2. The Department of International Trade Promotion is responsible for foreign trade transportation shipments, including customs clearance for land, sea, and air transport (Department of International Trade Promotion, 2015)

Use

After COVID-19 severity is reduced, the global economy has begun to recover, resulting in higher consumer demand for electrical and electronic equipment. The sales volume of PCB is shown in Figure 7.

Figure 7. The comparison of PCB sales volume during 2017-2021



According to Figure 7, PCB sales trend improved with a positive trend consistent with the analysis of Thai business and industry trends 2022-2024. The analysis stated that the demand for electrical appliances is expected to expand due to the new electrical and electronic trading business that has improved controllability. Moreover, an internet connection can satisfy consumers' preference for products that can facilitate the change in online commerce from using electronic devices to buy-sell products online (Krungsriresearch, 2022). For this reason, there is an increased demand for PCB components for the production process that can meet the needs according to technological changes and the direction of social media.

Disposal

In 2021, there were 435,187 tons of electrical and electronic waste products (65% of total waste), which increased from 2020 (Pollution Control Department, 2022) by 20 % (Khanitha chancharoen, 2022) through the collection, disposal, and treatment operations by a Category 105 industrial plant, which is a waste sorting or landfill business and unused materials. Besides, 106 industrial plants take unused industrial products to produce raw materials or new products through industrial production processes (Otwong et al., 2021). The remaining amount is piled up with other solid waste to wait for landfill. Some wastes are distributed to antique stores with improper management systems affecting the environment and health. Nowadays,

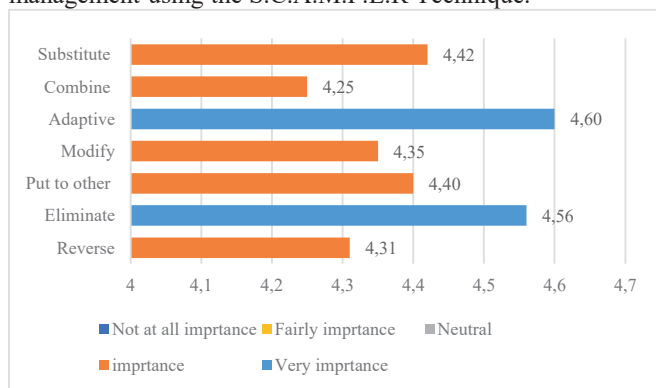
the government and related agencies are preparing a regulation on managing electrical and electronic waste products to manage electronic waste efficiently while promoting the establishment of an electronic waste collection center. If Thailand has ineffective management of electronic waste in the form of mixing with household waste, such action will affect heavy metal contamination in soil, surface water, and groundwater (Nieobubpa & Phoohinda, 2022). In addition, the government has promoted the policy of separating valuable e-waste components through various steps such as electronic waste selection, Pretreatment, and recovery of minerals (Nithya et al., 2021) Especially silver, and copper (Kovtun et al., 2019), from electronic circuit board waste to obtain raw materials for upcycling according to the circular economy.

Data analysis revealed that using the question of the S.C.A.M.P.E.R Technique surveys the expectation of building a new business in the PCB manufacturing industry by surveying 52 respondents involved in the production supply chain, as shown in Table 2. and a comparison can be made when considering each issue, as shown in Figure 7

Table 2. Mean (\bar{X}) Standard Deviation (S.D.) Level of Opinion Values for New Business Ideas Related to PCB Management with S.C.A.M.P.E.R Technique

S.C.A.M.P.E.R	n = 52		Result	Rank
Technique	\bar{X}	(S.D.)		
Substitute (S)	4.42	0.41	important	3
Combine (C)	4.25	0.50	important	7
Adaptive (A)	4.60	0.40	very important	1
Modify (M)	4.35	0.62	important	5
Put to other (P)	4.40	0.44	important	4
Eliminate (E)	4.56	0.37	very important	2
Reverse (R)	4.31	0.49	important	6
Total	4.41	0.46	important	

Figure 7. Average Comparison (\bar{X}) The level of importance to the concept of creating a new business related to PCB management using the S.C.A.M.P.E.R Technique.



From Table 2, the mean (\bar{X}) Standard Deviation (S.D.) level of the opinion of the importance of creating a new business related to PCB management. The overall S.C.A.M.P.E.R Technique was critical ($\bar{X} = 4.41$).

According to Figure 7, Average Comparison (\bar{X}) illustrates the level of importance for the concept of creating a new business related to PCB management using S.C.A.M.P.E.R. Technique found has highest average of priority were Adaptive (A) ($\bar{X} = 4.60$) followed by Eliminate (E) ($\bar{X} = 4.56$) Substitute (S) ($\bar{X} = 4.42$) Put to other (P) ($\bar{X} = 4.40$) Modify (M) ($\bar{X} = 4.35$) and Reverse (R) ($\bar{X} = 4.31$), respectively. However, Combine (C) is the issue with the lowest mean of importance ($\bar{X} = 4.25$). The study results revealed that Adaptive is important for improving product manufacturing in the face of technological change and applying clean technologies that support sustainable production and consumption. (PALAPLEEVALYA & Poboorn, 2022) In addition, Eliminate reduces the use of pure resources and harmful raw materials and chemicals, especially heavy metals that affect the health of producers and consumers.

Conclusion

According to the research questions the authors have been found that status of PCB manufacturing industry following the guidelines for driving the bio-economy model, circular economy, and green economy with S.C.A.M.P.E.R. technique, the public and private sectors have driven the PCB manufacturing industry towards sustainability. When considering the product life cycle, the cost of raw materials, energy, and transportation has risen due to global problems. In terms of production, there is a tendency to increase accordingly. During 2017-2021, the production for domestic use, the value of export goods, imported goods, and the value of sales to consumers have increased consistently with the direction of driving the country towards Thailand 4.0 which is stated by Suanpang & Jamjuntr (2019), is necessary to use PCB as electronic components to enhance technology and innovation. At the same time, the amount of electronic waste is increasing rapidly. Presently, Thailand has studied and developed e-waste management, with biological treatments to reduce the use of chemicals which is suggested by Kadivar et al. (2021) in resource recovery processes and transformed to upcycling into a new production system following the circular economy. Moreover, Expectations for the PCB manufacturing industry in Thailand according to the BCG Model with the S.C.A.M.P.E.R technique It has expressed a fundamental level of expectation and prospect in terms of adaptive in line with the bio-economy and elimination in the form of effective management of e-waste.

Further Research

For future research, the researcher aims to compare the results of the data analysis before and after the survey of Prospections towards the PCB manufacturing industry in Thailand. In addition, design and develop end-of-life management programs for electronic

products consistent with the guidelines S.C.A.M.P.E.R Technique.

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References

Boonkanit, P., & Kantharos, S. (2016). An AHP for prioritizing and selecting industrial waste management method case study: Map Ta Phut Industrial Estate. *Applied Mechanics and Materials*, Vol. 848, 251-254.

Ceballos, D. M., & Dong, Z. (2016). The formal electronic recycling industry: Challenges and opportunities in occupational and environmental health research. *Environment international*, 95, 157-166.

D'Amato, D., Droste, N., Allen, B., Kettunen, M., Lähtinen, K., Korhonen, J., Leskinen, P., Matthies, B. D., & Toppinen, A. (2017). Green, circular, bio economy: A comparative analysis of sustainability avenues. *Journal of Cleaner Production*, 168, 716-734.

Duan, H., Hou, K., Li, J., & Zhu, X. (2011). Examining the technology acceptance for dismantling of waste printed circuit boards in light of recycling and environmental concerns. *Journal of environmental management*, 92(3), 392-399.

Eksangsri, T., & Jaiwang, T. (2014). Feasibility study on reuse of washed water in electronic industry: case study for flexible printed circuit board manufacturing in Thailand. *Procedia Environmental Sciences*, 20, 206-214.

Hsieh, C.-H., & SOO, J. Y. (2019). A Comparative Analysis in Modal Choice for Electronics Products from Thailand to Singapore. *Journal of the Eastern Asia Society for Transportation Studies*, 13, 877-890.

Irimia-Vladu, M., Glowacki, E. D., Voss, G., Bauer, S., & Sariciftci, N. S. (2012). Green and biodegradable electronics. *Materials Today*, 15(7-8), 340-346.

Kadivar, S., Pourhossein, F., & Mousavi, S. M. (2021). Recovery of valuable metals from spent mobile phone printed circuit boards using biochar in indirect bioleaching. *Journal of environmental management*, 280, 111642.

Kovtun, I., Boiko, J., & Petrashchuk, S. (2019). Reliability Improvement of Printed Circuit Boards by Designing Methods for Solder Joint Technical Diagnostics with Application of Acoustic Emission Method. *Visnyk NTUU KPI Seriya-Radiotekhnika Radioaparotobuduvannia*(79), 60-70.

Liu, J., Yang, C., Wu, H., Lin, Z., Zhang, Z., Wang, R., Li, B., Kang, F., Shi, L., & Wong, C. P. (2014). Future paper based printed circuit boards for green electronics: fabrication

and life cycle assessment. *Energy & Environmental Science*, 7(11), 3674-3682.

Misra, N. R., Kumar, S., & Jain, A. (2021). A review on E-waste: Fostering the need for green electronics. 2021 International Conference on Computing, Communication, and Intelligent Systems (ICCCIS),

Nieobubpa, C., & Phoochinda, W. (2022). *MODEL OF ELECTRONIC WASTE MANAGEMENT FOR EASTERN ECONOMIC CORRIDOR* National Institute of Development Administration].

Nithya, R., Sivasankari, C., & Thirunavukkarasu, A. (2021). Electronic waste generation, regulation and metal recovery: a review. *Environmental Chemistry Letters*, 19(2), 1347-1368.

Otwong, A., Jongmeewasin, S., & Phenrat, T. (2021). Legal obstacles for the circular economy in Thailand: Illegal dumping of recyclable hazardous industrial waste. *Journal of Cleaner Production*, 302, 126969.

Ozkan, E., Elginöz, N., & Germirli Babuna, F. (2018). Life cycle assessment of a printed circuit board manufacturing plant in Turkey. *Environmental Science and Pollution Research*, 25(27), 26801-26808.

PALAPLEEVALYA, P., & Poboön, C. (2022). *DEVELOPMENT OF SUSTAINABLE CONSUMPTION AND PRODUCTION INDICATORS FOR INDUSTRIAL SECTOR ACCORDING TO CIRCULAR ECONOMY PRINCIPLES IN THAILAND* National Institute of Development Administration].

Robbins, N. B., & Heiberger, R. M. (2011). Plotting Likert and other rating scales. Proceedings of the 2011 joint statistical meeting,

Serrat, O. (2017). The SCAMPER technique. In *Knowledge solutions* (pp. 311-314). Springer.

Sophonthummapharn, K. (2009). The adoption of techno-relationship innovations: A framework for electronic customer relationship management. *Marketing Intelligence & Planning*.

Suanpang, P., & Jamjuntr, P. (2019). A smart farm prototype with an Internet of Things (IoT) case study: Thailand. *technology*, 5(12), 15.

Wan, Q. (2017). *Life Cycle Assessment of Paper Based Printed Circuits* KTH Royal Institute of Technology].

Wutthiphath Suebsinchai. (2019). The study of factors affecting the production of printed circuit board (Master's Thesis). Dhurakij Pundit University.

Innovativeness, Entrepreneurial Tendencies and Cultural Differences

Tiina Brandt, Haaga-Helia University of Applied Sciences, Finland

Isaac Wanasika, University of Northern Colorado, USA

Mikus Dubickis, RISEBA University of Applied Sciences, Latvia

Stephen Treacy, University College Cork, Ireland

Hanna Pihlajarinne, Tampere University of Applied Sciences, Finland

Rocco Acocella, University of Malta, Malta

Andreea Militaru, University Politehnica of Bucharest, Romania

Diederich Bakker, Hanze University of Applied Sciences, Netherlands

J. Liu, Hanze University of Applied Sciences, Netherlands

Rong Liu, Hubei University of Economics, China

Yukie Tsuzuki, Seijo University, Faculty of Social Innovation, Japan

Thu Vo, University of Applied Sciences Vaasa, Finland

The purpose of this study was to explore innovativeness and entrepreneurial tendencies among different national cultures. A survey instrument was administered on a sample of 731 business students from several countries in Asian, Baltic, USA, Nordic and Middle, South and East European countries. Respondents completed the questionnaire which focused on innovativeness and proactiveness as well as entrepreneurial risk-taking, growth and intention to start a business. Results indicated various statistically significant differences between cultures. The paper highlights country specific strategies for enhancing entrepreneurship.

Introduction

Entrepreneurs are regarded as inherently creative and innovative (Schumpeter; 1934). Consistent results show that a preference for innovation clearly differentiates entrepreneurs from managers (Carland & Carland, 1991; Stewart et al., 1999; Timmons, 1990). Managers tend to be more adaptive (Buttner & Gyskiewitz, 1993), and to be rewarded for their competence and efficiency (Schein, 1985) rather than for innovation and creative destruction (Schumpeter, 1934). More than eight decades later, Schumpeter's most of Schumpeter's insights are still relevant today. Recent studies have shown that unlike managers, the entrepreneurial mindset is characterized by a high propensity for risk, limited resources, and significant uncertainty that plays into their decision. On the other hand, innovation provides the means for entrepreneurial growth (Estrin et al., 2019)

Entrepreneurial career choices are impacted by entrepreneurial drive (Florin et al., 2007) and cultural values (Dahles, 2005). Culture has direct and indirect effects on different dimensions of entrepreneurship. Culture appears to play an important role in the business process, as cultural diversity can influence the predominant characteristics of entrepreneurship and thus moderate the effects of economic conditions on entrepreneurship (Jaén et al., 2017). Cultural values determine the degree to which a society views entrepreneurship as an attractive or unattractive professional outlet (Liñán et al., 2013). Thus, the level of entrepreneurship varies widely from country to country on the basis of culture (Hunt and Levie, 2003).

Studies on national culture have found interrelationships between national culture and entrepreneurship (Hofstede, 1980; 2000; House et al., 2004). The description of culture as "the collective programming of the mind that distinguishes the members of one group or category of people from another" (Hofstede, 2001, p. 5), implies that cultural norms are manifested in individuals' values, norms, cognitions, motivations, beliefs and behaviors. Scholars have identified culture as a moderating factor in career choice to be an entrepreneur and start a new business (Moriano et al., 2012; Thornton et al., 2011), theory of planned behavior constructs (Hagger et al., 2007), and entrepreneurial intentions (García et al., 2018). Multiple studies have shown that country's culture has impact on students' entrepreneurial intentions (Liñán et al., 2013; Pruett et al. 2009; Sánchez, 2010; Varamäki et al., 2013).

Background

Innovativeness and entrepreneurial orientation

Psychological and personality characteristics have been shown to be predictors of innovativeness. While some believe it is possible for all individuals to be innovative, creating new ideas is just easier for some. In a business setting, a preference for innovation refers to a willingness and inclination towards experimentation and creativity when developing and introducing new products and services (Lumpkin & Dess, 2001). Innovation is also enacted proactively. Proactive individuals scan the environment for opportunities, show initiative, and persevere until they bring about change (Bateman & Crant, 1993).

Studies indicate that innovative persons are persistent (Hurt et al., 1977; Sandberg et al., 2013), self-confident, open to experience, original, independent and have tolerance for ambiguity (Barron & Harrington, 1981; George & Zhou, 2001; Patterson, 1999; West and Wallace, 1991). Innovators are also willing to change (Hurt et al., 1977), eager to try new ideas (Rogers & Shoemaker, 1971), and tend to advance problem solving (Scott & Bruce, 1994). Additionally, they have the ability to inspire others and build networks (Akrich et al., 2002). Regarding personality, studies have found a positive correlation between openness, extraversion, and creativity (Bender et al., 2013; Hughes et al., 2013).

Entrepreneurial orientation includes innovativeness, risk-taking, proactiveness, autonomy and competitive aggressiveness. It has been shown to influence firm performance, profitability, growth and product innovation in entrepreneurial firms (Avlontis & Salavou, 2007; Johan & Dean, 2003; Moreno & Casillas, 2008; Tang et al., 2008). Harris and Gibson (2008) found that personal control, innovation, self-esteem and achievement with respect to business involvement were correlated with intentions to become an entrepreneur (Harris and Gibson, 2008). Additionally, several studies indicate that past experience with family business is linked to stronger entrepreneurial attitudes (Harris & Gibson, 2008; Roberts & Robinson, 2010; Zampetakis et al., 2009).

Florin, Karri and Rossiter (2007) have studied student attitudes which promote entrepreneurship and found that innovation, nonconformity, proactive disposition, self-efficacy and achievement motivation are crucial in this regard. Other researchers studying students used a variety of measures for entrepreneurial attitudes that included a mixture of attitude and trait measures, often including items referencing risk-taking and innovativeness (Domke-Damonte et al., 2008; Langkamp-Bolton & Lane, 2011; Levenburg & Schwarz, 2008; Macko & Tyszka, 2009; Zampetakis et al., 2009) as well as proactivity (Langkamp-Bolton & Lane, 2011; Zampetakis et al., 2009). In addition to creativity and proactivity Zampetakis et al. (2009) found

that the emotional intelligence is connected to entrepreneurial wishes.

Theory of Planned Behavior

The Theory of Planned Behavior (TPB) (Ajzen, 1991) is one of the models in the study of entrepreneurial intent in different countries (Autio et al., 2001; González-Serrano et al., 2016; Krueger et al., 2000; Liñán and Fayolle, 2015; Moriano et al., 2012). Ajzen (1991) postulates that behavior is a function of beliefs that influence a certain behavior. These beliefs are considered important premises that determine 1) personal attitude, 2) intention and 3) perceived behavior control. Personal attitude is the favorable or unfavorable assessment that a person makes on the behavior in question. The second predictor of perceived behavior is a social factor referred to as subjective norms. Subjective norms refer to the perceived social pressure to perform or not perform a certain action from people in the immediate environment who exert that influence and pressure. The third antecedent of intention is the degree of perceived behavior control (PBC) over behavior, which is the perceived ease or difficulty of the subject in performing an action based on past experiences, as well as difficulties and obstacles perceived by the subject.

The more favorable the subjective norms and attitudes towards behavior, the greater the perceived degree of control of the individual, leading to a stronger intention to perform a certain behavior (Ajzen, 1991). However, one of the current unresolved issues is the role of subjective norms. Some research findings support a direct influence of subjective norms on the intentions to undertake a behavior, while others do not (Figueiredo and Liñán, 2017; Fayolle and Gailly, 2004; Krueger et al., 2000). Certain authors have found a direct influence of subjective norms through personal attitude and perceived control of behavior (Meek et al., 2010; Moriano et al., 2012).

Previous studies have used TPB to predict certain variables that are related to entrepreneurship. These variables include entrepreneurial intentions, entrepreneurial behavior and entrepreneurial skills and attitudes. Entrepreneurial skills and attitudes are necessary antecedents in the process of effective entrepreneurship. Skills and attitudes are developed through learning, experience and environmental factors. Intention plays a central role in TPB by connecting norms, attitudes and behavioral control with enacted behaviors. Entrepreneurial intention is the “self-acknowledged conviction by a person that they intend to set up a new business venture and consciously plan to do so at some point in the future” (Thompson, 2009, p. 676). Entrepreneurial intention is the first step towards taking entrepreneurial action such as contemplating a startup. The second variable of interest is entrepreneurial behavior. Based on the TPB, intentions are correlated with behavior and also linked to behavioral control. Entrepreneurial behavior refers to entrepreneurial actions such as recognizing and exploiting

opportunities by reconfiguring existing and new resources in ways that create an advantage” (Zahra, 2005, p. 25). Entrepreneurial behavior is a necessary action that puts entrepreneurial intentions into play.

Culture

Previous studies have found associations between culture and entrepreneurship. Specific cultural dimensions are likely to strengthen or weaken the relationship between individual factors and entrepreneurial intent (Schlaegel and Engle, 2013). Looking at each of the relevant dimensions, we can identify theoretical and empirical support for this assertion. Commonly used cultural dimensions at research of entrepreneurship are four dimensions from Hofstede, which are power distance (PDI), individualism (IDV), masculinity (MAS) and uncertainty avoidance (UAI). Even Hofstede has defined six dimensions, these four have been noticed to play crucial role regarding entrepreneurship.

Power distance (PDI) dimension expresses the degree to which the less powerful members of a society accept and expect that power is distributed unequally. Societies exhibiting a large degree of PDI accept a hierarchical order, control and obedience to those with power (Hofstede, 1980). Everybody has a place that needs no further justification. There are contradictory studies of power distance, some studies indicate that high PDI promotes entrepreneurial activity (Busenitz and Lau, 1996) whereas some that low PDI is connected to entrepreneurs (Mueller et al., 2002). Connection to risk-taking propensity in entrepreneurship is moderated by PDI according to Antoncic et al. (2018).

Individualism dimension (IDV) refers to societies that prefer a social framework in which individuals are expected to take care of themselves and their immediate families. On the other hand, collectivist societies take care of the larger extended family in exchange for loyalty. According to Hofstede (1980), IDV culture that emphasize “I” rather than “we” are more likely to demonstrate entrepreneurship. This is supported Lee and Peterson (2000) who found that countries with high levels of individualism develop a greater entrepreneurial spirit. Interestingly, Pinillos Costa and Reyes Recio (2007) also note that the entrepreneurial activity rate of a nation is positively associated with individualism when the country’s income level is high; however, when the level of income is low, collectivist culture predicts a high ratio of business creation. Additionally, Mueller et al. (2002) study indicates that entrepreneurs tend to have high IDV. High IDV is also related to venture-capital investments (Gantenbein, et al., 2019).

Uncertainty avoidance (UA) dimension expresses the degree to which the members of a society feel uncomfortable with uncertainty and ambiguity. High uncertainty avoidance implies that the society exhibits strong beliefs and norms of behavior and is uncomfortable with new ideas and the unknown. Studies have found a negative relationship between UA and different attributes of entrepreneurship such

as innovation (Shane, 1993), risk-taking (Kreiser et al., 2010) and early-stage entrepreneurship (Arrak et al., 2020). Accordingly, Mueller et al. (2002) find out that low UA was related to entrepreneurs.

Masculinity (MAS) represents a preference for achievement, heroism, assertiveness, and material rewards for success. MAS has also been associated with traditional male values such as compensation, recognition and career advancement (Hofstede et al., 2005). These traits are somewhat perceived to be necessary in entrepreneurship. Numerous studies found support for this perception (Heilman, 2001). However, recent studies have pointed to sociocultural biases (Pecis, 2016) and gender blindness in research may conceal the gendered nature of innovation processes (Dheer et al., 2019).

Thomas and Mueller (2000) conclude that cultural values such as individualism and uncertainty avoidance are significantly related to traits such as internal locus of control, risk taking, and innovativeness, which are associated with entrepreneurship. Some authors (Del Junco and Brás-dos-Santos, 2009) have emphasized that a country’s cultural and social values impact personal values of entrepreneurs. However, Hofstede et al. (2004) add a psychological perspective, stating that when individuals are dissatisfied, they tend to become self-employed even when the country’s culture of entrepreneurship is not favorable.

Triandis (2004) postulates that collectivists conceive behavior to be a result of external factors, such as norms and roles, while individualists relate it to leadership, high educational attainment and mobility on the social scale. According to Soares et al. (2007), this theory is useful for formulating hypotheses in comparative studies at an intercultural level. Based on previous studies between cultural dimensions and entrepreneurial activity, we are able to develop specific propositions. High individualism and high masculinity appear to be highly correlated to entrepreneurship. Power distance promotes certain aspects of entrepreneurial activity such as risk-taking. Low uncertainty avoidance is likely to be associated with entrepreneurship. Altogether, related to entrepreneurship are high masculinity, low uncertainty avoidance and high individualism.

Entrepreneurship and culture

Gonzales-Serrano et al. (2018) compared entrepreneurial attitudes of eastern and western parts of Europe comparing Lithuanian and Spanish students. Lithuanian students had higher predictor variables for entrepreneurship having higher entrepreneurial intentions and perceived behavior control as well as personal attitude compared to Spanish students.

Earlier studies indicate that Danish and Finnish people have very positive attitudes towards entrepreneurship (Amway Global Entrepreneurship Report, 2013), and the attribute is common among adults under 30 years. Generally, most Europeans tend to have more positive attitude towards

entrepreneurship than US nationals, but interestingly the entrepreneurial rate is higher in the US. Additionally, contrary to positive attitudes, the Finnish and Danish are among the least likely to become entrepreneurs. A possible speculation for this phenomenon is that only 37% of US nationals indicate fear of failure as an obstacle to becoming entrepreneurs, while in Europe the fear of failure factor is 73% (Amway Global Entrepreneurship Report, 2013).

In the US, small businesses and startups play an instrumental role in economic and cultural environments, and account for two-thirds of net employment (Dilger, 2018). A significant part of the US cultural heritage that has been linked to entrepreneurship includes the protestant work ethic, freedom and independence (Morris et al., 1994). Lee and Peterson (2000) found that weak uncertainty avoidance, low power-distance, masculinity, individualism, achievement orientation and universalism were conducive to entrepreneurship. Based on a US sample, Mueller and Thomas (2000) found evidence of high individualism and high uncertainty avoidance as being supportive to entrepreneurship. Finally, while comparing the US culture to nine other countries, McGrawth et al. (1992) concluded that regardless of culture, individualism, high power-distance, low uncertainty avoidance and masculinity were common attributes among entrepreneurs.

Methodology

Sample

Total sample represents 817 students, but not all of them completed background information. Thus, for country comparison we used sample of 731 business students whose background information was filled in. The data was gathered from various countries in university colleges during the 2020-2022 academic period. Completion of background information on gender, age and field of was voluntary. The most represented regions were Asian, Baltic and USA. Some respondents had lived in more than country for more than one year and were categorized as a separate group called "lived in many countries". Below is the breakdown of the sample by country/geographic area:

- Asian, China, n=180
- Asian, Japan, n=133
- Baltic, Latvia, Lithuania, n=103
- Lived in many countries, n=103
- USA, n=73
- Middle Europe (mostly Netherlands and Germany), n=52
- East Europe (Romania, Bulgaria), n=44
- Nordic, Finland, n=43
- All together= 731

We used factor analysis (Varimax rotation) to run the data and create dimensions of the questionnaires of

Innovativeness and Entrepreneurial tendencies. Statistical analyses were made with correlations and ANOVA. Tukey's-b post-hoc test was used to determine statistically significant differences between cultural clusters.

Innovativeness and proactiveness

Innovativeness and proactiveness were measured using established scales. Sixteen questions were used in the questionnaire (Langkamp-Bolton & Lane, 2011). Likert scale was 1-7 (1=Never or almost never to 7=Always or almost always). Factor analyses (Varimax) produced 8 items for both dimensions. Reliability was high for both Innovativeness and Proactiveness.

Innovativeness items included the following: "How often do you look for opportunities to improve things?", "How often do you wonder how things can be improved?", "How often do you create new ideas?". Cronbach's alpha for Innovativeness was 0.914.

Proactiveness items included the following: "How often do you try to convince people to support an innovative idea?", "How often do you put effort in the development of new things?", "How often do you make suggestions to improve current products or services?" Cronbach's alpha was 0.859.

Entrepreneurial intention

Entrepreneurial intention was measured with the following question: How likely is it that you will become an entrepreneur in the next 5 years? Scale was Likert-scale (1-5): 1= I will definitely not start a business... 5=I will definitely start the business.

Entrepreneurial tendencies

Entrepreneurial tendencies were measured with risk-taking and growth orientation with either or questions, e.g. security related risk: "a) Working for someone else the best thing is security or b) You do not need security related to working with others", success related risk: "a) Do you start working only with that kind of projects, whose success is relatively sure or b) If you want to succeed, you must take risks?"

Results

Innovativeness and entrepreneurial orientation

First, we looked at how Innovativeness, Risk@Growth orientation and Entrepreneurial intention correlated (see Table 1). Results showed that Innovativeness, Proactiveness and Innovativeness overall had statistically significant correlation with Risk@Growth orientation and also with Entrepreneurial intention. Though not a research question for this study, we can see that Risk@Growth orientation correlated with Entrepreneurial Intention.

Table 1. Correlations of Innovativeness, Risk and Growth Orientation and Intention to start a Business.

		Innov	Proact	Overall	Risk@Growth	Entrepre
Innovativ.	Pearson Corr	1	,743**	,916**	,251**	,347**
	Sig. (2-tailed)		,000	,000	,000	,000
	N	741	720	720	732	737
Proactiv.	Pearson Corr	,743**	1	,949**	,246**	,377**
	Sig. (2-tailed)	,000		,000	,000	,000
	N	741	720	720	732	737
Innovativ. Overall	Pearson Corr	,916**	,949**	1	,262**	,386**
	Sig. (2-tailed)	,000	,000		,000	,000
	N	741	720	720	732	737
Risk@Growth	Pearson Corr	,251**	,246**	,262**	1	,515**
	Sig. (2-tailed)	,000	,000	,000		,000
	N	741	720	720	732	737
Entrepren.Int	Pearson Corr	,347**	,377**	,386**	,515**	1
	Sig. (2-tailed)	,000	,000	,000	,000	
	N	741	720	720	732	737

** Correlation is significant at the 0.01 level (2-tailed).

Innovativeness and culture

Table 2. ANOVA table: Innovativeness and culture

		Sum of Squares	df	Mean Square	F	Sig.
Innovativeness	Between Groups	27,904	7	3,986	4,537	,000***
	Within Groups	620,293	706	,879		
	Total	648,196	713			
Proactiveness	Between Groups	49,276	7	7,039	4,951	,000***
	Within Groups	983,801	692	1,422		
	Total	1033,077	699			
Innovativeness overall	Between Groups	27,922	7	3,989	3,997	,000***
	Within Groups	684,591	686	,998		
	Total	712,513	693			

Table 2 presents ANOVA results of Innovativeness and culture, showing that there are statistically significant differences in every dimension. Culture impacts on both Innovativeness and Proactiveness.

The Post-Hoc Test (Tukey B) in Table 3 shows differences, with the lowest ratings given to Innovativeness by those respondents who live in the Middle and South

Europe and the highest ratings in Innovativeness were indicated by students who have Lived in Many Countries.

Table 3. Post hoc (Tukey B): Innovativeness and Culture

Cultural Regions	N	Subset for alpha = 0.05	
		1	2
Middle and South Europe	51	4,7510	
Aasia-Japan	130	4,7638	4,7638
Aasia China	178	4,8742	4,8742
USA	69	4,9072	4,9072
Baltic	102	5,2098	5,2098
Nordic	42	5,2190	5,2190
East Europe	43	5,2209	5,2209
Lived in many countries	99		5,2374

Means for groups in homogeneous subsets are displayed.

a. Uses Harmonic Mean Sample Size = 69,942.

b. The group sizes are unequal. The harmonic mean of the group sizes is used. Type I error levels are not guaranteed.

In the case of Proactiveness (Table 4), Post-hoc test shows that subjects who have Lived in Many Countries and China had the highest points; Japanese respondents gave the lowest ratings to Proactiveness.

Table 4. Post hoc (Tukey B): Proactiveness and Culture

Areas to chosen to study	N	Subset for alpha = 0.05	
		1	2
Aasia-Japan	127	4,0079	
Middle and south Europe	49	4,2472	4,2472
USA	70	4,5000	4,5000
East Europe and Russia	42	4,5185	4,5185
Nordic	40	4,5194	4,5194
Baltic	96	4,5556	4,5556
Aasia China	178		4,7129
Lived in many countries	98		4,7676

Means for groups in homogeneous subsets are displayed.

a. Uses Harmonic Mean Sample Size = 68,018.

b. The group sizes are unequal. The harmonic mean of the group sizes is used. Type I error levels are not guaranteed.

In case of the Innovativeness overall (the Table 5), Post-hoc test shows that the highest ratings were indicated by

respondents who have Lived in the Many Countries and the lowest points were given by Japanese respondents.

Table 5. Post hoc (Tukey B): Overall Innovativeness and Culture

Areas to chosen to study	N	Subset for alpha = 0.05	
		1	2
Aasia-Japan	126	4,3963	
Middle and south Europe	49	4,5205	4,5205
USA	67	4,6924	4,6924
Aasia China	178	4,7935	4,7935
East Europe and Russia	42	4,8604	4,8604
Nordic	39	4,8670	4,8670
Baltic	96	4,8866	4,8866
Lived in many countries	97		5,0031

Means for groups in homogeneous subsets are displayed.

a. Uses Harmonic Mean Sample Size = 67,190.

b. The group sizes are unequal. The harmonic mean of the group sizes is used. Type I error levels are not guaranteed.

Table 6. ANOVA: Culture, Risk-and-Growth Orientation of Entrepreneurship

		Sum of Squares	df	Mean Square	F	Sig.
Risk@Growth	Between Groups	23,770	7	3,396	37,554	,000
	Within Groups	64,019	708	,090		
	Total	87,789	715			

Table 7. Post hoc (Tukey B): Culture and Risk-and-Growth Orientation of Entrepreneurship

Areas to chosen to study	N	Subset for alpha = 0.05		
		1	2	3
Asian-Japan	131	1,2576		
Aasia China	178		1,5646	
USA	70		1,6821	1,6821
Lived in many countries	97		1,6959	1,6959
Nordic	43			1,7267
Middle and south Europe	51			1,7451
East Europe and Russia	43			1,7616
Baltic	103			1,7961

Means for groups in homogeneous subsets are displayed.

a. Uses Harmonic Mean Sample Size = 70,376.

b. The group sizes are unequal. The harmonic mean of the group sizes is used. Type I error levels are not guaranteed.

Table 6 shows ANOVA results of Risk@Growth orientation and cultural impact on Risk@Growth orientation, with statistically significant results.

Post hoc test (Table 7) shows that mostly Risk@Growth oriented in entrepreneurship was highest in the Baltics, Eastern Europe, Middle and South Europe and the Nordic region. The second was Lived in Many Countries, USA and China. The lowest were given by Japanese respondents.

Conclusion

The purpose of this study was to study innovativeness and entrepreneurial tendencies in relation to cultural differences. The sample represented 731 business students from several countries. The students filled a questionnaire which focused innovativeness and proactiveness as well as Entrepreneurial risk-taking, growth orientation and intention to start a business.

Results showed that Innovativeness and Proactiveness correlated statistically with Risk@Growth orientation and also with Entrepreneurial intention. Also, there was a high correlation between Risk@Growth orientation and Entrepreneurial intention. These results support earlier studies where innovativeness and risk orientation are connected to entrepreneurship (Estrin et al., 2019; Harris and Gibson, 2008).

The main target of this study was to investigate cultural differences between Innovativeness and Risk@Growth orientation. Culture impacts both Innovativeness and Proactiveness indicating that the lowest Innovativeness were respondents who live in the Middle and South Europe and the highest ratings were given by the students who have Lived in Many Countries. In case of Proactiveness, lowest ratings were given by Japanese respondents and highest by Lived in many countries and China. Japanese culture does not appreciate active and pushy behavior, and thus it may be a reason for low proactiveness. Students who have been at least one year abroad seem to be both Innovative and Proactive. It may be that those students have innovation and proactiveness tendencies in their character and those qualities are increased in new situations in the new country. Thus, it would be important for students to have possibilities to have new experiences in the new cultures, to increase their innovation and proactive side.

Concerning Risk@Growth the Japanese respondents had the lowest scores. It seems that Japanese culture endorses harmony and balance, and entrepreneurial behavior does not fit in very well. Baltic countries, East, Middle, South Europe and Nordic countries were most Risk@Growth oriented. Baltic countries have pushed intentionally towards entrepreneurship, and most of them have quite good social security system, creating a safety net for entrepreneurial risks.

References

- Ajzen, I. (1991). The theory of planned behavior, *Organizational Behavior and Human Decision Processes*, 50 (2), 179-211.
- Akrich, M., Callon, M., Latour, B., & Monaghan, A. (2002a). The key to success in innovation part I: the art of intersement. *International Journal of Innovation Management*, 6(2), 187-206.
- Amway Global Entrepreneurship Report 2013. Encouraging Entrepreneurs –Eliminating the Fear of Failure. GFG Nurenberg, Germany
- Antonicic, J. A., Antonicic, B., Gantar, M., Hisrich, R. D., Marks, L. J., Bachkirov, A. A., & Kakkonen, M. L. (2018). Risk-Taking Propensity and Entrepreneurship: The Role of Power Distance. *Journal of Enterprising Culture*, 26(01), 1-26.
- Arrak, K., Kaasa, A., & Varblane, U. (2020). Regional Cultural Context as a Determinant of Entrepreneurial Behaviour: the Case of Germany. *The Journal of Entrepreneurship*, 29(1), 88-118.
- Autio, E., Keeley, R.H., Klofsten, M., Parker, G.G.C. and Hay, M. (2001), Entrepreneurial intent among students in Scandinavia and in the USA”, *Enterprise and Innovation Management Studies*, 2 (2), 2145-2160.
- Avlontis, G.J. & Salavou, H.E. (2007). Entrepreneurial orientation of SMEs, product innovativeness, and performance. *Journal of Business Research*, 60(5), 566-75.
- Bateman, T. S., & Crant, J. M. (1993). The proactive component of organizational behavior: A measure and correlates. *Journal of organizational behavior*, 14(2), 103-118. doi:10.1002/job.4030140202
- Barron, F., & Harrington, D. M. (1981). Creativity, Intelligence, and Personality. *Annual Review of Psychology*, 32(1), 439-476.
- Bender, S. W., Nibbelink, B., Towner-Thyrum, E., & Vredenburg, D. (2013). Defining characteristics of creative women. *Creativity Research Journal*, 25(1), 38-47.
- Busenitz, L.W. & Lau, C.M. (1996). A cross-cultural cognitive model of new venture creation. *Entrepreneurship Theory and Practice*, 20(4), 25-39.
- Buttner, E.H. & Gyskiewicz, N. (1993). Entrepreneurs' problem-solving styles: An empirical study using the Kirton adaptation/innovation theory. *Journal of Small Business Management*, 31(1), 22-31.
- Carland, J.W. & Carland, J.A. (1991). An empirical investigation into the distinctions between male and female entrepreneurs and managers. *International Small Business Journal*, 9 (3), 62-72.
- Dahles, H. (2005). Culture, capitalism, and political entrepreneurship: Transnational business ventures of the Singapore-Chinese in China. *Culture and Organization*, 11(1), 45-58.
- Del Junco, J.G. and Brás-dos-Santos, J.M. (2009). How different are the entrepreneurs in the European Union internal market? – An exploratory cross-cultural analysis of German, Italian and Spanish entrepreneurs”, *Journal of International Entrepreneurship*, 7 (2), 135-162.
- Dheer, R. J., Li, M., & Treviño, L. J. (2019). An integrative approach to the gender gap in entrepreneurship across nations. *Journal of World Business*, 54(6).
- Dilger, R. J. (2018). Small Business Administration and job Creation (CRS Report R41523). Washington, D.C.: *Congressional Research Service*.
- Domke-Damonte, D., Faulstich, J.A. & Woodson, W. (2008). Entrepreneurial orientation in a situational context: comparisons between Germany and the United States. *Journal of Business Strategies*, 25(1), 15-31.
- Estrin, S., Korosteleva, J., & Mickiewicz, T. (2019). *Schumpeterian entry: innovation, exporting, and growth aspirations of entrepreneurs*. In Academy of Management Proceedings (Vol. 2019, No. 1, p. 17308). Briarcliff Manor, NY 10510: Academy of Management.
- Fayolle, A. and Gailly, B. (2004). Using the theory of planned behaviour to assess entrepreneurship teaching programs: a first experimentation. Paper presented at *International Entrepreneurship Conference*, Naples, 5-7 July.
- Figueiredo, R. and Liñán, F. (2017). *Individual and cultural values as psychosocial cognitive antecedents and moderators of entrepreneurial intentions*. In Santos, S., Caetano, A., Mitchell, C., Landstrom, H. and Fayolle, A. (Eds), *The Emergence of Entrepreneurial Behaviour: Intention, Education and Orientation*, Edward Elgar Publishing, Cheltenham, pp. 66-88.
- Florin, J, Ranjan K., & Rossiter, N. (2007). Fostering entrepreneurial drive-in business education: An attitudinal approach. *Journal of Management Education*. 31(1): 17-42
- Gantenbein, P., Kind, A., & Volonté, C. (2019). Individualism and Venture Capital: A Cross-Country Study. *Management International Review*, 59(5), 741-777.
- García, J. C. S., Ward, A., Morúa, G. V., Daza, J. L. F., & Sánchez, B. H. (2018). How does cultural norms influence entrepreneurial intention?: A cross cultural study. *Journal of Business*, 10(1), 52-69.
- George, J.M. & Zhou, J. (2001). When openness to experience and conscientiousness are related to creative behaviour: an interactional approach. *Journal of Applied Psychology*, 86 (3): 513-524.
- González-Serrano, M.H., Valantine, I., Pérez-Campos, C., Aguado, S., Calabuig, F. and Crespo-Hervás, J. (2016). The influence of gender and academic training in the entrepreneurial intention of physical activity and sport sciences students. *Intangible Capital*, 12(3), 759-788.
- González-Serrano, M.H., Valantine, I., Crespo-Hervás, J., Pérez-Campos, C, Calabuig, F. (2018). Sports university education and entrepreneurial intentions: A comparison between Spain and Lithuania, *Education + Training*, 60 (5), 389-405
- Hagger, M. S., Chatzisarantis, N. L. D., Barkoukis, V.,

- Wang, J. C. K., Hein, V., Pihu, M., & Karsai, I. (2007). Cross-cultural generalizability of the theory of planned behavior among young people in a physical activity context. *Journal of Sport & Exercise Psychology*, 29, 1-20.
- Harris, M.L. and Gibson, S.G. (2008). Examining the entrepreneurial attitudes of US business students. *Education & Training*, 50 (7), 568-81.
- Heilman, M.E. (2001). Description and prescription: How gender stereotypes prevent women's ascent up the organizational ladder. *Journal of Social Issues*, 57, 657-674.
- Hofstede, G. (1980). *Culture's consequences: International differences in work related values*. Beverly Hills, CA: Sage.
- Hofstede, G. J. (2000). Organizational culture: siren or sea cow? A reply to Dianne Lewis. *Strategic Change*, 9(2), 135-137.
- Hofstede, G., Noorderhaven, N., Thurik, A.R., Uhlander, L.M., Wennekers, A.R.M. and Wildeman, R.E. (2004), "Culture's role in entrepreneurship: self-employment out of dissatisfaction", in Brown, T.E. and Ulijn, J.M. (Eds), *Innovation, Entrepreneurship and Culture*, Edward Elgar, Cheltenham, pp. 162-203.
- Hofstede, G., Hofstede, G. J., & Minkov, M. (2005). *Cultures and Organizations: Software of the Mind*. McGraw-Hill. New York, NY.
- House, R. J., Hanges, P. J., Javidan, M., Dorfman, P. W., & Gupta, V. (Eds.). (2004). *Culture, leadership, and organizations: The GLOBE study of 62 societies*. Sage publications.
- Hughes, D. J., Furnham, A., & Batey, M.(2013). The structure and personality predictors of self-rated creativity. *Thinking Skills and Creativity*, 9, 76-84.
- Hunt, S. and Levie, J. (2003), *Culture as a Predictor of Entrepreneurial Activity*. Babson College, Wellesley, MA.
- Hurt, T. H., Joseph, K., & Cook, C. D. (1977). Scales for the measurement of innovativeness. *Human Communication Research*, 4(1), 58-65.
- Jaén, I., Fernández-Serrano, J., Santos, F.J. and Liñán, F. (2017), "Cultural values and social entrepreneurship: a cross-country efficiency analysis", in Peris-Ortiz, M., Teulon, F. and Bonet Fernández, D. (Eds), *Social Entrepreneurship in Non-Profit and Profit Sectors*, Springer International Publishing, Gewerbestrasse, pp. 31-51.
- Johan, W. & Dean, S. (2003). Knowledge-based resources, entrepreneurial orientation, and the performance of small and medium-sized businesses. *Strategic Management Journal*, 24(13), 1307-14.
- Kreiser, P.M., Marino, D.L., Dickson, P., & Weaver, K.M. (2010). Cultural influences on entrepreneurial orientation: The impact of national culture on risk taking and proactiveness in SMEs. *Entrepreneurship Theory and Practice*, 34(5), 959-983.
- Krueger, N.F., Reilly, M.D. and Carsrud, A.L. (2000), "Competing models of entrepreneurial intentions", *Journal of Business Venturing*, 15(5/6), 411-432.
- Langkamp-Bolton, D. & Lane, M.D (2011). Individual entrepreneurial orientation: development of a measurement instrument. *Education + Training*, 54 (2/3), 219-233.
- Levenburg, N. & Schwarz, T. (2008). Entrepreneurial orientation among the youth of India: the impact of culture, education and environment. *The Journal of Entrepreneurship*, 17(1), 15-35.
- Liñán, F., Nabi, G. and Krueger, N. (2013). British and Spanish entrepreneurial intentions: a comparative study. *Revista de Economía Mundial*, 33, 73-103.
- Liñán, F. and Fayolle, A. (2015). A systematic literature review on entrepreneurial intentions: citation, thematic analyses, and research agenda. *International Entrepreneurship and Management Journal*, 11(4).
- Lumpkin, G. T., & Dess, G. G. (2001). Linking two dimensions of entrepreneurial orientation to firm performance: The moderating role of environment and industry life cycle. *Journal of Business Venturing*, 16(5), 429-451. doi:10.1016/S0883-9026(00)00048-3
- Macko, A. and Tyszka, T. (2009). Entrepreneurship and risk taking. *Applied Psychology: An International Review*, 58(3), 469-87.
- McGrath, R., MacMillan, I., & Scheinberg, S. (1992). Elitists, risk-takers, and rugged individualists? An exploratory analysis of cultural differences between entrepreneurs and non-entrepreneurs. *Journal of Business Venturing*, 7(2), 115-135.
- Meek, W.R., Pacheco, D.F. and York, J.G. (2010). The impact of social norms on entrepreneurial action: evidence from the environmental entrepreneurship context. *Journal of Business Venturing*, 25(5), 493-509.
- Moreno, A. and Casillas, J. (2008). Entrepreneurial orientation and growth of SMEs: a causal model. *Entrepreneurship Theory and Practice*, 32(3), 507-28.
- Moriano, J.A., Gorgievski, M., Laguna, M., Stephan, U. and Zarafshani, K. (2012). A cross-cultural approach to understanding entrepreneurial intention. *Journal of Career Development*, 39 (2), 162-185.
- Morris, M., Davis, D. & Allen, J. (1994). Fostering corporate entrepreneurship: Cross-cultural comparisons of the importance of individualism versus collectivism. *Journal of International Business Studies*, 25(1): 65-89.
- Mueller, S.L., Thomas, A.S. and Jaeger, A.M. (2002). *National entrepreneurial potential: the role of culture, economic development and political history*, in Hitt, M.A. and Cheng, J.L.C. (Eds), *Managing Transnational Firms: Resources, Market Entry and Strategic Alliances*, JAI Press, Amsterdam, pp. 221-257
- Patterson, F. (1999). *Innovation Potential Predictor*. Oxford: Oxford Psychologist Press.
- Pecis, L. (2016). Doing and undoing gender in innovation: Femininities and masculinities in innovation processes. *Human Relations*, 69(11), 2117-2140.
- Pinillos Costa, M.J. and Reyes Recio, L.E. (2007), "Influencia de la cultura individualista-colectivista en la

creación de empresas”, available at: <https://dialnet.unirioja.es/servlet/articulo?codigo=2487541>.

Pruett, M., Shinnar, R., Toney, G., Llopis, F. and Fox, J. (2009). Explaining entrepreneurial intentions of university students: a cross-cultural study. *International Journal of Entrepreneurial Behavior & Research*, 15 (6), 571-594

Roberts, L. & Robinson, P. (2010). Home-based entrepreneurs, commercial entrepreneurs and white-collar workers: a comparative study of attitudes toward self-esteem, personal control and business growth. *Journal of Small Business and Entrepreneurship*, 23(3), pp. 333-53.

Rogers, E. M., & Shoemaker, F. F. (1971). *Communication of Innovations; A Cross-Cultural Approach*.

Sánchez, J.C. (2010). Social learning and entrepreneurial intentions: a comparative study between Mexico, Spain and Portugal”, *Revista Latinoamericana de Psicología*, 41(1), 109-120

Sandberg, B., Hurmerinta, L., & Zettinig, P. (2013). Highly innovative and extremely entrepreneurial individuals: what are these rare birds made of? *European Journal of Innovation Management*, 16(2), 227–242.

Schein, F.H. (1985). *Organizational Culture and Leadership: A Dynamic View*. San Francisco: Jossey-Bass.

Schumpeter, J. (1934). *The Theory of Economic Development*. Cambridge, MA: Harvard University Press.

Scott, S. G., & Bruce, R. A. (1994). Determinants of innovative behavior: a path model of individual innovation in the workplace. *Academy of Management Journal*, 37(3), 580–607.

Schlaegel, C., He, X., & Engle, R. L. (2013). The direct and indirect influences of national culture on entrepreneurial intentions: A fourteen nation study. *International Journal of Management*, 30(2), 597.

Soares, A.M., Farhangmehr, M. and Shoham, A. (2007). Hofstede’s dimensions of culture in international marketing

studies. *Journal of Business Research*, 60(3), 277-284.

Stewart, W.H., Watson, W.E., Carland, J.C., & Carland, J.W. (1999). A proclivity for entrepreneurship: A comparison of entrepreneurs, small business owners, and corporate managers. *Journal of Small Business Venturing*, 14, 189-214.

Thomas, A.S. and Mueller, S.L. (2000). A case for comparative entrepreneurship: assessing the relevance of culture. *Journal of International Business Studies*, 31(2), 287-301.

Thompson, E. R. (2009). Individual entrepreneurial intent: Construct clarification and development of an internationally reliable metric. *Entrepreneurship Theory and Practice*, 33(3), 669-694.

Timmons, J. (1990). *New Venture Creation: Entrepreneurship in the 1990s* (3rd ed.). Homewood, IL: Irwin.

Thornton, P. H., Ribeiro-Soriano, D., & Urbano, D. (2011). Socio-cultural factors and entrepreneurial activity: An overview. *International Small Business Journal*, 29 (2), 105-118,

Triandis, H.C. (2004), “The many dimensions of culture”, *The Academy of Management Executive*, 18 (1), pp. 88-93.

West, M. A., & Wallace, M. (1991). Innovation in health care teams. *European Journal of Social Psychology*, 21(4), 303-315.

Zahra, S. (2005). Entrepreneurial risk taking in family firms. *Family Business Review*, 18(1), 23–40.

Zampetakis, L.A., Kafetsios, K., Bouranta, N., Dewett, T. & Moustakis, V.S. (2009). On the relationship between emotional intelligence and entrepreneurial attitudes and intentions. *International Journal of Entrepreneurial Behaviour & Research*, 15(6), pp. 595-618.

A Case of Thai Fabric Purchase Decisions in Government Saving Bank's Employees

Thanakon Ratchatakulpat, Rajamangala University of Technology Phra Nakhon, Thailand
 Rattanavalee Maisak, Rajamangala University of Technology Phra Nakhon, Thailand
 Aradchariya Phuangthong, Rajamangala University of Technology Phra Nakhon, Thailand
 Thanaphon Ratchatakulpat, Rajamangala University of Technology Phra Nakhon, Thailand
 Sirikarn Tirasuwanvasee, Rajamangala University of Technology Phra Nakhon, Thailand
 Maneerat Ratchatakulpat, Rajamangala University of Technology Phra Nakhon, Thailand

Thai fabrics are a unique cultural heritage which inherited for a long time. Thai fabrics in ASEAN countries, it has been recognized around the world for its beauty and quality of silk. Besides the beauty of Thai fabrics and the characteristics of various patterns that are distinctive and unique, it is also historical evidence for indicative of culture tradition (Saisaard, 2016). Thai identity would be conveyed to appear in various patterns on Thai fabrics such as Thai patterns, geometric flowers, animal figures, and many local symbols are conveyed by weaving on the fabric. By the craftsmanship and wisdom of Thai villagers, such patterns are delicate, beautiful and wearer feels comfortable, elegant, charming and retains the uniqueness of Thai. Therefore, worthy of conservation and wear, It can be worn by all genders, ages, and Any places. Thai silk designed to be modern, comfortable to wear, suitable for daily use. However, if used it at work that could reflects the social status due to the design including the sewing method. These will be formal and elegant (Cloth Museum in the Queen Sirikit, 2020).

Government Savings Bank was born by the wishes of his Majesty King Mongkut. King Rama VI, in addition to acting as a financial institution for the country saving and determined to carry out the duties of continuation, creation, and social development in all aspects. It is committed to being a bank for all the community and society. Therefore, the bank has developed various projects for the development, support and conservation of Thai such as promoting and preserving Thai traditional. The Bank has a policy to encourage employees to wear Thai cloth in specified month such as the anniversary month of the establishment of the Government Savings Bank and the month that have the important festivals of Thailand (Government Savings Bank, 2022).

The problems that manufacturer can't distribute products widely and the big event only once a year according to the product category in Thai traditional. However, they also do sale online and social media channel still resulting in

insufficient income for small business. Regarding to this problem, the researcher is interested in studying the factors of marketing mix and purchasing decisions of Thai fabrics in order to obtain the results of the study to be used as information to promote and some solution of Thai fabric producers and consumers more precisely.

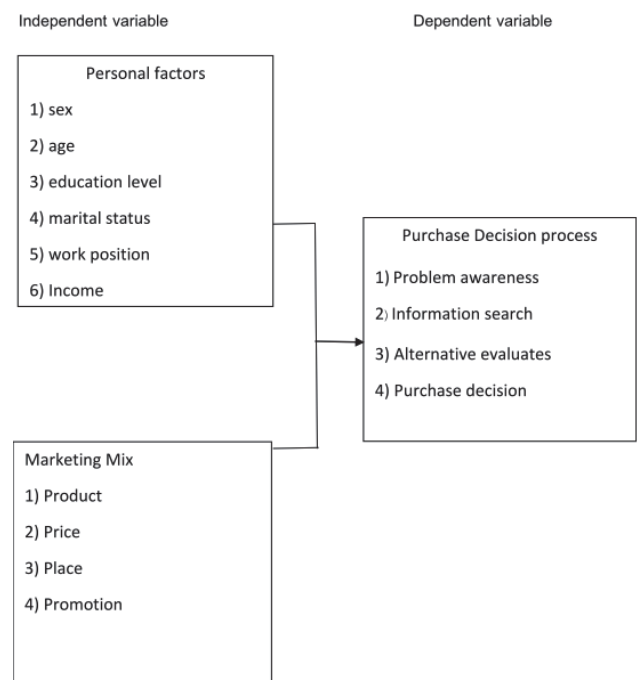


Figure 1. The Research framework

Research objectives are firstly comparison the purchasing decisions of Thai Fabric products by personal factor of the Government Savings Bank employees. Classified by personal factor. Secondly, study marketing mix factors that affect the purchasing decision to buy Thai fabrics of the Government Savings Bank employees. According to objective, the first hypothesis is Different personal factors

have affected the purchase decision of Thai fabrics differently for the Government Savings Bank employees. Second hypothesis is marketing mix factors affecting the purchasing decision of Thai fabrics for Government Savings Bank employees. Research Benefits consider that the outcomes will be key guideline information that entrepreneurs can use in the implementation of the Thai fabric business to meet the needs of the target group and generate more profit and sustainable business in long run. Moreover, the research result can be used to develop and improve the marketing plan of the Thai fabric business more effectively and expand the market.

Research consider literature review on conception of personal factors, marketing mix and Decision process. Sereerat (2015) defined personal factors consisting of age, sex, marital status, income, occupation, educational level. These elements are popular criteria used in marketing segmentation and measurable statistics of the population can help determine the market of the target audience and make them easier to measure than other variables. Kotler (2018) stated that the marketing mix refers to social and administrative processes which individuals or groups are met as needed by creating, offering and exchanging. It consists with product, price, place and promotion. Schwartz (2020) mention decision process that even consumers are different and they have different needs, but consumers have similar decision-making styles. The purchase decision-process is divided into 4 steps which are problem awareness, information search, alternative evaluation and purchase decision.

The research methodology considers a quantitative with statistical analysis by SPSS program software. Regarding to research population of total Government Saving bank employees are 15,366 employees Government savings bank. (2020), these apply the Yamane formula to define the sample size and the results of sample size is 400 samples (Silcharu, 2020). By using random quota data collection according, the chain of command of the Government Savings Bank office according to GSB management system. GSB has total 18 Chain of command and each Chain of command has 7 Districts. However, each district has a different number of branches according to the size of the district in each Chain of command. Those include the total number of branches nationwide as 1,055 branches, details as in Table sampling data collection by Quota. A questionnaire was the tool to gather the respondents' data. The data were analyzed by using frequency, percentage, mean, and standard deviation, t-test (Independent samples), F-test (One-Way ANOVA), LSD (Least Significant Difference), and Pearson's correlation coefficient at the 0.05 significance level.

The results revealed that the sample group consisted of 400 people, mostly 62.5 percent female, aged 41-50 years, 39.3%, marital status, 78.3%, bachelor's degree, 63.0%, staff position at operating level, 34.3% and monthly income 20,001 - 30,000 baht/month 40.5% .

Table sampling data collection by Quota

No	Government Saving Bank (Chain of command)	Government Saving Bank (District)	Branch (Ratio)%	Random by Quota (Number of Branches)	Branch Quota (Number of Staffs)
1	GSB 1	4	48 (4.54%)	18	18
2	GSB 2	6	64 (6%)	24	24
3	GSB 3	4	46 (4.36%)	18	18
4	GSB 4	4	46 (4.36%)	18	18
5	GSB 5	5	63 (5.97%)	24	24
6	GSB 6	5	61 (5.78%)	24	24
7	GSB 7	6	57 (5.4%)	21	21
8	GSB8	4	51 (4.83%)	20	20
9	GSB 9	5	58 (5.49%)	22	22
10	GSB 10	8	64 (6%)	24	24
11	GSB 1	7	73 (6.91%)	27	27
12	GSB 12	6	64 (6%)	24	24
13	GSB 13	5	52 (4.9%)	20	20
14	GSB 14	6	61 (5.78%)	23	23
15	GSB 15	9	88 (8.34%)	33	33
16	GSB 16	6	64 (6%)	24	24
17	GSB 17	5	52 (4.92%)	20	20
18	GSB 18	4	43 (4.0%)	16	16
Total		99 District	1,055 Branch	400 Branch	400 Staffs

The outcome of data on factors of Thai fabric market mix found that overall employees of the Government Savings Bank had opinions on the factors of Thai fabric marketing mix. at the highest level which has an average of 4.36 when considering each aspect, the most valuable component was price with an average of 4.53, followed by products with an average of 4.45, distribution with an average of 4.30, and the least valuable was marketing promotion with an average of 4.15.

The study on purchasing decision of Thai fabric products of Government Savings Bank employees found that overall, GSB employees made decisions about purchasing Thai fabric products. at the highest level which has an average of 4.48 when considering each aspect, the most valuable component was problem perception with an average of 4.61, followed by data searching with an average of 4.56. and purchase decision with a mean of 4.48 and the lowest value was the evaluation of alternatives having a mean of 4.28

The hypothesis testing on first Hypothesis show that Different personal factors have affected the purchase decision of Thai fabrics differently for the Government Savings Bank employees. Classified by personal factors, it was found that GSB employees with different gender, age, marital status, job position and monthly income had different levels of purchasing decisions of Thai cloth products. overall no difference therefore not in accordance with the assumptions set. The results of the second hypothesis testing indicate that marketing mix factors affecting the purchasing decision of Thai fabrics for Government Savings Bank. With the decision to buy Thai fabrics of the Government Savings Bank employees, it was found that the overall marketing mix factors It was a factor affecting the decision to buy Thai fabrics of the Government Savings Bank employees at a high level ($r=.790$) when considering each aspect of the marketing mix. Product aspect ($r=.782$), price ($r=.782$) and distribution aspect ($r=.709$) are factors affecting employees' purchasing decisions of Thai fabrics. at a high level as for marketing promotion ($r=.484$), the effect was at a moderate level.

Discussion and recommendation, Thai Fabric business

have to aware of the purchase decision from employees of the Government Savings Bank which entrepreneurs can use in planning to promote marketing strategies and marketing activities to meet the needs of consumers more. They can bring the strengths that consumers are consider the most important on Thai Fabric and put into manage and adjust it into a strategy. This would result more advantage to compete with competitors and stimulate increase more sales

In terms of products, it was found that employees of the Government Savings Bank had demands in terms of product quality. durability Products that are exquisite, beautiful, do not stretch, do not shrink, bright colors, durable, do not fade. Therefore, manufacturers should produce them with meticulousness, using quality raw materials. Because most of Thai fabric products are quite expensive. Government Savings Bank employees have expectations in detail of product and quality therefore a necessity that entrepreneurs must consider seriously.

Prices issue, Government Savings Bank employees expect to set prices that are suitable for the quality of raw materials, beauty, patterns, and product prices are clearly specified. Therefore, entrepreneurs should set guidelines for setting prices in each product category and be specified. clearly the price of the product to build confidence for consumers

Distribution consideration, Government Savings Bank employees expect it to be widely available for purchase. Products are wildly arranged so that they can be easily selected. Therefore, entrepreneurs have to try to expand their distribution to cover as many consumer groups as possible, such as Modern Trade Exhibition Center and online channel of distribution as well as use of social media as online store. Those should provide a variety of Thai fabric products that are integrated in the same place for convenience in purchasing products

Promotion aspect, marketing promotions could consider trade fairs and exhibition event with special discounting. Moreover, entrepreneur should provide special offer in Thai tradition events festivals. Those would increase more public relation to see the value and create a positive attitude towards Thai fabric products. The atmosphere of retail shop and attitude of sell person have to provide more friendly and lovely welcome such as smiling, good-natured, taking care of customers.

According to research results, it was found that the marketing mix factor was a factor affecting the purchasing decision of the Government Savings Bank employees at a high level ($r = .790$). Therefore, Thai Fabric entrepreneurs have to try to complete range of products, ordering, and multiple payment channels, service accuracy, sale promotions such as price reductions, free gifts which those method have affected the perception of adjustment. that Entrepreneurs should focus on consumer marketing strategies because the purchase decision-making factor will lead the consumer to a positive memory and a chance to come back and buy again

References

Cloth Museum in the Queen Sirikit. (2020). History of Thai fabrics. Phiphat Hall in the Royal Palace, Grand Palace Subdistrict, Phra Nakhon District, Bangkok. Reference from www.asmtthailand.org/

Government savings bank. (2020). Annual Report of the Government Savings Bank. Bangkok: Government Savings Bank.

Government savings bank. (2022). History of the Bank. Retrieved from www.gsb.or.th/about/index.php. February 12, 2022.

Kotler, P. (2018). Marketing Management: Analysis, Planning, Implement, and Control. (9th ed.), Prentice-Hall, Inc.

Saisaard, O. (2016). "The values and buying behavior of Thai consumers in the province.

Ubon Ratchathani, Cambodians in Siem Reap Province and Lao people in Chana Somboon City", Sri Wanalai Research Journal, Vol. 4, No. 7 (January-June 2016) : pages 58-64.

Schwartz. A. (2020). Organizational behavior: Human behavior at work. New York: McGraw-Hill.

Sereerat, S. (2015). Marketing principles. Bangkok: Thirafilm and SITEX.

Silcharu, T (2020). Statistical Research and Analysis with SPSS and AMOS. Bangkok: Business R&D Ordinary Partnership.

The influence of Environmental Taxes on Sustainability in Germany and the European Union

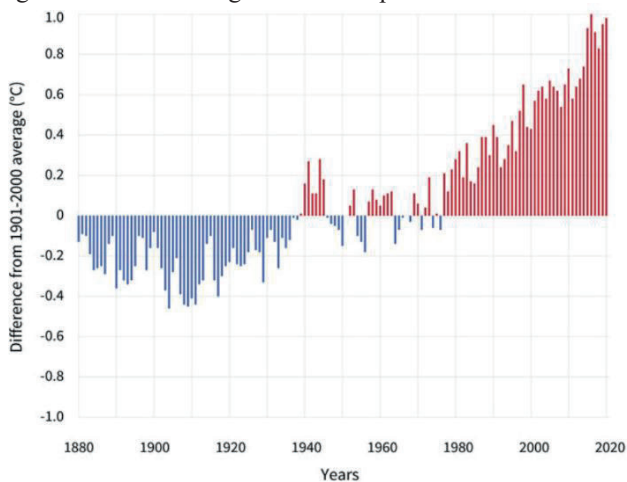
Rainer Wehner, University Applied Sciences Würzburg-Schweinfurt, Würzburg, Germany
Emin Akcaoglu, Manisa Celal Bayar University, Manisa, Turkey

Global warming, floodings and wildfires are just some results of the environmental damages caused by an unsustainable behaviour in the last decades. The fact that neither companies nor the public will change their behaviour voluntarily forces governments to act and tackle the problem. In this regard taxation could be a powerful tool for governments to make people think and act more sustainable. However, the implementation of i.e. environmental taxes to foster sustainability requires careful consideration, as past examples have shown that behavioural change did not necessarily contribute to sustainability.

Introduction

The earth has faced particularly severe environmental sustainability issues over the time. Climate change is considered one of the most important challenges nowadays (Lindsey, Dahlmann 2022).

Figure 1: Global average surface temperature



Scientists have confirmed that global warming is mainly caused by human activity. Especially the burning of fossil fuels like coal, oil and gas causes the rise of the average global temperature. The consequences are various and from

year to year more devastating. Floodings, wildfires and the aridisation of huge landscapes are just some examples that show us, how far we already went and that we cannot continue our behaviour. Besides the problem with the fossil fuels the progressive deforestation causes another big problem. As we release carbon dioxide into the atmosphere, we concurrently harm the forests, which are the best-existing natural carbon banks. On top of that the aging global population and the rapidly depleting natural sources are making sustainability more urgent than ever before. (Union of Concerned Scientists, 2021). But what can be done to convince companies as well as the public to behave in a more sustainable way. As voluntary approaches doesn't seem to work, it is the role of the governments to impose sanctions and make the people rethink about their behaviour. One of the most powerful measures of governments to steer into a particular direction are the introduction of taxes. In this context this research paper deals with the question: *Are environmental taxes suitable to foster a sustainable behaviour in the European Union and in Germany?*

To answer this question a scoping literature review was conducted to get a general overview over the actual situation.

Sustainability and environmental taxes

Sustainability is the buzzword of the last decade. Nearly every company is advertising it's products or services as sustainable, even if they are ways behind a sustainable behaviour. Therefore the basic meaning of sustainability is explained and why governments, companies and the public have to pay more attention to this matter? In 1987 the United Nations Brundtland Commission defined sustainability as "meeting the needs of the present without compromising the ability of future generations to meet their own needs" (United Nations 1987). Today, there are nearly 140 developing countries worldwide who are trying to find ways to meet their development needs. Due to the increasing threat of climate change, concrete measures must be taken to make sure that the future is not negatively impacted by the present society's behaviour. Therefore sustainability is not just related to the environment, it is a holistic approach that considers ecological, social and economic matters in the

same way. (United Nations, 2005).

The three pillars of sustainability

To guarantee the balance of sustainability, it is essential to consider the three major pillars of sustainability, each depending on the other to ensure the welfare of humanity, earth, and economy on a long-term basis.

Environmental Sustainability: To maintain natural resources, keep a healthy balance for the ecosystem and consequently, ensure longevity for the future, interacting with responsibility towards the planet.

Economic Sustainability: To achieve long-term economic stability by taking the right business decisions while ensuring to not harm social, environmental, and cultural elements.

Social Sustainability: Universal human rights and basic necessities are attainable by all people, who have access to enough resources in order to keep their families and communities healthy and secure. (McGill University, 2013, p. 2).

Reasons to implement environmental taxes

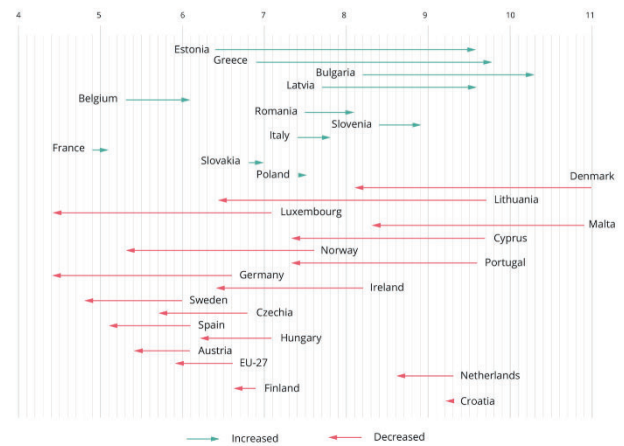
To achieve a more sustainable behaviour among people, companies and also governments, a change of their attitudes is necessary. If governments are convinced that things have to change they have the resources and the power to influence the behavioural change by implementing appropriate tax measures. Such a tax can work in two ways, first as a stimulus for environmentally friendly activities and second as a penalty for unsustainable actions. As a matter of fact, such implementations are inevitably affecting both citizens and businesses. Subsequently, it is necessary communicate its impact on personal income levels in a clear manner, but also allow businesses to keep growing, generating revenue, and making investments, while to operate in an environmentally friendly manner (Bish, 2020).

In a jointly developed declaration by Eurostat, the European Commission, the Organization for Economic Cooperation and Development (OECD) and the International Energy Agency (IEA) in 1997, the group defined environmental taxes as "those whose tax base consists of a physical unit (or similar) of some material that has a negative, verified and specific impact on the environment" (Iberdrola, 2022). In other words: Those who pollute have to pay, others who act responsible not. Nevertheless the implantation of environmental taxes can also have a lot of positive effects. Besides energy saving and the use of renewable sources, they can motivate companies to innovate towards sustainability, and lastly, generating revenue for governments to carry out environmental projects. The transaction to a climate-neutral economy by 2050 and European Green Deal's goal to reach a net reduction of greenhouse gas emission by 55 percent by 2030 can be supported by generating revenues from environmental taxes

(Iberdrola, 2022).

A study of the trends in generating environmental taxes among the 27 EU Member States (EU-27) shows, that the revenues during the last two decades increased by 18%. However, this growth was less than the increase in GDP (26%) and total tax revenues (31%). (European Environment Agency, 2022)

Figure 2: Trend of environmental tax revenues in EU-27, EU Member States and Norway (2002-2019). Share of environmental tax revenue including social contribution (in percent)



Between 2002 and 2019, some of the European countries have shown an increase in their share of environmental tax revenues, while others have seen a decrease. Despite demands for more environmental taxes at national, European, and global levels, execution has been very unhurried. In the EU, environmental taxes account for 5.9 percent of total taxes, less than the 6.6 percent almost 20 years ago, taking into consideration variations from country to country (European Environment Agency, 2022). Consequently, many experts in this field and international organizations such as the OECD or the European Commission criticize the lack of commitment to environmental taxation in many countries and urge them to impose environmental taxes (Iberdrola, 2022).

Related to that, the United Nations Development Programme (UNDP) has introduced the Sustainable Development Goals (SDGs), adopted by the United Nations in 2015 and integrated 17 SDGs with the intention to create a sustainable balance between social, economic, and environmental areas. Within those SDGs, the UNDP is pursuing different targets, i.e. to end poverty, protect the planet and fight discrimination.

After a closer look at the SDGs environmental taxes positively affect at least 5 of them. For example: SDG 11 - Sustainable cities and communities, SDG 12 - Responsible Consumption and production, SDG 13 - Climate action, SDG 14 - Life Below Water and SDG 15 - Life on Land (United

Nations Development Programme, 2022).

Introducing environmental taxes

In order to achieve the most efficient results from environmental taxes for sustainability, several factors need to be considered in the implementation process. Experiences in the past have shown, that poorly designed taxes can result in a reduced sustainability effect and in increased economic costs, consequently, leading to opposite effects.

First, the addressor of the tax needs to be identified. The environmental tax should be levied as directly as possible on the person or organization that causes the damage. If the tax can be attributed directly to the polluting activity it can serve as a measurable incentive to reduce the cost and thus the tax burden. For instance, this incentive can encourage businesses to implement cleaner production processes, or to develop fewer pollution-triggering products, which can be measured according to the amount of emissions released to the environment. On top of that, specifying the tax rate on goods that fall under the same category is crucial as the intended goal is to improve sustainability (Braathen, Greene 2011, p. 4). Therefore it is very important to identify the individual goods that are subject to tax to avoid an inefficient taxation.

Designers of environmental taxes should also draw into account that the scope of the tax should cover the scope of the environmental damage. This could sometimes be difficult because of the range of the pollution. While it is unproblematic to tax the pollution of soil or a lake on a local level, the emission of greenhouse gas is a global concern that does not substantially differ from municipality to municipality, as the emissions result in atmospheric changes that influences our planet holistically. In this case, imposing a global tax would be more effective since it covers a broad range of businesses and households worldwide (Braathen, Greene, 2011, pp. 5-6).

Environmental taxes should furthermore apply uniformly. If the countries stay united and the tax is linked to the scope of pollution there is the same incentive in every country for ablation. Furthermore there is no sense in relocating the company to another country to avoid such taxes.

Another serious aspect of implementing environmental taxes are the structural reactions of the public, whether they are short-term or long-term. If an environmental tax should have an influence on the sustainable behaviour long-term reactions, like a change of the company's investment culture or a change in the consumers purchasing habits, have to be achieved. Changes are depending on the producers' or consumers' long-term views and expectations about prices. Thus, implementing an environmental tax to convince the public to change their behaviour in the long run, the policy must be credible. People need to trust their governments that they do the right thing by implementing such a tax. For this reason an open communication as well as transparent,

reliable information is necessary (Braathen, Greene, 2011, pp. 6-7).

After setting the tax rate, other factors need to be taken into consideration such as inflation, economic growth, society's changing preferences for sustainable protection, and the impact of future innovation on the cost of pollution reduction. Crucial is, to have a transparent process of updating tax rates, so that the public can be aware of potential determinants and the time of future modifications (Braathen, Greene, 2011, p. 7). As an example, Denmark established a system where excise taxes on environmentally related issues are transparently discussed and thus ad-hoc adjustments could be done (Jacobsen, Wier, 2001, p. 1).

Utilizing the generated tax revenue

Generally, environmentally related taxes that were imposed in the past did not raise a lot of revenue for governments.

Figure 3: Revenues from environmentally related taxes in per cent of GDP, by tax base in 2000

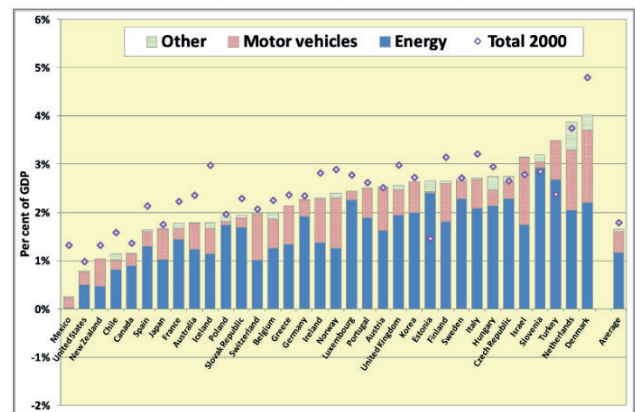


Figure 3 shows the percentage of environmental taxes on the GDP. All in all in the year 2019 approximately five percent of total tax revenues in OECD countries came from environmentally related taxes. Based on that figures the costs of the environmental damage caused by the polluters cannot be covered. (Braathen, Greene, 2011, pp. 7-8). On top of that, governments are not able to spend money for alternative energy programmes and give incentives to those companies and private persons who are willing to change their behaviour and act in a more sustainable way. As a consequence the environmental tax rates in the countries need to be increased to generate more revenue. This money should be used directly in the affected sector, to compensate the costs of the environmental damage, to motivate the industry and the public to reduce their carbon footprint as well as investing into innovative technologies.

Challenges of implementing environmental taxes

Imposing environmental related taxes can raise concerns to particular groups in the economy and the society. Thus, distributional concerns need to be addressed directly. As an example, low-income households may suffer the most from a tax increase on water or energy usage. Because of that, one of the first approaches is generally to reduce the tax burden on certain segments of society. There are different ways this can occur. One way is to exempt such households from the tax (Braathen, 2013, p. 1). Another alternative is to reduce the rate to economically depressed regions, such as the reduction of duties on natural gas for Southern Italy. Furthermore, the government might impose a progressive rate which is based on the amount consumed (Braathen, Greene, 2011, p. 9).

One of the biggest challenges is the competitiveness among businesses. The basic intention of imposing an environmental tax to companies is to make them reconsider their current production decisions and to move towards to more sustainable practices. Higher production costs however might encourage companies to relocate their production to a lower-taxed region in order stay competitive. This is the problem of the uncoordinated implementation of taxes. Some countries might use this situation as an advantage to attract such relocations. In return they accept a higher level of pollution (Braathen, Greene, 2011, p. 10).

At the end of the day the societal acceptance of environmental taxes is rising or falling with the trust against the government. Moreover big multinationals will argue with stakeholder value and may lobby tremendously against environmental taxes. The problem of the past, either in the companies or in the public was a lack of transparent communication and senseful actions from the governments. People had the feeling, that the money generated by environmental taxes is percolating somewhere in the household. Nevertheless, governments have a profound influence on the behavioural change by introducing fair and equitable sustainable tax measures which incentivise environmental friendly and punish environmental unfriendly behaviour (Hogan 2021).

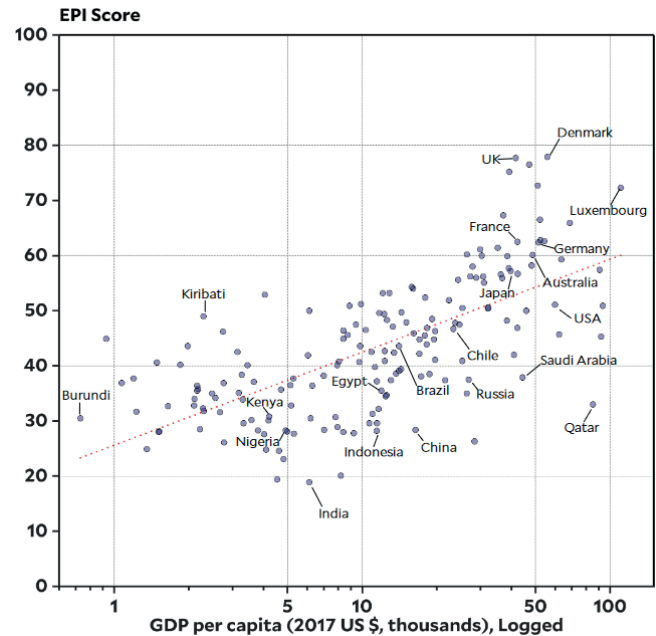
Taking all aspects into consideration the introduction of environmental taxes is mainly depending on a clear structure and a transparent communication. Companies and the public need to know exactly i.e. how the revenues are generated and what the money is used for. If the people have the feeling that the process is fair and equitable they will accept the taxes and change their behaviour to avoid them.

Successful implementation of environmental taxes

To get an overview over the global situation regarding sustainability, the Environmental Performance Index (EPI)

is an appropriate instrument to indicate the state of sustainability in each country. The 2022 Environmental Performance Index (EPI) provides a data-driven summary of the state of sustainability around the world. Using 40 performance indicators across 11 issue categories, the EPI ranks 180 countries on their progress toward improving environmental health, protecting ecosystem vitality, and mitigating climate change. The EPI offers a scorecard that highlights leaders and latecomers in environmental performance and provides practical guidance for countries that aspire to move toward a sustainable future. Having a closer look at the EPI 2022, it shows, that the top 24 countries are European countries (Yale, 2022, p. XII). Remarkable is furthermore that richer countries seem to be more sustainable than developing countries. This could be the outcome of a higher status of the environment paired with concrete investments into environmental friendly processes like the circular economy. In Denmark i.e. 30 percent of the energy supply comes from renewable energies. By 2050 it is planned to be already 100 percent (Lena, 2021).

Figure 4: Environmental Performance Index score 2022 (Yale, 2022, p. X)



The sustainability of the countries is furthermore supported by agreements between the countries, like the Kyoto Protocol or the Paris Agreement, which has been in force since 2016. Until today 191 countries have signed the declaration to limit global warming to 1.5 degrees. Furthermore, greenhouse gas neutrality is to be achieved in the second half of the 21st century, the countries' abilities to deal with the effects of climate change should be strengthened and the financial flows are to be directed

towards a sustainable economy (United Nations, n.d.).

The EU Green Deal

The European Union (EU) has set itself the goal of achieving climate neutrality by 2050, thereby fulfilling its obligations under the Paris Agreement. To this end, the EU wants to implement an economic change that should be cost-efficient and socially balanced. The project was launched by the EU Commission in December 2019 as the “European Green Deal” and will address the following key areas: climate, environment, energy, transport, industry, agriculture, sustainable finance, sustainable development (European Commission, 2022).

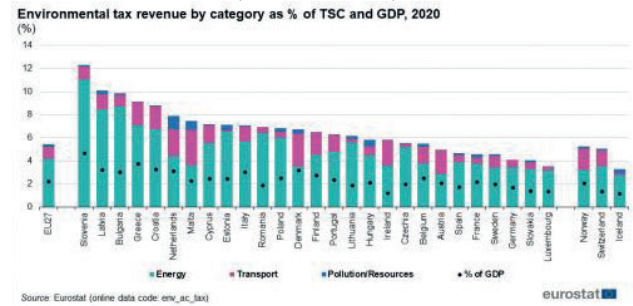
The regulation on the European climate law to achieve climate neutrality by 2050 has become a legal obligation for all member states. European industry should take the lead in the transition to climate neutrality. This should be seen as an accelerator and pioneer for change, innovation, growth and at the same time, increase Europe's competitiveness. It is important to the EU Commission that the transition by 2050 is fair. For example, some member states are more dependent on fossil fuels or have carbon-intensive industries employing significant numbers of people. (European Council, 2022).

The EU Green Deal includes also regulations for the revision of the Energy Tax Directive (ETD) and a Carbon Border Adjustment Mechanism. Both regulations are significantly important for a consistent and fair environmental taxation in the EU member countries. Especially the ETD that lays down EU rules for the taxation of the all kind of energy needed a revision. After multiple changes in the EU climate policy over the years it turned out, that the ETD regulation from 2003 was no longer in line with the EU internal market and climate objectives. With the new tax directive the EU reacted on plenty of misleading regulations and brought the environmental tax system in line with the EU climate and energy policy. Thus the EU created a solid base for all European nations to adjust their national environmental tax laws.

Environmental taxes in Germany

Environmental taxes in Germany are not really efficient, therefore the share of environmental taxes of the total tax revenue in Germany is extremely low. According to a statistics from Eurostat that has recently be published the percentage of the environmental taxes dropped from 2019 with 4.2 percent to 4.1 percent in 2020. Contrary to the myth that environmental and climate protection makes 'everything more expensive', the share of environmental taxes in public revenues has been declining for almost two decades. In 2021, it was reported a historic low of 3.7 percent. Except of Slovakia and Luxemburg, all other European countries had higher environmental taxes in 2020 (FÖS, 2022)

Figure 5: Environmental tax revenue by category as % of TSC and GDP, 2020 (Eurostat, 2022)



Germany is a really bad example for environmental taxation because the revenues from the taxes cover only a fraction of the costs that are needed to fix the environmental and the health damage. Furthermore the tax and levy system is so imprecise that most of the people are unaware what is being taxed and how the system is working. For this reason the German environmental tax system provides too little incentive to reduce environmental pollution and resource consumption. The system rather causes inequality because the costs are not covered by those who cause them. Polluters currently pay less than 20 percent of the real costs of damage to the environment and health through environmental taxes. 80 percent are solidarized to the tax payers or to future generations (FÖS, 2022). This situation shows that the German environmental tax system urgently needs to be reformed to comply with the European tax regulations. Environmental taxes should be perceived as fair, they should charge the polluter and in primarily they should motivate the people to deal responsible with resources and use less.

In this context the Circular Economy in Germany needs to be closer examined. Germany is regarded as a role model in terms of CE which mainly traces back to early actions in the 1990s. The approach was holistic because besides ecological there are significant economic and social effects announced. The German CE measures drive down negative externalities of resource extraction but could lead to an additional annual reduction in greenhouse gas emission of about 440 million tonnes until 2030. Furthermore, the social benefits include macro-economic effects, such as additional employment in the field of recycling (Kruse, Wedemaier 2022, p.6.). The recycling branch however is not really developed in Germany and concentrates in its CE efforts more on waste management. Moreover, the amount of waste that is undergoing a recycling procedure implicates not on a high level of circularity, as the majority of waste is thermally treated (Wilts, 2021) For this reason the exclusive focus on waste policy in Germany has not led to the establishment of a sufficient CE or a sustainable solution of the waste problematic. Thus it can be determined that the CE transition in Germany lost momentum since the 1990s and is evaluated to be still in an early phase (Gandenberger, 2021). In this

context progressive environmental tax incentives for the industry could play a major role to focus more on recycling of the waste instead of burning.

Contrary effects of environmental taxes

Environmental taxes as well as taxes in general result in an increased cost burden for companies and individuals. While businesses, especially big multinational companies often find loopholes in tax laws, individuals have almost no chance to escape and suffer higher prices. This will primarily affect the poorer income groups and thus lead to an even greater division in society (Pettinger 2020).

The relocation of companies to tax friendly jurisdictions to avoid taxes on profits and also indirect taxes i.e. on CO2 emissions is a big problem, because the affected countries lose money to remove the devastation of the environment. Even those companies argue with competitiveness or stakeholder value their attitude regarding a sustainable behaviour can be questioned. Nevertheless extra taxes rise the costs of production and in consequence the price for the consumer. Especially nowadays when the European Union is facing one of their biggest energy crises because of the Russian war with the Ukraine, additional taxes are more than counterproductive. According to a survey of the German Industry and Trade Chamber (DIHK) around 20 percent of the German companies have to reduce production in Germany and are already thinking about relocating parts of their company. (DIHK 2022). These measures were taken within a period of just a few months after the high price burden. Due to the comparability of the outcome, it can be assumed that the consequences after the introduction of an (additional) CO2 or energy tax could be very similar. Furthermore, according to a research study of the DIHK (2021), 75 percent of companies see their competitiveness severely endangered because of the increased costs and are putting off investments of any kind. This could naturally have a negative influence on the market and limit companies from advancements due to lack of financial means for research and development.

Furthermore, companies plan to postpone climate protection measures because of the enormous increase of energy costs. These effects clearly show the lack of understanding of the long-term effects on our environment without sustainable change measurements. Consequently, the example of Germany makes it clear that the integration of environmental taxes requires much more rethinking initiatives than just drafting a new law.

On top of that companies heavily depending on fossil fuels will face a tough time with the introduction of carbon taxes, as their production costs could skyrocket. That would deprive them from equal chances on the market compared to companies, which boundaries to switch to alternative energies are lower. Hence, through the introduction of carbon taxes, selected companies could go out of business and jobs could be lost (Environmental Conscience, 2021).

This aspect goes hand in hand with disrupted international competition. To balance the tax burden on companies and ensure normally continuing operation, the introduction of a uniform and global sustainability tax would be necessary. This, however, is highly unrealistic and would on the other hand, also lead to further problems in developing countries (Environmental Conscience, 2021).

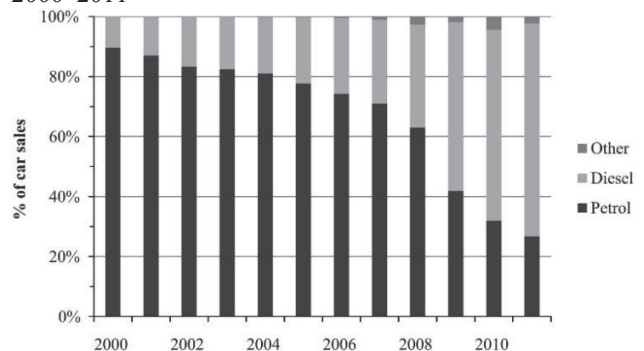
The whole process of changing the system into a more sustainable future is subject to many decisions and therefore may take many years or even decades before it is implemented. Many aspects have to be analysed and decided to avoid negative or even contrary effects of the implementation of such a tax.

Environmental taxes on the example of Ireland

On the example of Ireland, the real issue aimed to target with the introduced eco-taxes has been missed. As part of the EU's 2007 climate and energy package to minimize greenhouse gases, Ireland needed to drastically reduce its carbon footprint. Ireland's greenhouse gas emissions peaked in 2001 at 27 percent above 1990 levels. The sector with the largest increase in energy-related CO2 emissions was transport, which had more than doubled between 1990 and its peak in 2007. In the period 2000 - 2008 there was an increase in car activity, on the one hand, as well as an increase in car fleet size of 46 percent, on the other, which together resulted in a 34 percent increase in CO2 emissions (Leinert, e.a. 2013, p. 1152).

To improve the originally lacking energy efficiency of the vehicles, both the vehicle registration tax (VRT) and the annual vehicle tax (AMT) were developed for redesignation. This new tax policy was intended to help encourage car buying behaviour towards more economical cars with lower CO2 emissions and came into effect on July 1, 2008. The changed regulations indeed led to a reduction in the average transport-specific CO2 emissions, however, mainly caused by an increased switch to diesel cars. The chart below shows the changes in purchasing behaviour in the years following the introduction of the policy (Leinert, e.a. 2013, p. 1155).

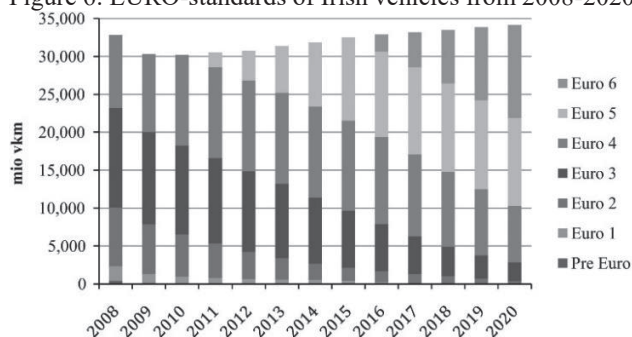
Figure 5: Share of private car sales according to fuel type, 2000–2011



While the ultimate goal should have been to achieve less air pollution from noxious substances, the introduction of the tax in Ireland has only led to a redistribution of the toxic substances. Due to the fact that diesel emission also contains harmful pollutants for our environment, the introduced eco tax did not improve the actual goal of supporting a more sustainable future (Leinert, e.a. 2013, p. 1158).

After all it was initially thought that the measures would at least have had a positive effect on the purchase of many new and therefore better Euro 4-6 cars. But the latest studies have shown that Euro 4-6 norms fall short of expected emission reduction standards and the impact on the road is up to 130 percent higher. All in all, this means that the subsidies for diesel cars that have been achieved have caused far more damage than expected (Leinert e.a. 2013, p. 1156).

Figure 6: EURO-standards of Irish vehicles from 2008-2020



At the end of the day, ineffective targeting at the root of the problem has only encouraged another harmful alternative. As an improvement, the focus should have been on electrification of vehicles and biofuel blends, to truly improve air quality in a sustainable way (Leinert, 2013, p. 1158).

Conclusion

Climate change and environmental degradation are nowadays among the greatest challenges of the society. The effects of climate change are global and on an unprecedented scale. An advancing aridisation that is threatening the food production or rising sea levels increasing the risk of floodings are just some scenarios of the global warming. Thus climate change is the defining issue of the current time that governments, companies, and the public have to address and to tackle.

To reduce environmental damage while minimizing harm to economic growth, governments have a range of instruments at their disposal, including regulations, environmental subsidies, innovation policies, information programs and environmental taxes. Particularly taxes are an important tool of governments to influence the public towards a responsible and sustainable behaviour. Even if

ideal designed environmental taxes promise positive ecological, economic and social effects, their role as a driver for sustainability is often limited. Besides increasing costs and higher prices, a lack of transparency paired with the feeling of an unequal taxation lead to acceptance problems among the societies.

To have a positive influence on the environment and make people think about their behaviour, environmental taxation must be implemented in a way that provides certainty about its impact on personal income levels and incentives for businesses that allow them to continue to grow while doing the right thing for the environment.

Without governmental intervention, there is no market incentive for firms and households to minimize environmental damage, since its impact is spread across many people, and it has little or no direct cost to the polluter. Therefore, protection of the environment generally requires collective action, usually led by the government, to develop an economic system that rewards activities that are socially and environmentally responsible.

To sum it up, an effective implementation of environmental taxes requires careful consideration of a number of factors. As seen on the example of Denmark, properly designed environmental taxes can definitely be a driver for sustainability. They are a great success and thus bring the desired effect and relief for the environment. At the end of the day it is essential to foster environmental change initiatives, not only by supporting an effective and fair environmental tax system, but also by raising public awareness to act in a more responsible and sustainable way against the environment.

References

- Bish J. (2020). *Drastic changes in sustainability issues: Cause and effect*. From <https://info.populationmedia.org/blog/drastic-changes-in-sustainability-issues-cause-and-effect>.
- Braathen, N. A. (2013). *The United Kingdom Climate Change Levy: A Study in Political Economy*. Organisation for Economic Co-Operation and Development. From <https://www.oecd.org/env/tools-evaluation/34512257.pdf>.
- Braathen, N. A. Greene, J. (2011). *Environmental Taxation - A Guide for Policy Makers*. Organisation for Economic Co-Operation and Development. From <https://www.oecd.org/env/tools-evaluation/48164926.pdf>.
- DIHK (2022). *Stark gestiegene Energiepreise gefährden Produktion in Deutschland*. From <https://www.dihk.de/de/themen-und-positionen/wirtschaftspolitik/energie/erdgas-als-druckmittel-wege-aus-der-krise/stark-gestiegene-energiepreise-gefahrdet-produktion-in-deutschland-76516>
- Environmental Conscience (2022): *Advantages and Disadvantages of Carbon Taxes*. From <https://environmental-conscience.com/carbon-tax-pros->

cons-alternatives/

European Commission. (2019). *European Green Deal*. From https://ec.europa.eu/clima/eu-action/european-green-deal_en

European Council. (2022). *European Green Deal*. From: <https://www.consilium.europa.eu/en/policies/green-deal/>

Eurostat. (2022). Environmental tax statistics. From https://ec.europa.eu/eurostat/statistics-explained/index.php?title=Environmental_tax_statistics

FÖS, Forum Ökologisch-Soziale Marktwirtschaft e.V. (2022), Warum Umweltsteuern sinken und wie wir sie auf Klimaschutz programmieren. Berlin 2022

Gandenberger, C, (2021): *Innovationen für die Circular Economy – Aktueller Stand und Perspektiven – Ein Beitrag zur Weiterentwicklung der deutschen Umweltinnovationspolitik, Umwelt, Innovation, Beschäftigung*, Karlsruhe, 01/2021

Hodan D. (2021): *How taxation can help make the world a more sustainable place*. EY. From: https://www.ey.com/en_ie/tax/how-taxation-can-help-make-the-world-a-more-sustainable-place

Iberdrola. (2022). *Environmental taxes make way to protect the environment*. From <https://www.iberdrola.com/sustainability/green-and-environmental-taxes>.

Jacobsen, H. K., & Wier, M. (2001). *Environmental taxation in Denmark and its distributional impact*. From https://www.researchgate.net/publication/343809541_Environmental_taxation_in_Denmark_and_its_distributional_impact.

Kruse, M. Wedemeier, J. (2022). *Circular Economy in Germany: A Methodology to assess the Circular Economy Performance of NUTS3 Regions*. In Hamburg Institute of International Economics (2022), p.6.

Leinert, S. Daly, H. Hyde, B. Gallachóir, B. (2013). *Co-*

benefits? Not always: Quantifying the negative effect of a CO2-reducing car taxation policy on NOx emissions. In: Energy Policy, Elsevier, Volume 63 (2013), 1151–1159

Lena. (2021). *Ländervergleich Nachhaltigkeit*. From <https://www.lena.de/reise-mobilitaet/laendervergleich-nachhaltigkeit>.

Lindsey, R. & Dahlman, L. (2022). Climate Change: Global Temperature. From <https://www.climate.gov/news-features/understanding-climate/climate-change-global-temperature>

McGill University. (2013). *What is Sustainability?* University of Alberta Office of Sustainability. From: <https://www.mcgill.ca/sustainability/files/sustainability/what-is-sustainability.pdf>.

Pettinger T (2020): *Carbon Tax – Pros and Cons* from <https://www.economicshelp.org/blog/2207/economics/carbon-tax-pros-and-cons/>

United Nations (1987): “*Our Common Future: Report of the World Commission on Environment and Development*”. From: <http://www.un-documents.net/ocf-02.htm>.

United Nations (2005): “48. Sustainable development: managing and protecting our common environment “2005 World Summit Outcome. 24 October 2005. A/RES/60/1

Union of Concerned Scientists. (2021). *How Do We Know that Humans Are the Major Cause of Global Warming?* From <https://www.ucsusa.org/resources/are-humans-major-cause-global-warming>.

United Nations. (n.d.). *Climate Change*. From: <https://www.un.org/en/global-issues/climate-change>

Wilts, H. (2021): *Zirkuläre Wertschöpfung – Aufbruch in die Kreislaufwirtschaft*, Friedrich-Ebert-Stiftung, Bonn 15/21

Yale. (2022). Environmental Performance Index 2022. From: <https://epi.yale.edu/downloads/>

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GDP Efficiency and Productivity of Selected Southeast Asia

Adirek Vajrapatkul, Sukhothai Thammathirat Open University, Thailand

This work highlights the support of the macro-level indicators, which are assumed to be the resources, namely, foreign direct investment, the workforce, and gross capital formation, for economic growth. To investigate the efficiency and productivity in raising growth, the methods of Data Envelopment Analysis (DEA) and Malmquist Productivity Index (MPI) are applied to the data within the period between 2009 and 2019 of the selected ASEAN-11 countries. The results reveal that under the constant returns to scale assumption, only Singapore and Brunei, in the year 2019, perform efficiently on the boundary of the frontier in driving GDP. However, under the variable returns to scale assumption, Indonesia, Thailand, Myanmar, Singapore, Timor, and Brunei perform efficiently in driving GDP. In terms of productivity, it was found that GDP creation productivity fluctuated with the increasing trend as a result of technological improvement. Thus, the recommendations are that the governments of other countries, except Singapore and Brunei, should make more effort to utilize their resources to support the growth of the economy.

Keywords: Efficiency, Productivity, Southeast Asia, Economic growth

Introduction

The growth of the economy is a major indicator of government achievement in managing the country. The driving forces for this growth have also been investigated over time. However, most previous works did not link the concepts of efficiency and productivity to economic growth. Efficiency and productivity are important issues as they indicate how much the government concerns and accounts for the resources available in the country. If this is the case, the government will not only be looking for growth but also efficiency and productivity in utilizing the country's resources.

To learn how high efficiency and productivity are measured, two techniques, namely Data Envelopment Analysis and the Malmquist Productivity Index, are used. In general, these techniques are used to extract the levels of efficiency and productivity from the relationship between inputs and outputs of the firms; e.g., banks within the ASEAN-5 consisting of Indonesia, Malaysia, the Philippines, Singapore, and Thailand countries optimize their resources, i.e., employees' benefits, fixed assets, and

deposits, to maximize income and loans (Wahyudi & Azizah, 2018); and the health systems use per-capita health expenditure as an input to maximize the health outcome indicators, namely healthy life expectancy at birth and infant mortality per 1000 live births (Ahmed et al., 2019).

However, the concept of these techniques is also extended to the macro level, e.g., the assessment of efficiency in implementing sustainable development policy by using energy consumption from coal, oil, and gas sources as inputs to maximize GDP and minimize CO₂ emission ((Łozowicka, 2020); and the analysis of the performance of the renewable energy sector by using labor force, total energy consumption, share of renewable energy, and total renewable energy capacity as inputs to maximize GDP and minimize CO₂ emission (Wang et al., 2022).

The applications of these techniques will also be expanded in this work. To make an application, this work regards national income as an output that the country needs to maximize and some macro-level indexes, namely foreign direct investment, workforce, and gross capital formation, as inputs. This work will be conducted by using the data of the selected ASEAN-11 countries, and it will be managed in the following sequence: The next section will review some literature. Then the concepts of Data Envelopment Analysis and Malmquist Productivity Index will be presented. After that, the results of the analysis and policy recommendations will be provided.

Literature Review

This section will provide some evidence of the connection between the inputs and output studied in this work. Empirical studies on the relationship between foreign direct investment and economic growth indicate that FDI inflows can have both significant and insignificant positive impacts on economic growth in the long run and in the short run, depending on development status. Also, natural resource-rich countries grow at a faster rate, and countries with relatively more democratic governments experience rapid economic growth in the long-run (Sahu, 2021); Foreign investment is one of the key elements to promoting economic development. However, the benefits of these foreign capital inflows are not automatic, they depend on some domestic factors in the host countries, e.g., the quality of institutions reflected by political stability, the quality of the legal system (the rule of law), and the reduction of corruption. The

relationship between FDI and economic growth is nonlinear. The growth-enhancing effect of FDI appears only in countries that have reached a certain level of institutional development, below this level, FDI has either a negative or null effect on economic growth (Yeboua, 2021); There is a unidirectional causality from economic growth to FDI, i.e., FDI inflows are attracted by strong economic growth (Odhiambo, 2021); The impact of FDI inflow is not identical for each country. The inflow ratio depends upon the host country's policies, institutional settings, and absorption level. Similarly, the impact of FDI depends upon the amount and type of FDI inflow (Liang et al., 2021).

Empirical studies in the relationship between workforce and economic growth indicate that gross capital formation growth and labour force participation rate have significant positive impact on economic growth but the rate of unemployment has no significant impact on the economic growth. The countries need to have a sufficient supply of labor for economic growth and development. Also, they need to promote the creativity of the large labor force by properly investing in their education and enhancing female labor force participation to spur the country's economic growth (Jafrin et al., 2021); Despite having a huge labour market and abundant natural resources, some regions are underdeveloped because their productivities on many fronts are very low. Expanding work participation, particularly among women, will contribute to better economic performance. Workforce participation with sufficient capability is an essential input for the development of modern industrial and service sectors and is an integral part of the overall development of the economy (Mawkhlieng & Algur, 2021).

Empirical studies on the relationship between capital formation and economic growth indicate that domestic gross fixed capital formation, which acts as the labor-absorbing capability of a country, positively influences gross regional domestic product growth. The population with a large workforce, which indicates the potential for productive businesses to produce goods and services, has a significant and positive effect on the gross regional domestic product (Afiat et al., 2021); There is cointegration among the variables used, and energy use, trade, capital, labour, foreign direct investment, and human capital development have positive and significant impacts on economic growth in the long run. A bidirectional causality between economic growth and capital and labour is also found (Rahman & Alam, 2021).

Methodology

The Data Envelopment Analysis was developed by Charnes et al. (1978). This method aims to measure the productive efficiency of a set of DMUs through the empirical construction of a piecewise linear frontier. It calculates technical efficiency by solving a nonlinear programming system of the decision-making units (DMUs). DEA is used

to identify an efficiency frontier and the distance of each decision-making unit (DMU) to the frontier. One type of DEA model, developed by Charnes, Cooper and Rhodes (CCR), assumes that production has constant returns to scale (CRS). On the other hand, model proposed by Banker, Charnes and Cooper (BCC) assumes that production has variable returns to scale (VRS) implying an increase in the input will result in either an increase or a decrease in the output. The scale efficiency will indicate whether DMUs are operating at their optimal sizes or not (DEAX (Ferraz et al., 2018) (Ahmed et al., 2019) (Wang et al., 2021)). To have the concept of DEA, let's define:

$$E_0 = \frac{\sum_{j=1}^J u_j y_{j0}}{\sum_{i=1}^N v_i x_{i0}}, \quad (1)$$

where $0 \leq E_0 \leq 1$ is an efficiency score such that 1 imply maximum technical efficiency. The linear programming of output and input oriented DEA based on Constant returns to scale (CRS) and Variable returns to scale (VRS) can be, respectively, represented as follows:

Constant returns to scale (CRS): Output oriented

$$\begin{aligned} & \text{MAX} \sum_{j=1}^J \mu_j y_j \\ & \text{st.} \\ & \sum_{i=1}^N v_i x_i = 1 \\ & \sum_{j=1}^J \mu_j y_{jk} - \sum_{i=1}^N v_i x_{ik} \leq 0, k = 1, \dots, K \\ & \mu_j, v_i \geq \varepsilon \end{aligned} \quad (2)$$

Variable returns to scale (VRS): Output oriented

$$\begin{aligned} & \text{MAX} \sum_{j=1}^J v_j y_j + w \\ & \text{st.} \\ & \sum_{i=1}^N v_i x_i = 1 \\ & \sum_{j=1}^J \mu_j y_{jk} - \sum_{i=1}^N v_i x_{ik} + w \leq 0, k = 1, \dots, K \\ & \mu_j, v_i \geq \varepsilon \end{aligned} \quad (3)$$

where $x_i, i=1,2,\dots,N$, represents the amount of input i of K DMUs, $y_j, j=1,2,\dots,J$, represents the amount of output j of K DMUs; $x_{ik}, k=1,2,\dots,K$, represents the amount of input i of DMU k ; y_{jk} represents the amount of output j of DMU k ; $v_i = w_i$ represents the weight of input i ; $\mu_j = w_j$ represents the weight of output j , being $t = \left(\sum_i v_i x_i\right)^{-1}$; w represents the scale factor. ε is a parameter to force the variables to be positive

The Malmquist index is demarcated using distance function. This function include of two kinds, i.e., the input distance function which depicts the production technology that reduces the input vector for a given output vector and the output distance which depicts the production technology that increases the output vector for a given input vector. To have an idea of output distance function(Coelli et al., 1998) (Zrelli et al., 2020), let define

$$P^t(\mathbf{x}^t) = \{\mathbf{y}^t : \mathbf{x}^t\}, t=1,\dots,T \quad (4)$$

where $P^t(\mathbf{x}^t)$ is the output possibility set is, \mathbf{y}^t is the set of output vector, \mathbf{X}^t denote the set of input vector. Then we can define the distance function as follows:

$$D^t(x, y) = \min \left\{ \lambda \in [0, 1] : \frac{y}{\lambda} \in P^t(x) \right\} \quad (5)$$

where $D^t(x, y) \leq 1$ and λ is weight.

This index can be used to measures total factor productivity (TFP) change between any particular two periods. In the case of output orient MPI, MPI is given by:

$$M_O^{t,t+1}(x^t, x^{t+1}, y^t, y^{t+1}) = \left[\frac{D_O^t(x^{t+1}, y^{t+1}) D_O^{t+1}(x^{t+1}, y^{t+1})}{D_O^t(x^t, y^t) D_O^{t+1}(x^t, y^t)} \right]^{\frac{1}{2}} \quad (6)$$

where $M_O^{t,t+1}(x^t, x^{t+1}, y^t, y^{t+1}) > 1$ indicates the productivity improvement as the result of technology change. The first ratio signifies the MPI in period t that expresses the efficiency change that measure the change of productivity from period t to period $t+1$ using period t technology as reference. It reflects an ability to utilize the technology at particular time. However, the second ratio represents MPI in period $t+1$ which measures productivity

change from period t to time $t+1$ using time $t+1$ technology as a reference. These two terms express MPI as geometric mean.

By assuming constant returns-to-scale, we can calculate these four distance functions between period t and $t+1$ as follows:

$$M_O^{t,t+1}(x^t, x^{t+1}, y^t, y^{t+1}) = \left[\frac{D_O^t(x^{t+1}, y^{t+1}) D_O^{t+1}(x^{t+1}, y^{t+1})}{D_O^t(x^t, y^t) D_O^{t+1}(x^t, y^t)} \right]^{\frac{1}{2}} \quad (7)$$

where $y_{it}, i=(1,\dots,N)$, is the $M \times 1$ vector of output, x_{it} is the $K \times 1$ vector of input, Y_t is, is the $M \times N$ vector of output and, X_t is the $K \times N$ vector of input, λ is $N \times 1$ vector of weights, and θ is a scalar indicating the technical efficiency score.

The MPI is performed to evaluate the relative technical efficiency of each country in maximizing outcomes. This MPI can be evaluated with either assumption of constant and variable returns to scale. However, variable return to scale output-oriented model is assumed in the analysis of a cross-sectional study with heterogeneity in characteristic of the studied units. Analytically, a DMU could be better than it was in the successive periods with MPI score greater than unity, that is, it becomes more efficient in producing output. This means frontier productivity shifts outward, which may be a result of utilizing fewer inputs or technical progress within or emanating from outside the system. Conversely, a DMU could experience productivity regress when the MPI score is less than unity, that is, it becomes inefficient or worse off in producing output. This may be, as a result of an increase in inputs without a corresponding rise in output. Similarly, a DMU may experience productivity stagnation over a given time frame with a unit score of MPI (Shailender et al., 2021)

This works chooses the output oriented model because it assumes that the countries try to utilize their limited resources efficiently for reaching highest growth (Wahyudi & Azizah, 2018). To conduct the analysis, the panel data of gross domestic product, foreign direct investment, workforce, and gross capital formation within the period between 2009 and 2019 of the selected ASEAN-11 countries are downloaded from the Word Bank database.

Results

The technical efficiency calculated based on the constant returns to scale (CRS) assumption for the year 2019 was shown in Table 1. It shows that only Singapore and Brunei perform efficiently on the boundary of the frontier, while the other 8 countries perform inefficiently, as reflected by the score ranging between 0.031 and 0.707. As these

technical efficiency scores are computed under the output-oriented approach, the inefficient countries can increase their GDP by trying to utilize the rest of the inputs shown in Table 2. To make an improvement, the inefficient countries can use the countries in their peers' column as a benchmark.

Table 1: Countries' technical efficiency of CRS in 2019

Countries	Technical efficiency	Peers	
Indonesia	0.231	Brunei	Singapore
Philippines	0.135	Singapore	Brunei
Vietnam	0.094	Brunei	Singapore
Thailand	0.707	Brunei	-
Myanmar	0.075	Brunei	Singapore
Malaysia	0.439	Singapore	Brunei
Cambodia	0.031	Singapore	Brunei
Singapore	1.000	-	-
Timor-Leste	0.072	Brunei	Singapore
Brunei	1.000	-	-
Darussalam			

Source: Author's calculation

Table 2: Countries' slacks of CRS in 2019

Countries	Output Slacks	Input Slacks		
		FDI	WSW	GCF
Indonesia	0	75.165	0	0
Philippines	0	418.277	0	0
Vietnam	0	581.969	0	0
Thailand	0	789.558	0	0
Myanmar	0	423.299	0	0
Malaysia	0	340.234	0	0
Cambodia	0	367.708	0	0
Singapore	0	0	0	0
Timor-Leste	0	479.19	0	0
Brunei	0	0	0	0
Darussalam				

Source: Author's calculation

The technical efficiency calculated based on the variable returns to scale (VRS) assumption for the year 2019 was shown in Table 3. It shows that Indonesia, Thailand, Myanmar, Singapore, Timor, and Brunei perform efficiently on the boundary of the frontier, while the other 4 countries perform inefficiently, as reflected by the score ranging between 0.041 and 0.522. Similarly, these four inefficient countries can increase their GDP by trying to utilize the rest of the inputs shown in Table 4. In the case of scale efficiency, it is shown that most countries perform under the increasing returns to scale (IRS), which implies that they have a relatively small size of operation compared with the optimal size. Only Singapore and Brunei perform under the constant returns to scale (CRS).

Table 3: Countries' technical efficiency of VRS in 2019

Countries	TE_{VRS}	scale	Return to Scale	peers		
Indonesia	1.000	0.231	IRS			
Philippines	0.185	0.733	IRS	Brunei	Timor	Thailand
Vietnam	0.171	0.550	IRS	Singapore	Timor	Brunei
Thailand	1.000	0.707	IRS			
Myanmar	1.000	0.075	IRS			
Malaysia	0.522	0.840	IRS	Brunei	Timor	Thailand
Cambodia	0.041	0.759	IRS	Singapore	Timor	Brunei
Singapore	1.000	1.000	CRS			
Timor-Leste	1.000	0.072	IRS			
Brunei	1.000	1.000	CRS			
Darussalam						

Source: Author's calculation

Table 4: Countries' slacks of VRS in 2019

Countries	Output Slacks	Input Slacks		
		FDI	WSW	GCF
Indonesia	0	0	0	0
Philippines	0	42.331	0	0
Vietnam	0	224.133	0	0
Thailand	0	0	0	0
Myanmar	0	0	0	0
Malaysia	0	93.204	0	0
Cambodia	0	76.742	0	0
Singapore	0	0	0	0
Timor-Leste	0	0	0	0
Brunei	0	0	0	0
Darussalam				

Source: Author's calculation

The change in productivity will be presented in the following. The changes in TFP can be decomposed into technical efficiency changes and technological changes. The technical efficiency change represents improvements in efficiency due to improved operations, management, and returns to scale, which increase the ability to use a given input to produce a maximum level of output. This efficiency change index, with a value above 1, will suggest that the technical efficiency has improved. Technological change is a source of productivity change that shifts the production frontier. Technological change occurs due to improvements in technology used in production and service processes. This index with a value above 1 will suggest technological progress while a value less than 1 suggests technological regress.

Table 5: Technical change

Countries	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Indonesia	0.863	0.86	0.971	0.883	1.367	0.887	2.003	0.887	0.585	0.965
Philippines	0.831	0.984	0.824	0.885	1.699	0.921	1.108	0.89	0.867	0.901
Vietnam	0.641	0.667	0.795	0.801	0.834	0.858	0.876	0.89	0.901	0.909
Thailand	0.761	1.014	0.651	0.882	1.223	1.022	1.525	0.889	0.657	1.21
Myanmar	1.093	0.752	0.97	0.86	0.956	0.925	0.985	1.046	0.881	0.845
Malaysia	0.161	0.675	0.825	0.889	1.123	0.869	0.884	0.892	0.764	1.037
Cambodia	0.648	0.763	0.868	0.837	0.982	0.925	0.985	0.963	0.901	0.909
Singapore	0.504	0.667	0.754	0.802	0.833	0.857	0.875	0.889	0.9	0.909
Timor-Leste	0.876	0.753	0.985	0.839	1.193	0.89	2.439	0.912	0.378	0.846
Brunei Darussalam	0.555	0.782	0.789	0.854	1.037	1.298	1	0.885	0.906	1.058

Source: Author's calculation

Table 6: Technological change

Countries	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Indonesia	0.863	0.86	0.971	0.883	1.367	0.887	2.003	0.887	0.585	0.965
Philippines	0.831	0.984	0.824	0.885	1.699	0.921	1.108	0.89	0.867	0.901
Vietnam	0.641	0.667	0.795	0.801	0.834	0.858	0.876	0.89	0.901	0.909
Thailand	0.761	1.014	0.651	0.882	1.223	1.022	1.525	0.889	0.657	1.21
Myanmar	1.093	0.752	0.97	0.86	0.956	0.925	0.985	1.046	0.881	0.845
Malaysia	0.161	0.675	0.825	0.889	1.123	0.869	0.884	0.892	0.764	1.037
Cambodia	0.648	0.763	0.868	0.837	0.982	0.925	0.985	0.963	0.901	0.909
Singapore	0.504	0.667	0.754	0.802	0.833	0.857	0.875	0.889	0.9	0.909
Timor-Leste	0.876	0.753	0.985	0.839	1.193	0.89	2.439	0.912	0.378	0.846
Brunei Darussalam	0.555	0.782	0.789	0.854	1.037	1.298	1	0.885	0.906	1.058

Source: Author's calculation

Table 7: Total Factor Productivity Change

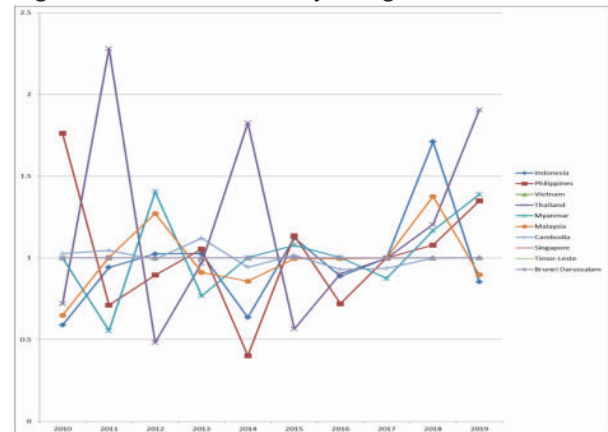
Countries	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Indonesia	0.508	0.811	0.995	0.906	0.87	0.995	1.779	0.886	1.002	0.823
Philippines	1.464	0.701	0.737	0.933	0.683	1.046	0.797	0.89	0.936	1.215
Vietnam	0.641	0.667	0.795	0.801	0.834	0.858	0.876	0.889	0.9	0.909
Thailand	0.548	2.314	0.314	0.855	2.233	0.579	1.378	0.887	0.792	2.307
Myanmar	1.093	0.417	1.363	0.661	0.957	0.997	0.988	0.915	1.028	1.173
Malaysia	0.104	0.677	1.049	0.811	0.964	0.865	0.88	0.892	1.052	0.931
Cambodia	0.666	0.799	0.861	0.938	0.927	0.94	0.916	0.903	0.9	0.909
Singapore	0.504	0.667	0.754	0.802	0.833	0.857	0.875	0.889	0.9	0.909
Timor-Leste	0.876	0.753	0.985	0.839	1.193	0.89	2.439	0.912	0.378	0.846
Brunei Darussalam	0.555	0.782	0.789	0.854	1.037	1.298	1	0.885	0.906	1.058

Source: Author's calculation

It is indicated in Table 6 that the GDP creation productivity of all countries has fluctuated with the increasing trend. The source of this productivity

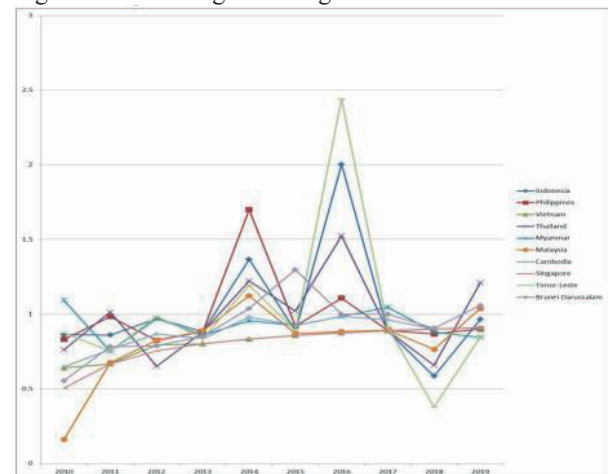
improvement can be traced back to technological improvement.

Figure 1: Technical efficiency change



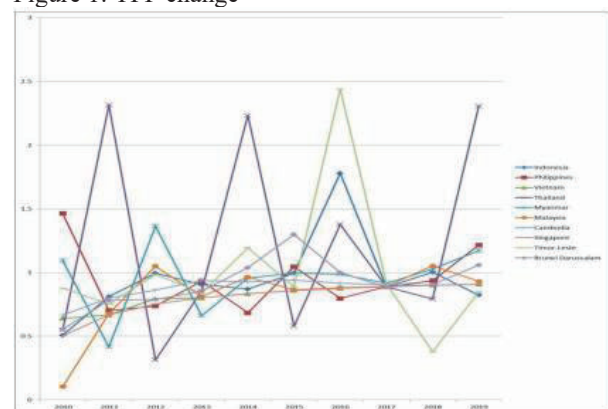
Source: Author's presentation

Figure 2: Technological change



Source: Author's presentation

Figure 1: TFP change



Source: Author's presentation

Policy Recommendation

According to the evidence of input slacks in the constant return to scale analysis, this research recommends that the governments of other countries, except Singapore and Brunei, make more effort to utilize their resources to support the growth of their economies.

Conclusion

This work presents an idea of measuring efficiency and productivity at the macro level. The measuring techniques of Data Envelopment Analysis and Malmquist Productivity Index techniques are employed with To conduct the analysis, panel data on gross domestic product, foreign direct investment, workforce, and gross capital formation are downloaded from the Word Bank database for the selected ASEAN-11 countries of Indonesia, Philippines, Vietnam, Thailand, Myanmar, Malaysia, Cambodia, Singapore, Timor-Leste, and Brunei Darussalam. The results reveal that under the constant returns to scale assumption, only Singapore and Brunei, in the year 20i9, perform efficiently on the boundary of the frontier in driving GDP. However, under the variable returns to scale assumption, Indonesia, Thailand, Myanmar, Singapore, Timor, and Brunei perform efficiently in driving GDP. In terms of productivity, it was found that GDP creation productivity fluctuated with the increasing trend as a result of technological improvement. Thus, the recommendations are that the governments of other countries, except Singapore and Brunei, should make more effort to utilize their resources to support the growth of the economy.

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Reference

Afiat, M. N., Nasser, G. A., & Hasan, S. M. (2021). Analysis of the Effect of Domestic Gross Fixed Capital Formation (DGFCF) and Population on the Gross Regional Domestic Product (GRDP) in Southeast Sulawesi. *IOSR Journal of Business and Management*, 23(1), 35–39.

Ahmed, S., Hasan, M. Z., MacLennan, M., Dorin, F., Ahmed, M. W., Hasan, M. M., Hasan, S. M., Islam, M. T., & Khan, J. A. M. (2019). Measuring the efficiency of health systems in Asia: A data envelopment analysis. *BMJ Open*, 9(3), e022155. <https://doi.org/10.1136/bmjopen-2018-022155>

Barasa, E., Musiega, A., Hanson, K., Nyawira, L., Mulwa, A., Molyneux, S., Maina, I., Tsofa, B., Normand, C., & Jemutai, J. (2021). Level and determinants of county

health system technical efficiency in Kenya: Two stage data envelopment analysis. *Cost Effectiveness and Resource Allocation*, 19(1), 78. <https://doi.org/10.1186/s12962-021-00332-1>

Coelli, T., Rao, D. S. P., & Battese, G. E. (1998). *An Introduction to Efficiency and Productivity Analysis*. Springer US. <https://doi.org/10.1007/978-1-4615-5493-6>

Ferraz, D., Moralles, H. F., Campoli, J. S., Oliveira, F. C. R. de, & Rebelatto, D. A. do N. (2018). Economic Complexity and Human Development: DEA performance measurement in Asia and Latin America. *Gestão & Produção*, 25(4), 839–853. <https://doi.org/10.1590/0104-530x3925-18>

Jafrin, N., Mahi, M., Masud, M. M., & Ghosh, D. (2021). Demographic dividend and economic growth in emerging economies: Fresh evidence from the SAARC countries. *International Journal of Social Economics*, 48(8), 1159–1174. <https://doi.org/10.1108/IJSE-08-2020-0588>

Khaksar, M., & Malakoutian, M. M. A. (2020). Productivity Evaluation for Banking System in Developing Countries: DEA Malmquist Productivity Index Based on CCR, BCC, CCR-BCC (A Case Study). 1, 16.

Liang, C., Shah, S. A., & Bifei, T. (2021). The Role of FDI Inflow in Economic Growth: Evidence from Developing Countries. *Journal of Advanced Research in Economics and Administrative Sciences*, 2(1), 68–80. <https://doi.org/10.47631/jareas.v2i1.212>

Łozowicka, A. (2020). Evaluation of the Efficiency of Sustainable Development Policy Implementation in Selected EU Member States Using DEA. *The Ecological Dimension. Sustainability*, 12(1), 435. <https://doi.org/10.3390/su12010435>

Mawkhlieng, D. R., & Algur, K. (2021). Workforce Participation in North-East India. *IASSI Quarterly: Contributions to Indian Social Science*, 40(4), 782–794.

Odhiambo, N. M. (2021). Foreign Direct Investment and Economic Growth in Kenya: An Empirical Investigation. *International Journal of Public Administration*, 1–12. <https://doi.org/10.1080/01900692.2021.1872622>

Rahman, M. M., & Alam, K. (2021). Exploring the driving factors of economic growth in the world's largest economies. *Heliyon*, 7(5), e07109. <https://doi.org/10.1016/j.heliyon.2021.e07109>

Sahu, J. P. (2021). Does inflow of foreign direct investment stimulate economic growth? Evidence from developing countries. *Transnational Corporations Review*, 13(4), 376–393. <https://doi.org/10.1080/19186444.2020.1833603>

Shailender, S., Muhammad, M. B., Nishant, K., & Hawati, J. (2021). Application ofDEA-Based Malmquist Productivity IndexonHealthCareSystem Efficiency ofASEANCountries. *Int J Health Plann Mgmt.*, 1–15. <https://doi.org/10.1002/hpm.3169>

Sharma, I., & Sekhon, M. K. (2021). Measurement and Determinants of Technical Efficiency in Crop Production: A

- Review. *Agricultural Reviews*, Of. <https://doi.org/10.18805/ag.R-2144>
- Wahyudi, S. T., & Azizah, A. (2018). A COMPARATIVE STUDY OF BANKING EFFICIENCY IN ASEAN-5: THE DATA ENVELOPMENT ANALYSIS (DEA) APPROACH. *Journal of Indonesian Economy and Business*, 33(2), 168. <https://doi.org/10.22146/jieb.24479>
- Wang, C.-N., Nguyen, H.-P., & Chang, C.-W. (2021). Environmental Efficiency Evaluation in the Top Asian Economies: An Application of DEA. *Mathematics*, 9(8), 889. <https://doi.org/10.3390/math9080889>
- Wang, C.-N., Nguyen, N.-A.-T., Dang, T.-T., & Wang, J.-W. (2022). Assessing Asian Economies Renewable Energy Consumption Efficiency Using DEA with Undesirable Output. *Computer Systems Science and Engineering*, 43(1), 347–362. <https://doi.org/10.32604/csse.2022.022941>
- Yeboua, K. (2021). Foreign Direct Investment and Economic Growth in Africa: New Empirical Approach on the Role of Institutional Development. *Journal of African Business*, 22(3), 361–378. <https://doi.org/10.1080/15228916.2020.1770040>
- Zrelli, H., Alsharif, A. H., & Tlili, I. (2020). Malmquist Indexes of Productivity Change in Tunisian Manufacturing Industries. *Sustainability*, 12(4), 1367. <https://doi.org/10.3390/su12041367>

Appendix: Largers forms of some tables and figures indicated above

Table 5: Technical change

Countries	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Indonesia	0.589	0.942	1.025	1.026	0.636	1.122	0.888	0.999	1.711	0.853
Philippines	1.762	0.712	0.895	1.054	0.402	1.136	0.72	1	1.079	1.349
Vietnam	1.001	1	1	1	1	0.999	0.999	0.999	1	1.001
Thailand	0.719	2.281	0.482	0.969	1.826	0.566	0.903	0.998	1.206	1.906
Myanmar	1	0.555	1.405	0.768	1.002	1.078	1.003	0.875	1.167	1.388
Malaysia	0.649	1.004	1.272	0.912	0.858	0.996	0.996	1	1.376	0.897
Cambodia	1.027	1.046	0.992	1.121	0.944	1.017	0.93	0.937	0.999	1.001
Singapore	1	1	1	1	1	1	1	1	1	1
Timor-Leste	1	1	1	1	1	1	1	1	1	1
Brunei Darussalam	1	1	1	1	1	1	1	1	1	1

Source: Author's calculation

Table 5: Technological change

Countries	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Indonesia	0.863	0.86	0.971	0.883	1.367	0.887	2.003	0.887	0.585	0.965
Philippines	0.831	0.984	0.824	0.885	1.699	0.921	1.108	0.89	0.867	0.901
Vietnam	0.641	0.667	0.795	0.801	0.834	0.858	0.876	0.89	0.901	0.909
Thailand	0.761	1.014	0.651	0.882	1.223	1.022	1.525	0.889	0.657	1.21
Myanmar	1.093	0.752	0.97	0.86	0.956	0.925	0.985	1.046	0.881	0.845
Malaysia	0.161	0.675	0.825	0.889	1.123	0.869	0.884	0.892	0.764	1.037
Cambodia	0.648	0.763	0.868	0.837	0.982	0.925	0.985	0.963	0.901	0.909
Singapore	0.504	0.667	0.754	0.802	0.833	0.857	0.875	0.889	0.9	0.909
Timor-Leste	0.876	0.753	0.985	0.839	1.193	0.89	2.439	0.912	0.378	0.846
Brunei Darussalam	0.555	0.782	0.789	0.854	1.037	1.298	1	0.885	0.906	1.058

Source: Author's calculation

Table 6: Total Factor Productivity Change

Countries	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Indonesia	0.508	0.811	0.995	0.906	0.87	0.995	1.779	0.886	1.002	0.823
Philippines	1.464	0.701	0.737	0.933	0.683	1.046	0.797	0.89	0.936	1.215
Vietnam	0.641	0.667	0.795	0.801	0.834	0.858	0.876	0.889	0.9	0.909
Thailand	0.548	2.314	0.314	0.855	2.233	0.579	1.378	0.887	0.792	2.307
Myanmar	1.093	0.417	1.363	0.661	0.957	0.997	0.988	0.915	1.028	1.173
Malaysia	0.104	0.677	1.049	0.811	0.964	0.865	0.88	0.892	1.052	0.931
Cambodia	0.666	0.799	0.861	0.938	0.927	0.94	0.916	0.903	0.9	0.909
Singapore	0.504	0.667	0.754	0.802	0.833	0.857	0.875	0.889	0.9	0.909
Timor-Leste	0.876	0.753	0.985	0.839	1.193	0.89	2.439	0.912	0.378	0.846
Brunei Darussalam	0.555	0.782	0.789	0.854	1.037	1.298	1	0.885	0.906	1.058

Source: Author's calculation

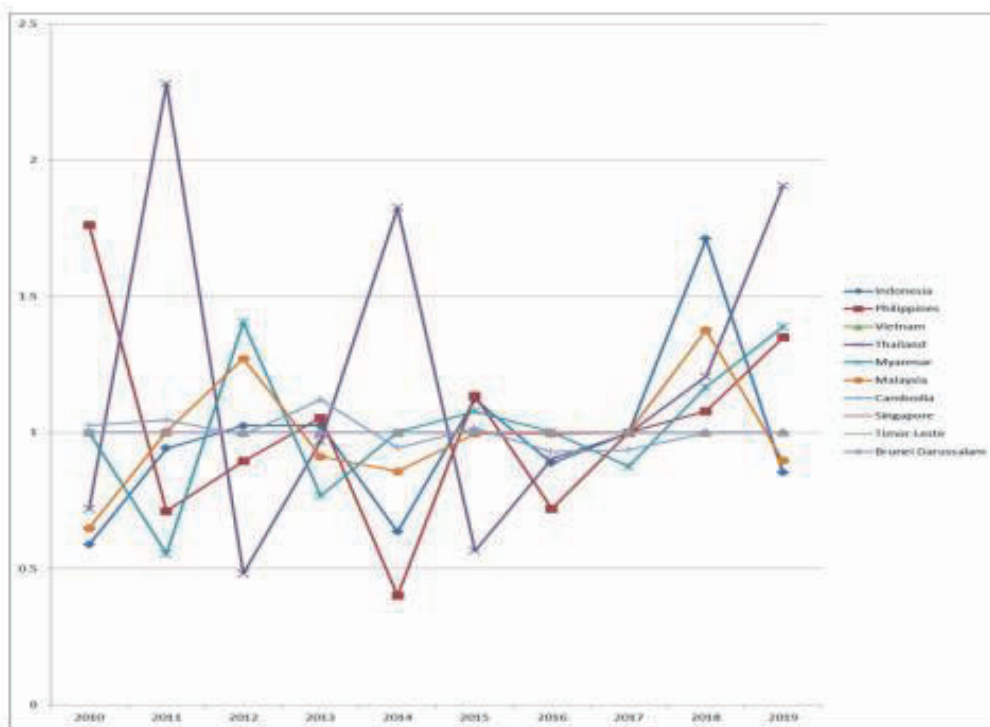


Figure 1: technical efficiency change

Source: Author's presentation

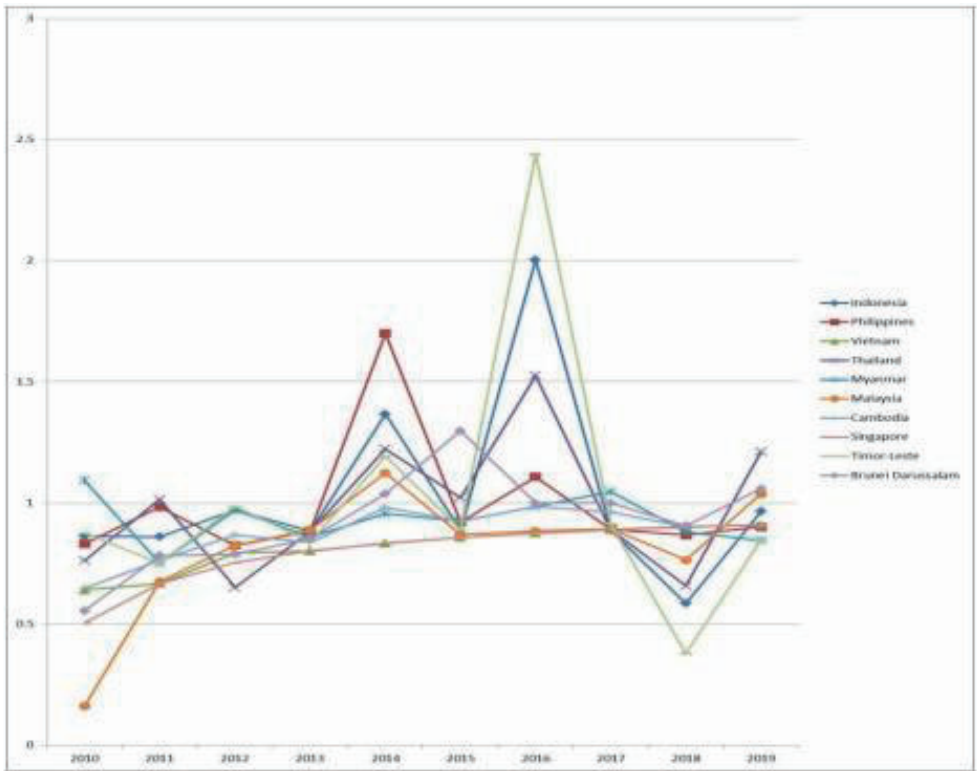


Figure 1: Technological change
Source: Author's presentation

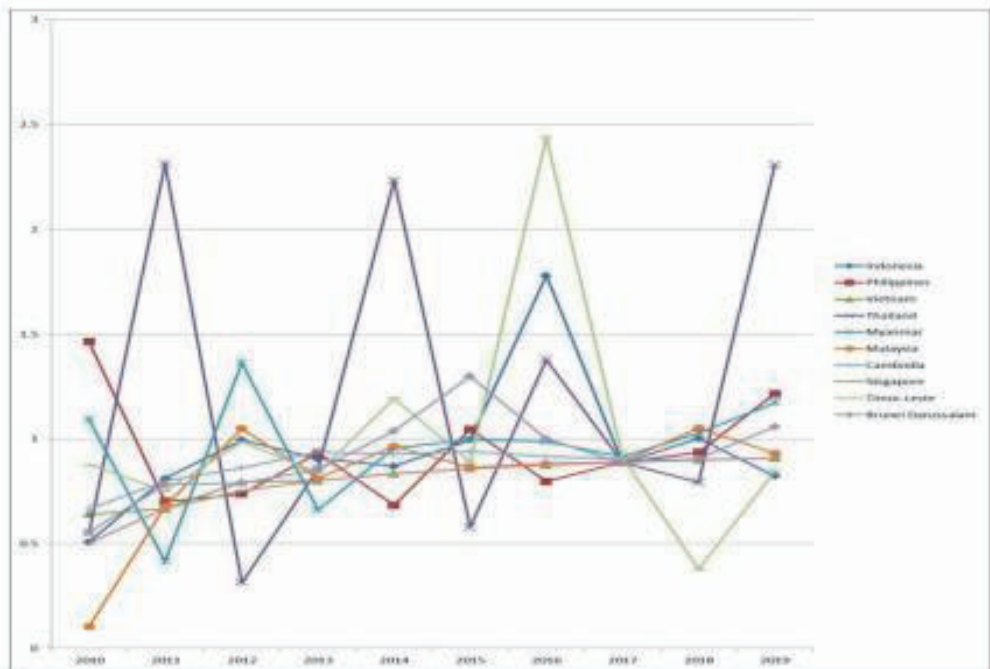


Figure 1: TFP change
Source: Author's presentation

Using Short-form Video Content (SVCs) in Digital Marketing: Mobile Application Engagement Model

Kritcha Yawised, Naresuan University, Thailand
Darlin Apasarawirote, Naresuan University, Thailand
Maneerut Chatrangsan, Naresuan University, Thailand
Paisarn Muneesawang, Naresuan University, Thailand

The significant advances in science and technology have brought a dramatically change in human being-life. This paper aims to review the literature to propose a mobile application engagement model that identifies potential constructs of short-form video approach and engagement and related critical factors. From the existing literature, the study demonstrates three primary constructs that operationalize the model, including action viral, co-creation, engagement, and evangelism. This study is provided as a starting point for the new ideas for business owner-managers. The model also highlights the potential associations among determinant factors that affect the intention and attitude towards the short-form video engagement..

Introduction

The trends of research on content marketing trends related to social media (SM) marketing through the use of mobile applications (apps), have been well research over the past years. Both academics and practitioners have tried to investigate and examine the major factor affecting the attitude and intention of individuals towards SM usage as well as engaging in such contents. The age of traditional marketing is beginning to end, and the age of the digital revolution will continue its journey. Thus, businesses need to understand and take advantage of the capability of the digital platforms particularly, understanding the trends of customer's preferences (Juntunen et al., 2020). Interactive marketing focuses less on immediate sales and building relationships. In other words, the new mindset focuses on relationship engagement of which businesses build with their customers is more important than the products and services they sell them (Almeida et al., 2020; Bowden & Mirzaei, 2021). Consequently, the marketing and sales departments need to cooperate to build a better story around their products. To this end, the creation of short-form video engagement through the use of mobile applications has enabled content to be reached and engaged with potential customers.

In the digital marketing era, different businesses have different potential strategies particularly, the extensive adoption of content marketing-based promotion across all business and industry sectors, which will continue to thrive even more, obviously in small and medium-sized businesses (Kumar et al., 2018; Plessis, 2017). However, there are still many businesses that do not respond to comments on their posts, or even there are no interaction and communication among audiences towards brands (Taecharungroj, 2019). This implies that business uses SM without listening to their customers—is no longer perceived as an appropriate method and strategy for them anymore. Thus, the business is necessary to put more effort and to spend more time building engaging content and being more engaged (Shutsko, 2020). Interactive engagement will help businesses in producing sustainable long-term relationships with not only their existing customers but also captivating their audiences and prospects. This study will focus on examining factors that may determine short video content and activities to engage with audiences. The results of this study will be helpful to see the strategic approach that enables owners/managers of a firm to have a proper strategy and a systematic perception on how to create such initiatives also. Recommendations for creating video content related to various SM tools built on the results of this study are also provided.

This paper is structured as follows: a review of literature related of short video content engagement, incorporating with the underpinning of theoretical background is firstly provided. The following section demonstrates on the proposed model followed by the discussion of the extracted determinants, along with descriptions and strategic proposed. Finally, the paper ends with conclusion and recommendation for future research in the last section.

Literature Review

In this study, 'short-form video' refers to the Internet video content transmission based on a personal computer smart mobile phone device under five minutes in length of time. It has simple, creative, rich information, engaging,

flexible, and easy. With the popularity of mobile application platforms and the speed of the Internet network, brands and consumers become close by working operatively together to create a content leading to many short videos with high-traffic content.

Consumer characteristics

Prior research indicated that the assumptions of User Generate Content (UGC) stem from the social psychology traits, including the attitude, motivation, user behavior's self-expression, group and cultural identity of needs which lead to a different pattern of media exposure (Daugherty et al., 2008; Omar & Wang, 2020; Wang, 2020; Zuo & Wang, 2019). Short-form video content is one of the forms of UGC, where it is an integral part of digital marketing strategy. Research suggested that the degree of difference of consumer characteristics and behavior has undoubtedly affected the user-generated video contents—this includes self-expression motive for the creation of video content on Social Networking sites (SNSs) has a significant effect on audiences' sharing behavior (Hsiao & Chiang, 2015). Previous research also investigated the factor affecting consumer preferences for video content and co-creation generated new ideas for short-form video. Those factor includes social psychology, personality traits (Aslan & Gdkbay, 2019; Omar & Wang, 2020), motivations of users (Ahlse et al., 2020; Daugherty et al., 2008; Omar & Wang, 2020), education (Kassamali et al., 2021; Tajurahim et al., 2020), gender (Assaker, 2020; Kennedy, 2020; Omar et al., 2020), adolescent generation (Ahlse et al., 2020; Jaffar et al., 2020; Kennedy, 2020; Kottasz & Bucknell Bossen, 2020), consumer behavior (Gao & Huang, 2019; Zuo & Wang, 2019), the intention of usage (Goli, 2020; Onyenucheya, 2018; Svendsen et al., 2009; Yongkuk & Wei, 2020), and difference of culture (ChwibBkowska & Kontkanen, 2017; Kitirattarkarn et al., 2019; Zuo & Wang, 2019). When it comes to creating content, therefore, brands create messaging that resonates with their key audience. Indeed, it requires a strategic engagement plan towards customers and prospects that are looking for connections on a personal level with businesses. Thus, brands are seen as part of their community. Eventually, the business realized that they should change their role by acting as mentor or supporter to be more helpful and an understanding of such audiences in the community than simply a product/service seller.

Content elements and creativity

The creative short video as the main content provides users with a platform to freely use their imagination and creativity. Previous research indicated that short-form video created via social application fulfills the needs of users in terms of social, pleasure, and stress relieving. (Feldkamp, 2021; Kumar et al., 2018; Wilson & Mihalcea, 2019). As such, various platforms are dedicated to social entertainment, news, and information. Meanwhile, the business also focuses

on creating relevant and consistent and distributing valuable to retain existing customers and to attract prospects—to drive the profitability of such audience's action. According to Fan et al. (2017), the value of collaboration between brands and consumers affects online brand's performance relies on form, content, sources of information, and time. A variety of shapes, complementary contents, diversity of sources, and real time mutual communication via a message and video conference. Thus, many businesses are now focusing on video content on numerous levels to ensure informative and engaging content delivering across multiple SM platforms (Gao & Huang, 2019; Moriuchi, 2016). These include content creation, sharing, enrichment, and consumption.

More recent studies about the short-form video have categorized into a different type of contents, including education (Moussiades et al., 2019), dissemination of rich information (Darnell et al., 2017), expertise-knowledge sharing (life hacks) (Lu & Lu, 2019), entertainment (Wang, 2020), influencer/peer review (Haenlein et al., 2020), inspiration (Gao et al., 2020), and marketing content (advertising, sales, and promotion) (Plessis, 2017). Indeed, content marketing that makes the business more attractive as a potential employer and enables it to differentiate itself from competitors. The features, functionality, and techniques by shot video content platform provide audiences with endless video content to meet their curiosity, psychological, and entertainment needs, leading to increase audience's stickiness and enabling them to continue their creation (Melton et al., 2020; Plessis, 2017). Thus, a business could not only create basic content but also create a rich content that allows for conversations around it, which a brand could use to resolve concerns. At the same time, the community members could also assist each other through UGC. To be successful, a business must have formally content marketing strategy in place.

Engagement approach: Integrated Marketing Communications

Marketing communications is the collaborative process of leveraging the marketing practices and marketing mix by using messages to participate and encourage active audience participation. With the advance in technology and the emergence of SM platforms, it has affected both marketing practice and consumer behavior. Thus, many businesses has involved with the Integrated Marketing Communication (IMC) where it considers as the marketing programs/plans that execute various marketing activities with consistency to create the unified force of different aspects of marketing communication (e.g., sales promotion, public relations, branding advertising, and direct marketing) rather than to work in isolation (Duffett, 2020; Falahat et al., 2020; Laurie & Mortimer, 2019; Pisticchio & Toaldo, 2020; Porcu et al., 2019). Indeed, from a marketing practitioner's perspective, IMC has a considerably positive impact on communications creativity and cause consistency in communications,

especially the emergence of such SM platforms. Short-form video perceived one of the IMC tools that many businesses intend to adopt and create as a strategic business model. Currently business model has involved and offered advertising services by using monetization of users (e.g., consumers, influencers, or even peers)—to anyone wishing to reach those audiences with digital content and marketing communications. Previous research indicated that IMC impacted brand awareness among the millennial generation (Mamduh & Hutagalung, 2020). In doing this, business at the first stage must be analyzed of prospects to whom that the message will communicate with; thus, demographic characteristics of the target audience are required. The second step conducts with creating a brand or unique business identity which matches to characteristics of prospects to differentiate from other competitors. The next step is too specific goals related to brand identity and objectives must be determined for the building trust. The fourth step is selecting tools and allocating of budget. All tools selected is followed by defining time-phased onboarding and measuring of program. For this process to be successful, previous academics argued that the establishment of an online community is necessary. The online community can facilitate transparency in communication between companies and customers (Yawised, Ellis, et al., 2017). As such, SM tools are becoming centers of conversations to exchange an idea. Business have tried to integrate SM tools within their daily Customer Relationship Management program (CRM) routines. Under these circumstances, a short-form video is currently plays a vital role for many the businesses as it enables business to collect existing customers and audiences profiles, to listening and monitoring comments from prospects to increase the effectiveness and efficiency of their CRM activities (Cheng & Shiu, 2019; Lu & Miller, 2019; Yawised & Torugsa, 2014; Yawised, Torugsa, et al., 2017).

Proactive engagement

The audience engagement strategies for more meaningful content have been proposed by many previous scholarly (Bowden & Mirzaei, 2021; Chen et al., 2020; Izogo & Mpinganjira, 2020; Juntunen et al., 2020; Rietveld et al., 2020). Such engagement encourages audiences to perform their engagement, activity and, expression of opinion with creativity. Many forms of engagement approaches created by the creator will be sent to the audience to build relationships and trust between them. Many contents and activities are designed on offerings and bringing them to market by using various techniques that motivated them to actively participate, such as Hashtag (#), content keep related to technology, providing educational solutions, social experiment and so forth. All such activities can be seen as initially relational constructs of the engagement, which can further develop into a various relationships such as brand loyalty, relationship marketing, concentric marketing,

marketing orientation, customer relationship management, and social networks (Schultz and Peltier, 2013). Integrating these relational constructs into a consumer context that underpins of “psychological state” concept leading to a consumer brand proactive engagement where psychological state refers to “virtue of interactive, co-creative customer experiences with a focal agent/object, under a specific set of context-dependent conditions, and exists as a dynamic, iterative process in which other relational concepts are antecedents and, or consequences” (Calder et al., 2016, p. 40). As such, antecedents and consequences of proactive brand engagement may view considering key SM usage metrics such as expressions of agreement, ratings, comments, and shares due to the interactive and co-creative nature of SM (Barger and Labrecque, 2013). On this basis, brand attitude may affect the likelihood of consumers posting negative product reviews without ever purchasing the product they are reviewing (Anderson and Simester, 2014). On the opposite end of the spectrum, the likelihood of a consumer sharing a viral video linked to support the brand and making a positive feedback to peers also (Huang et al., 2013). To cope with these challenges, brand usually uses a various marketing engagement technique, including providing a reward, using marketing mix and customer relationship program (Haenlein et al., 2020; Yawised, Ellis, et al., 2017), or even to build up an online community the mitigate risks of their brand reputation. Such online communities are powered by exchanging and sharing content and information and will turn into the powerful brand reputations and sales instruments (Bowden & Mirzaei, 2021).

Technology Acceptance Model (TAM)

TAM emerged as the most popular theory in the review of technology adoption studies, with researchers adopting, adapting, and extending the model across various use contexts (David et al., 1989). In the age of content marketing, particularly short video content engagement, partnering with SM influencers is already familiar to many brands. Thus, the market is undergoing constant change so brands are continually evolving their strategies accordingly. The market is rapidly expanding as influencer types have proliferated, with influencers filling every conceivable niche and sub-niche interest (Trivedi & Sama, 2020). As a result, consumers' attitudes towards technology adoption becomes significant for the brand and its strategy in their markets. With the cutting-edge of short-form video content engagement, it can state that whether consumers' buying decisions will be made out of a product fulfilling their needs and not the customer's experiences with the business (Harrigan et al., 2021; Wang, 2020). Hence, previous research studies have not only focused on individual consumers' perception and acceptance of such novel technologies, but is also the effect of influencer marketing on attitude towards the brand relationship, perceived source

credibility, attractiveness, and purchase intentions (Trivedi & Sama, 2020).

Proposed short-form video content engagement model

Based on the previous section, this study proposed a ‘Short-form Video Content Engagement Model’ as shown in Figure 1. The model comprises three main core components, including subject areas which provide the required parameters for testing hypotheses and relationships between them. The three main components are ‘Consumer Characteristic’, ‘Content Elements/variety’ and ‘Engagement Approach/program’. This model also represents the interaction between such research constructs (e.g., Action viral, Co-creation, and Engagement) and presents a partial overlapping between the three circles leading to the type of marketing called ‘Evangelism’.

Consumer characteristic

The consumer characteristic component contains information of individual traits, and people that are of interest to engage in the short form of video content marketing. It also captures information about internal and external forces that impact the attitude and willingness of such engagement. The internal factors insight audiences include personality traits, pain points, social psychology, and uniqueness. The external factors include generation, motivation, and culture.

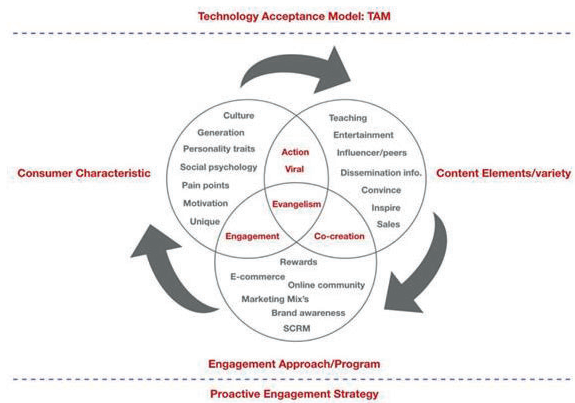
Content elements/variety

The content elements/variety component describes all the content aspects are involved in marketing purposes based on business context. It also contains activities interactions between brand and consumers. The characteristic of content proposed in this model includes dissemination information, entertainment, teaching, influencer/maven/peer, inspiration, convince, and sales content.

Engagement approach/program

The engagement marketing component lens on the idea of existing or even having a strategic engagement and monitoring system in place. These represent a potentially valuable resource for individual business size and sector. It acquires specialized knowledge and highly skills experts to perform a task and requires sophisticated monitoring and back-office systems. Indeed, top executive management plays a crucial role in this part. It must be strategic and tactical planning for the short-long-term integration with existing and vision and mission. These include the traditional mix’s approach, brand awareness, rewards, e-commerce, SCRM, and online community.

Figure 7 short-form Video Content Engagement Model



Action/Viral

The interaction between consumer characteristics circle and elements/variety content circle—creates a new dimension titled ‘action and viral’ marketing aspects (Kumar et al., 2018). It is a method of marketing whereby consumers are encouraged to share information about brands’ products and services using of SM platform. With the ability of smart mobile devices and applications, consumers would get inspired by anyone and create their content in seconds with various feature and functionality templates provided by those applications. Such activities include imitating someone’s ideas style, experimental tests, proposing solutions, and accelerating creativity with the aims of the number of viewers and followers (Su et al., 2020; Wang, 2020; Yongkuk & Wei, 2020). However, tweeting, liking, following, and sharing are not the only social engagement conversions that businesses can encourage, but is also acquire new and better-educated customers. Thus, the initially short-form video-sharing SM platform created by the business must less than five minutes and could gain inspiration from anyone to create a challenge marketing. Consumers can express their solidarity by forming consumer groups and then encouraging them to post, retweet, and share ideas or even retweeting consumer’s comments without advertising purposes (Lu & Lu, 2019). The initial video content must based on trending hashtags and then mix and match your hashtag across all exiting SM platform’s presence of a business. The strategic planning of SM usage must be defined. For example, TikTok could be used for uploading short-form video and highlight the content, then encourage audiences to follow long video content on YouTube channel continually, and Facebook must be set for lives steaming content and focusing on sharing, Twitter will be used as creating new trending topics and new hashtag related to business. Instagram also uses uploading a picture incorporated with a short form of video content.

Co-creation

New cutting-edge applications embedded inside a smartphone or even a free video download application—will

enable audiences and existing customers to co-create unique value. Their mission is to capture and present the world's creativity, sharing knowledge, precious life moments, and talent videos' content directly from the mobile phone. Such capabilities provide brands with more options for growth, and their value is not limited. The businesses could be optimized through marketing techniques through different combinations of approaches. One of the methods frequently used for brand engagement based on previous research is altruistic marketing (Lu & Miller, 2019), where business is branding itself as a 'trustworthy, moral code, integrity and transparency person' or simply calling themselves as 'good guy' for current and potential customers sympathetic to a need-situation or cause. Brands intend to apply the altruistic marketing strategy to their business. It aims to tap into people's emotional and psychological aspects. The further step is the creation of meaningful communication with audiences. At this stage, the marketing approach/program (e.g., SCRM) exploits existing SM by encouraging customers to share news stories with their friends. Brand and customer are mutually working together as co-creation content and deliverables value to others (Chuang, 2020; Feldkamp, 2021; Yawised, Ellis, et al., 2017).

Engagement

Engaging interaction and long-term engagement with short-form video content must incorporate into existing business program's presence such as reward programs and CRM (Itani et al., 2020; Lu & Miller, 2019). Such programs would cultivate new lines of engagement and support to create active mentorships to help provide personalized action plans for success. Brands would increase the level of cognitive absorption reached by the audiences influences the perceived ease of use and the perceived the usefulness of the technology, thus linking to the attitude towards technology adoption (i.e., TAM principles) that motivates its benefit with time and long-term engagement. For example, using the SCRM program incorporate with content marketing—precise customer's consuming behavior and preferences sensing, combined with mobile applications, will enable a new generation of highly personalized services and information (Mamduh & Hutagalung, 2020). This because intelligence smartphone devices have activities sensor capabilities that use multiple positioning methods to provide different granularities of individual potential customer data. Knowing an individual's behavior is helpful in delivering highly relevant contextual information and services. As a result, the forming of online community groups has especially during particularly events.

Evangelism

Evangelism is a marketing strategy in which existing customers become the critical influencers by advocating and disseminating information about the brand, products, and

services without being paid. In this sense, it can be called a customer loyalty program that current customers can draw the attention of others and can convince someone to join the brand. Such evangelists can speak and communicate with others as peers directly. Unsurprisingly, they will express their perception of the brand in both positive and negative sides to peers, and they will not recommend some unsafe products or even dissatisfaction with some services to their peers also. Consequently, this would build trust with a transparent business practices in the long run. A short-form video can initially create that empowered and inspired employees will expand brand ideas almost naturally, leading to satisfaction among the audiences once audiences become potential customers. Trustworthiness is the key to convert those into the lead and natural evangelists finally. In the same vein, the value of co-creation and customer brand engagement are drivers of evangelical brand-related behaviors (Harrigan et al., 2021). Evangelists or brand-savvy has a long-term effect on the brand equity and works as a shield against the market forces (competition), and any negatives stemmed from rivals. From business's perspectives, influencers and content creators would be anyone who will embrace SM creator applications (e.g., Facebook, TikTok, Instagram, etc.) to disseminate brand's messages. At the same time, marketing person (advertisers) will focus more on compelling, short-form video content for use in advertisement breaks throughout all this new video content (Bowden & Mirzaei, 2021; Melton et al., 2020; Sun et al., 2020). Finally, top executive's management will create a marketing strategy that embraced user-generated content because it allows not for free high-quality content, but also it helps customers to feel that they are part of a great community of brand enthusiasts (Assaker, 2020; Shutsko, 2020).

Conclusion and Future Research Direction

This study proposes a short-form video content engagement model with a business purpose covering a series of research constructs, factors, and theoretical concepts supported by the model. This study also provides strategic engagement approaches aligned with the proposed model constructs, including the creation of short-form video content and the manipulation of SM platform related to such activities. In future research, the proposed model of this study can apply to different research approaches and models of organizational culture. In the academic sphere, the relationship between variables proposed would be tested. The variable pool of the proposed component will be formed and refined using the current literature presence of correlations among the extracted factors. The examination of the external factors on value co-creation between potential customers and brand is also recommend. As for practitioner research, brands need to view customers who identify with

them as socially active customers capable of participating in value co-creation with other customers and engaging in the rivalry faced by the brands. On this basis, action research would suggest engaging current customers, influencers, or even evangelists of the brand in strategic development and the betterment of engagement practices in business.

References

- Ahlse, J., Nilsson, F., & Sandström, N. (2020). It's time to TikTok: Exploring Generation Z's motivations to participate in #Challenges.
- Almeida, S. O. d., Scaraboto, D., & Fleck, J. P. d. S. (2020). "No piracy talk": how online brand communities work to denormalize controversial gaming practices. *Internet Research*, 30(4), 1103-1122.
- Aslan, S., & Güdükbay, U. (2019). Multimodal Video-based Apparent Personality Recognition Using Long Short-Term Memory and Convolutional Neural Networks. *ArXiv*, 14(8), 1-10.
- Assaker, G. (2020). Age and gender differences in online travel reviews and user-generated-content (UGC) adoption: extending the technology acceptance model (TAM) with credibility theory. *Journal of Hospitality Marketing & Management*, 29, 428 - 449.
- Bowden, J., & Mirzaei, A. (2021). Consumer engagement within retail communication channels: an examination of online brand communities and digital content marketing initiatives. *European Journal of Marketing, ahead-of-print*(ahead-of-print).
- Calder, B., Isaac, M. S., & Malthouse, E. (2016). How to Capture Consumer Experiences: A Context-Specific Approach To Measuring Engagement. *Journal of Advertising Research*, 56, 39 - 52.
- Chen, Q., Min, C., Zhang, W., Wang, G., Ma, X., & Evans, R. (2020). Unpacking the black box: How to promote citizen engagement through government social media during the COVID-19 crisis. *Computers in Human Behavior*, 110, 106380.
- Cheng, C. C., & Shiu, E. C. (2019). How to enhance SMEs customer involvement using social media: The role of Social CRM. *International Small Business Journal*, 37(1), 22-42.
- Chuang, Y.-W. (2020). Promoting Consumer Engagement in Online Communities through Virtual Experience and Social Identity. *Sustainability*, 12(3), 855.
- ChwibBkowska, A., & Kontkanen, M. (2017). How culture shapes user responses to firm-generated content on social media: the role of cultural dimensions of in-group collectivism, indulgence, and masculinity. *International Journal of Export Marketing (IJEXPORTM)*, 1(4).
- Darnell, D., Dorsey, C. N., Melvin, A., Chi, J., Lyon, A. R., & Lewis, C. C. (2017). A content analysis of dissemination and implementation science resource initiatives: what types of resources do they offer to advance the field? *Implementation Science*, 12(1), 137.
- Daugherty, T., Eastin, M., & Bright, L. (2008). Exploring Consumer Motivations for Creating User-Generated Content. *Journal of Interactive Advertising*, 8, 16 - 25.
- David, F., Bagozzi, R., & Warshaw, P. (1989). User acceptance of computer technology: a comparison of two theoretical models. *Journal of Management Science*, 35(8), 982-1003.
- Duffett, R. G. (2020). The YouTube Marketing Communication Effect on Cognitive, Affective and Behavioural Attitudes among Generation Z Consumers. *Sustainability*, 12(5075), 1-25.
- Falahat, M., Ramayah, T., Soto-Acosta, P., & Lee, Y.-Y. (2020). SMEs internationalization: The role of product innovation, market intelligence, pricing and marketing communication capabilities as drivers of SME international performance. *Technological Forecasting and Social Change*, 152(3), 1-7.
- Fan, X., Dong, X., & Chang, Y. (2017). Effects of the characteristics of online multimedia synergy on consumers' message acceptance and message response. *Online Information Review*, 41(5), 710-727.
- Feldkamp, J. (2021). The Rise of TikTok: The Evolution of a Social Media Platform During COVID-19. In C. Hovestadt, J. Recker, J. Richter, & K. Werder (Eds.), *Digital Responses to Covid-19: Digital Innovation, Transformation, and Entrepreneurship During Pandemic Outbreaks* (pp. 73-85). Springer International Publishing.
- Gao, B., & Huang, L. (2019). Understanding interactive user behavior in smart media content service: An integration of TAM and smart service belief factors. *Heliyon*, 5(12), 1-13.
- Gao, P., Li, C., Chu, Y., & Xie, Y. (2020). The triggering mechanism of short video customer inspiration and its influence on customer engagement. *Advances in Psychological Science*, 28(5), 731-745.
- Goli, M. (2020). Behavioural Intention to use social networking mobile apps: The case of TikTok. *International Journal of Business Innovation and Research*, 1, 1.
- Haenlein, M., Anadol, E., Farnsworth, T., Hugo, H., Hunichen, J., & Welte, D. (2020). Navigating the New Era of Influencer Marketing: How to be Successful on Instagram, TikTok, & Co. *California Management Review*, 63(1), 5-25.
- Harrigan, P., Roy, S. K., & Chen, T. (2021). Do value co-creation and engagement drive brand evangelism? *Marketing Intelligence & Planning*, 39(3), 345-360.
- Hsiao, K.-L., & Chiang, H.-S. (2015). YouTube stickiness: the needs, personal, and environmental perspective. *Internet Research*, 25(1), 85-106.
- Itani, O. S., Krush, M. T., Agnihotri, R., & Trainor, K. J. (2020). Social media and customer relationship management technologies: Influencing buyer-seller

- information exchanges. *Industrial Marketing Management*, 90, 264-275.
- Izogo, E. E., & Mpinganjira, M. (2020). Behavioral consequences of customer inspiration: the role of social media inspirational content and cultural orientation. *Journal of Research in Interactive Marketing*, 14(4), 431-459.
- Jaffar, B. A., Riaz, S., & Mushtag, A. (2020). Living in a Moment: Impact of TikTok on Influencing Younger Generation into Micro-Fame. *International Journal of Knowledge Content Development & Technology*, 10.
- Juntunen, M., Ismagilova, E., & Oikarinen, E.-L. (2020). B2B brands on Twitter: Engaging users with a varying combination of social media content objectives, strategies, and tactics. *Industrial Marketing Management*, 89, 630-641.
- Kassamali, B., Villa-Ruiz, C., Mazori, D. R., Min, M., Cobos, G. A., & LaChance, A. H. (2021). Characterizing top educational TikTok videos by dermatologists in response to "TikTok and dermatology: An opportunity for public health engagement.". *Journal of the American Academy of Dermatology*.
- Kennedy, M. (2020). If the rise of the TikTok dance and e-girl aesthetic has taught us anything, it's that teenage girls rule the internet right now : TikTok celebrity, girls and the Coronavirus crisis. *European Journal of Cultural Studies*, 23(6), 1069 - 1076.
- Kitirattarkarn, G. P., Araujo, T., & Neijens, P. (2019). Challenging Traditional Culture? How Personal and National Collectivism-Individualism Moderates the Effects of Content Characteristics and Social Relationships on Consumer Engagement with Brand-Related User-Generated Content. *Journal of Advertising*, 48(2), 1-16.
- Kottasz, R., & Bucknell Bossen, C. (2020). Uses and gratifications sought by pre-adolescent and adolescent TikTok consumers. *Young Consumers*, 21(4), 463-478.
- Kumar, H., Singh, M. K., & Gupta, M. P. (2018). Socio-influences of user generated content in emerging markets. *Marketing Intelligence & Planning*, 36(7), 737-749.
- Laurie, S., & Mortimer, K. (2019). How to achieve true integration: the impact of integrated marketing communication on the client/agency relationship. *Journal of Marketing Management*, 35(1), 1-22.
- Lu, Q. S., & Miller, R. (2019). How Social Media Communications Combine with Customer Loyalty Management to Boost Green Retail Sales. *Journal of Interactive Marketing*, 46(11), 87-100.
- Lu, X., & Lu, Z. (2019). Fifteen Seconds of Fame: A Qualitative Study of Douyin, A Short Video Sharing Mobile Application in China. In G. Meiselwitz (Ed.), *Social Computing and Social Media. Design, Human Behavior and Analytics* (pp. 233-244). Springer International Publishing.
- Mamduh, N., & Hutagalung, I. (2020). Strategy of integrated marketing communication to increase brand awareness in millennial generations. *Journal of Social Science and Humanities Research* 5(12), 1-8.
- Melton, R., Min, J. E., Kim, J., & Kim, B. Y. (2020). Who says what?: exploring the impacts of content type and blog type on brand credibility, brand similarity and eWOM intention. *Journal of Fashion Marketing and Management: An International Journal*, 24(4), 611-630.
- Moriuchi, E. (2016). Social Media Marketing: Strategies in Utilizing Consumer-Generated Content. *Business Expert Press*.
- Moussiades, L., Kazanidis, I., & Iliopoulou, A. (2019). A framework for the development of educational video: An empirical approach. *Innovations in Education and Teaching International*, 56(2), 217-228.
- Omar, B., & Wang, D. (2020). Watch, Share or Create: The Influence of Personality Traits and User Motivation on TikTok Mobile Video Usage. *Int. J. Interact. Mob. Technol.*, 14(04), 121-137.
- Omar, S., Tang, L., Bolong, J., & Zawawi, J. W. M. (2020). Moderating Effect of Gender on the Relationship between TikTok Usage and Positive Emotion among TikTok Users in China. *The International Journal of Academic Research in Business and Social Sciences*, 10, 51-66.
- Onyenucheya, U. D. (2018, June 18 – 21, 2017). What do we Know about Personality Traits, Technology Use, Intention, Reputation and Brand Credibility? Cross Cultural Issues in the Aviation Industry's User-Generated Content (UGC). 31st Bled eConference: Digital Transformation – From Connecting Things to Transforming Our Lives, Bled, Slovenia.
- Pisicchio, A. C., & Toaldo, A. M. (2020). Integrated marketing communication in hospitality SMEs: analyzing the antecedent role of innovation orientation and the effect on market performance. *Journal of Marketing Communications*, 1-20.
- Plessis, C. D. (2017). The role of content marketing in social media content communities. *SA Journal of Information Management*, 19(1), 1-7.
- Porcu, L., Barrio-García, S., Alcántara-Pilar, J. M., & Crespo-Almendros, E. (2019). Analyzing the influence of firm-wide integrated marketing communication on market performance in the hospitality industry. *International Journal of Hospitality Management*, 80, 13-24.
- Rietveld, R., van Dolen, W., Mazloom, M., & Worring, M. (2020). What You Feel, Is What You Like Influence of Message Appeals on Customer Engagement on Instagram. *Journal of Interactive Marketing*, 49, 20-53.
- Shutsko A. (2020) User-Generated Short Video Content in Social Media. A Case Study of TikTok. In: Meiselwitz G. (eds) *Social Computing and Social Media. Participation, User Experience, Consumer Experience, and Applications of Social Computing. HCII 2020. Lecture Notes in Computer Science*, vol 12195. Springer, Cham. https://doi.org/10.1007/978-3-030-49576-3_8

- Su, Y., Baker, B. J., Doyle, J., & Yan, M. (2020). Fan Engagement in 15 Seconds: Athletes' Relationship Marketing During a Pandemic via TikTok. *International Journal of Sport Communication*, 13, 436-446.
- Sun, L., Zhang, H., Zhang, S., & Luo, J. (2020). Content-based Analysis of the Cultural Differences between TikTok and Douyin. *ArXiv, abs/2011.01414*.
- Svendsen, G. B., Sohlt, Y., Munch-Ellingsen, A., Gammon, D., & Schurmann, A. (2009). The Importance of Being Useful and Fun: Factors Influencing Intention to Use a Mobile System Motivating for Physical Activity. 2009 42nd Hawaii International Conference on System Sciences, Hawaii
- Taecharungroj, V. (2019). User-generated place brand identity: harnessing the power of content on social media platforms. *Journal of Place Management and Development*, 12(1), 39-70.
- Tajurahim, N. N. S., Bakar, E. A., Jusoh, Z., Ahmad, S. o., & Arif, A. M. (2020). The effect of intensity of consumer education, self efficacy, personality traits and social media on consumer empowerment. *International Journal of Consumer Studies*, 44, 511-520.
- Trivedi, J., & Sama, R. (2020). The effect of influencer marketing on consumers' brand admiration and online purchase intentions: an emerging market perspective. *Journal of Internet Commerce*, 19(1), 103-124.
- Wang, Y. (2020). Humor and camera view on mobile short-form video apps influence user experience and technology-adoption intent, an example of TikTok (DouYin). *Comput. Hum. Behav.*, 110, 1-9.
- Wilson, S. R., & Mihalcea, R. (2019). Predicting Human Activities from User-Generated Content. Proceedings of the 57th Annual Meeting of the Association for Computational Linguistics, Florence, Italy.
- Yawised, K., Ellis, L., & Wong, M. C. (2017). The role and nature of scrm in Australian private sector: an exploratory study. *Asia Pacific Journal of Contemporary Education and Communication Technology (APJCECT)*, 4(1), 139-150.
- Yawised, K., & Torugsa, N. (2014). An exploration of the factors influencing social CRM adoption: evidence from australian firms. *Academy of Taiwan Business Management Review*, 10(1), 24-31.
- Yawised, K., Torugsa, N., & O'Donohue, W. (2017). Exploring social customer relationship management in Australian small and medium enterprises. *International Journal of Globalisation and Small Business*, 9(4), 222-251.
- Yongkuk, C., & Wei, X. (2020). Effects of Perceived Quality of TikTok on User Satisfaction and Continuance Intention: and the Role of Commercial Viability. *The Journal of the Korea Contents Association*, 20, 77-89.
- Zuo, H., & Wang, T. (2019). Analysis of Tik Tok User Behavior from the Perspective of Popular Culture. *Frontiers in Art Research*, 1(3), 1-5.

Effect of FDI on Economic Growth in BRICS and Turkey

Okan Tunsoy, Baskent University, Turkey

Emin Akcaoglu, Manisa Celal Bayar University, Turkey

It is widely considered that foreign direct investments (FDI) play an important role in growth and development of countries, particularly developing ones. It is reasonable to expect that FDI may increase the capital stock in a country, and hence the employment by also enabling the country to reach international markets. In addition, FDI may also contribute to host country economies over technology transfers to, and productivity increases in domestic companies. That is why many countries are making an extraordinary effort to attract foreign capital in direct investment terms instead of portfolio investments such as international borrowing. However, empirically testing such expectations is a necessity to ensure whether FDI is really cure for developing countries' economic problems. To that end this study especially focuses on the relationship between FDI inflows and economic growth in BRICS countries and Turkey.

Introduction

Increasing importance of international production networks has made countries significantly dependent on each other economically. FDI operations of multinational companies have played a big role in this process. Multinationals simultaneously operate in various countries in the same value chain either horizontally or vertically. In many instances, countries' exports and imports are in fact intra-firm trade of some multinationals.

While this is true, many countries, developing or developed have important economic problems such as high unemployment, low growth etc. In case of the developing countries such problems are related to savings and hence capital shortages to finance investments. It is always possible to reach capital in a number of forms. Portfolio investments, especially in the form of international borrowing is one these. However, this option is rather problematic due to a number of reasons. For instance, the cost of capital for borrowing from outside parties is rather expensive for many developing nations, as they are usually regarded risky by foreign lenders. In this respect, governments of many developing tend to attract foreign direct investment to fill in the savings gap for growth and employment. That is why in the recent years, many developing countries have been trying to convince foreign investors either green field investments of mergers

and acquisitions. For this purpose, governments use a number of incentives such as tax advantages, or holidays, provision of free land, coverage of social security premiums of local staff etc.

The biggest potential contribution of foreign direct investments to developing countries is an increase in total physical capital stock. This could be true in terms of green field investments, but there is no a clear-cut outcome in terms of foreign investments over asset acquisitions such privatizations etc. However, in both cases FDI may stimulate economic growth because FDI does not only contribute to capital or financial shortages. But also it may have some other positive effects on productivity, transfer of new or advanced technologies, innovativeness, competition, organizational improvements, and integration to international markets, and spillover effects of which into different compartments of developing economies. Without doubt, in the case of existence of similar effects, employment and growth may be positively influenced by the entry of direct foreign capital.

Some of the developing countries are large direct foreign capital attractors. As is known BRICS refers to Brazil, Russia, India, China, and South Africa which are having relatively high economic potentials due to their large populations, rich natural resource bases, large markets. These characteristics are also important for economic growth potential. In accordance with this, BRICS are among the leading FDI attractors. For instance, in 2020, FDI inflows in China increased to \$149 billion from \$141 billion in 2019; in India to \$64 billion from \$51 billion in 2019, while many countries suffered from significant decreases due to the global Covid pandemic. Brazil, Russia and South Africa were among those countries which had decreasing FDI levels. FDI inflows plummeted in Brazil with \$25 billion in 2020 (\$65 billion in 2019), and Russia with \$10 billion in 2020 (\$32 billion in 2019). It also decreased by 39 per cent to \$3.1 billion in South Africa (UNCTAD, 2021).

Here, we should also note the role of China and India in global production networks as manufacturers and very large markets. China has an unrivaled position to that end. Its position in the world trade is pivotal, and its economy performs as the engine of the growth globally. Between 1992 and 2017, China ranked among the top in the world in terms of economic growth rate.

India has also a dominant position in the world economy with the largest forecasted population by 2050. The fact that India is dependent on foreign energy resources such as oil and natural gas. It is an attractive host location for multinationals in terms of labor costs, high labor quality, and productivity.

Brazil has a relatively different position with wide and diverse natural resources. Russia has a similar position. Both countries are dependent upon extractive industries. The recent events like the war in Ukraine has proved that Russia's role in the world economy is really influential over energy resources such oil and natural gas. That is why both countries are very attractive particularly for resource-seeking multinationals.

South Africa's case is rather different. The country is the most important economy of the Sub-Saharan Africa; its economy is based on manufacturing industries and mining with rich mineral resources, also together with favorable agricultural areas. The country has also important advantages with its position as a trade gateway to the African continent. And therefore, it is also a significant host location in the African continent.

On top of the BRICS nations, Turkey is an important FDI host though the total foreign capital attracted so far cannot be comparable with the major BRICS members. However, historically Turkey has always been cared by foreign multinationals from various industrial countries such as Germany, and the Netherlands. The country has a special geographical position between three continents, Asia, Europe and Africa. The country has also young and dynamic population that is attractive for manufacturing and service companies serving not only locally but also thirsty for proximity to the European Union market. These have provided significant advantages to Turkey in terms of foreign direct investments. In Turkey, FDI inflows also decreased to \$7.8 billion in 2020 from \$9.3 billion in 2019 (UNCTAD, 2021).

In this study, the effect of FDI inflows on economic growth in BRICS countries and Turkey is examined for the period 1992 – 2017 over a detailed panel data analysis. Annual data used for the period specified in the study were obtained from the World Bank and UNCTAD.

Literature Review: FDI and Economic Growth

There is no consensus among the authors of empirical studies examining the relationship between foreign direct investment and economic growth. Some of these studies involve country groups while there are also single country investigations. Given the following studies in the literature examining the relationship between FDI and economic growth; it is seen that the effect of FDI on economic growth is positive in most of the studies, whereas there is negative or not any relationship in some of these. However, it should be kept in mind that the use of different methods and periods

in these studies and the presence of unique characteristics of the country examined may also have an effect on the results achieved (Table 1.).

Table 1. Earlier studies of the relationship between FDI inflows and economic growth, and their outcomes

Study	Countries and period involved in research	Findings (Effects of FDI on growth)
Sridharan et al (2009)	BRICS countries	no relationship
Kottaridi (2010)	20 OECD countries and 20 Non-OECD countries (1970-2008)	+ (stronger in developed countries)
Ağayev (2010)	25 transition countries (1994-2008)	+
Yılmazzer (2010)	Turkey (1991-2007)	+
Feridun (2011)	Singapore (1976-2002)	no relationship
Behname (2012)	South Asian countries (1977-2009)	+
Ludoşean (2012)	Romania (1991-2009)	no relationship but economic growth increases FDI inflows
Sichei et al (2012)	45 African countries (1980-2008)	+
Xing (2013)	Chin, (1994-2011)	+
Belloumi (2014)	Tunisia (1970-2008)	no relationship
Karimi (2014)	15 middle income countries (1996-2005)	+
Szkorupova (2014)	Slovakia (2001-2010)	+
Abbes et al (2015)	65 countries (1980-2010)	no relationship
Gerçeker (2015)	Turkey (1998-2014)	no relationship
Hussain et al (2016)	Pakistan (1991-2015)	+
Iamsiraroj et al (2015)	140 countries, 1970-2009	+
Şahin (2015)	Turkey (1980- 2013)	+ (long term)
Bostan et al (2016)	6 Eurasian countries (1995-2012)	no relationship
Topallı (2016)	BRICS countries and Turkey (1982-2013)	no relationship
Simionescu (2016)	EU countries (2008-2014)	FDI has a positive effect on economic growth.
Acaravcı et al (2017)	Turkey (1998-2015)	+ (long term) no relationship (short term)
Bakırtaş et al (2017)	BRIC countries and Turkey (1992-2013)	+
Benli et al (2017)	Turkey (2000-2015)	+
Sothan, (2017)	Cambodia (1980-2014)	+

Sothan, (2017)	Cambodia (1980-2014)	+
Nlandu et al (2018)	34 countries (1988-2013)	+
Dinh et al (2019)	Low and middle income countries	+ (long term) - (short term)
Sinha (2019)	30 Asia-Pacific countries (2001-2017)	+
Vásquez et al (2019)	32 countries (some OECD and non-member countries) (1996-2014)	+

Data and Econometric Analysis

In this study, the relationship between foreign direct investments (FDI) and gross national product (GDP) is analyzed by panel data analysis for the BRICS countries and Turkey by using the data for the period of 1992 - 2017.

Panel data, which can have time or group effects at the same time, are cross-section time series data and the resulting effects are analyzed by fixed and random effects models. The panel data set consists of observations of “n” individuals each measured at the time point “T”, and the total number of observations is “nT” (Yaffee, 2003).

In general terms, a linear panel data model can be created as shown below.

$$Y_{it} = \beta_{0it} + \beta_{1it} X_{1it} + \beta_{2it} X_{2it} + \dots + \beta_{kit} X_{kit} + u_{it}$$

In the model, $i = 1, 2, \dots, N$ shows the section unit and $t = 1, 2, \dots, T$ also shows the time period. It is assumed that the error term is independently and normally distributed for all time periods and all units. Before proceeding with the estimation to be made regarding the model, some assumptions are made according to the fact that the parameters take value according to unit and / or time.

This study has three major stages: In the first stage, the basic statistical values of the selected data sets for the foreign direct investments (FDI) and gross national product (GDP) were examined. At this stage, the movements of the series in cyclical terms over time are shown with graphs, and the unit root properties of all series in the analysis are revealed by checking whether the data set contains unit root within the time series. In this context, unit root test developed by Breitung (2000), Levin, Lin & Chu (2002) and Im, Pesaran, and Shin (2003) was used.

In the second stage of the study, correlation and panel Granger causality tests were applied to reveal the causality relationship between variables.

In the third and last stage of the study, the relationship between FDI (independent variable) and GDP (dependent variable) was investigated.

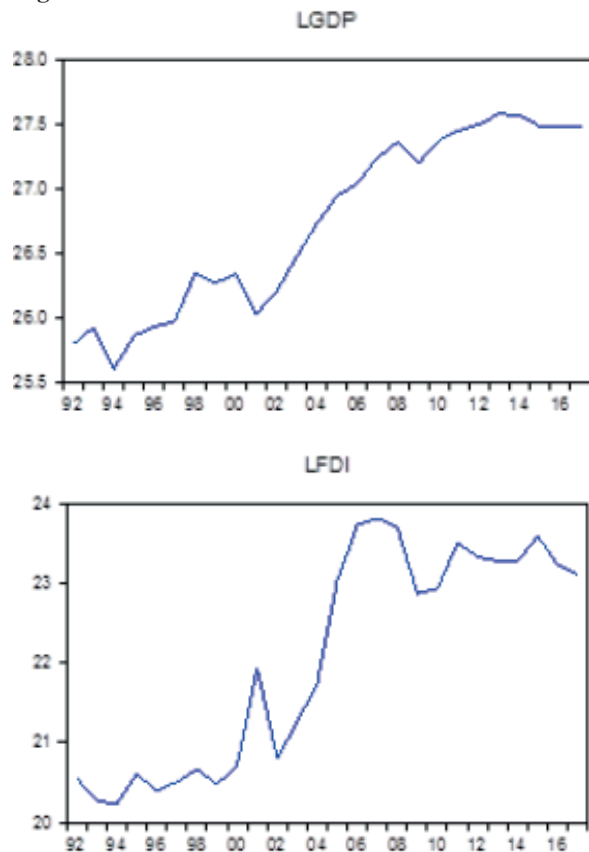
The basic statistical values of the data set are shown in

logarithmically in Table 2 below. As is shown in the table, the standard deviation values for most of the variables are within normal ranges compared to the average value, and this is an indication that there is no significant volatility in the variables.

Table 2. Basic Descriptive Statistical Values for the Data Set

Statistics	LFDI	LGDP
Average	22.05996	26.73330
Median	22.40305	26.83366
The Greatest Value	23.81644	27.58035
The Smallest Value	20.22569	25.59610
Standard error	1.351628	0.675803
Distortion	- 0.105928	- 0.160343
Kurtosis	1.254846	1.426910
Jarque - Bera Test Statistics	23.43587	19.54567
Significance (P)	0.000008	0.000057
Number of Observations	182	182
Horizontal - Number of Sections	7	7

Figure 1. Line Plots of FDI and GDP versus Time.



FDI and GDP variables showed significant volatility

(breaks) in all countries, especially in crisis periods in the world (especially in 2000, 2008) (Figure 1).

In this study, primarily, unit root test was performed to determine the stationarities of the series and then causality test was applied. Because regression analysis for non-stationary series will show high standard error. In this case, the test may cause insignificance of statistics and spurious regression results. In this study, Breitung (2000), Levin et al. (2002) and Im et al. (2003) panel unit root techniques are used. Levin et al. (2002) and Breitung (2000) in panel unit root tests, the null hypothesis for the existence of a common unit root is tested. Im et al. (2003) in panel unit root test, the H0 hypothesis for the existence of individual unit root is tested. Breitung (2000) and Levin and others (2002) used the following equation number (1) Augmented Dickey - Fuller (ADF).

$$\Delta Y_{it} = \delta Y_{it-1} + \sum_{j=1}^{p_i} \beta_{ij} \Delta Y_{it-j} + X'_{it} \alpha + \varepsilon_{it} \quad (1)$$

In Eq. (1), $i = 1, 2, \dots, N$ means cross section units; $t = 1, 2, \dots, T$ time dimension; X_{it} , exogenous variables that include any fixed effect or individual trend component; ε_{it} , independent error terms and p_i means the length of the delay. Within the framework of the null hypothesis ($H_0: \delta = 0$) indicating the existence of a unit root and alternative hypotheses stating that there is no unit root ($H_1: \delta < 0$) Levin et al. (2002) used the standard normal distribution t statistics for fixed and trendless regression.

$$t_{\delta} = \frac{\hat{\delta}}{STD(\hat{\delta})} \quad (2)$$

Levin et al. (2002) proposed the corrected t statistic shown in equation (3) for the model with individual constant and trend.

$$t_{\delta}^* = \frac{t_{\delta} - N \hat{T} \hat{S}_N \hat{\sigma}_{\varepsilon}^{-2} STD(\hat{\delta}) \mu_{m\bar{T}}^*}{\sigma_{m\bar{T}}^*} \quad (3)$$

In the equation in (3) $\bar{T} = T \cdot p^{-1}$ indicates the average number of observations per unit in the panel; N , the cross-sectional size; $\hat{S}_N = \frac{1}{N} \sum_{i=1}^N \hat{S}_i$, the standard deviation; $\bar{T} \mu_{m\bar{T}}^*$ the mean correction and $\sigma_{m\bar{T}}^*$, indicates the standard deviation correction. Under the $H_0: \delta = 0$ hypothesis, if the coefficient is not equal to zero, it is decided that the series does not have a unit root (Levin and others, 2002: 4-8).

For each cross section, based on the mean of t statistics calculated for δ_i by estimating ADF equation (1), zero ($H_0: \delta = 0$, for all i 's) and under the alternative $H_1: \left\{ \begin{array}{l} \delta_i = 0 \quad i = 1, 2, \dots, N \\ \delta_i < 0 \quad i = N + 1, N + 2, \dots, N \end{array} \right\}$ hypotheses Im et al. (2003) used the standardized t statistics shown in equation (4).

Breitung and Levin used the standardized t statistics shown in equation 4 under the zero ($H_0: \delta = 0$, for all i) and alternative $H_1: \left\{ \begin{array}{l} \delta_i = 0 \quad i = 1, 2, \dots, N \\ \delta_i < 0 \quad i = N + 1, N + 2, \dots, N \end{array} \right\}$ hypotheses based on the averages of the t statistics calculated for the δ_i via estimating the ADF equation 1 for each cross section.

Breitung (2000), Levin et al. (2002) argued that the corrected t statistics used to test the unit root is biased and that power loss occurs when this statistic is used especially in models with individual trends, and they proposed a new t statistic (Breitung, 2000: 24). Im et al. (2003), by modifying the test statistics of Levin et al. (2002), selects the average of individual t statistics for each section unit in the panel as baseline.

$$W_{\bar{t}_{NT}} = \frac{\sqrt{N}(\bar{t}_{NT} - N^{-1} \sum_{i=1}^N E(\bar{t}_{iT}(p_i)))}{\sqrt{N^{-1} \sum_{i=1}^N \text{Var}(\bar{t}_{iT}(p_i))}} \quad (4)$$

Table 3. Panel Unit Root Test Results for Variables

Method	Statistics	P değeri	Cross Section	N
H0: There is a Unit Root..				
Levin, Lin & Chu t*	-8.35640	0.0000*	4	96
Breitung t-stat	-7.01745	0.0000*	4	92
H0: There is a Unit Root..				
Im, Pesaran and Shin W-stat	-6.80499	0.0000*	4	96
ADF - Fisher Chi-square	48.4701	0.0000*	4	96
PP - Fisher Chi-square	48.5374	0.0000*	4	96

* Means that the null hypothesis is rejected at the 1% level.

According to the panel unit root test results given in Table 3, Levin et al. (2002), Breitung (2000) and Im et al. (2003) methods denied the existence of a unit root.

In the second phase of the study, correlation analysis was performed. The purpose of this analysis is to determine the direction and degree of the relationship between variables. The Pearson correlation values calculated between the variables used in the study are shown in Table 4. As a result of this correlation analysis, if the correlation coefficient turns out to be negative, it can be said that there is an inverse (negative) relationship between the variables. So it can be said that "one of the variables will increase while

the other variable will decrease". On the other hand, if the relationship between variables is positive, it can be interpreted that "one of the variables will increase while the other variable will increase". When the correlation values in Table 4 are examined; a positive and strong relationship has been found between foreign capital investments (FDI) and the Gross National Product (GDP).

Table 4. Pearson Correlation Analysis Results Between Variables

	LFDI	LGDP
LFDI	1.000000	0.931045
LGDP	0.931045	1.000000

Except for the simple correlation relationship, the Granger causality test was conducted for the causality relationship between variables. The Granger causality test used to determine the direction of causality relationships between variables was introduced by Granger in 1969. Accordingly, if the addition of information about the x variable to the model contributes to the prediction of the y variable, then the variable x is the cause of y. The Granger causality test for the model given above is performed as follows:

If the following H1 hypothesis is accepted, x is not the cause of y.

$$H1: b_{21} = b_{22} = \dots = b_{2q} = 0 \quad (5)$$

If the H2 hypothesis is accepted, y is not the cause of x.

$$H2: d_{11} = d_{12} = \dots = d_{1q} = 0 \quad (6)$$

If both the H1 and H2 hypotheses are rejected, it is understood that there is a bilateral causality between x and y.

Table 5. Granger Causality Test Analysis Results

Hipotez	N	F value	P value
LFDI is not the Granger cause of LGDP.	25	2.26356	0.1467
LGDP is not the Granger cause of LFDI.	25	5.38650	0.0300*

* It indicates that the zero hypothesis is rejected at the 1% level.

According to Table 5, LGDP is the Granger cause of the LFDI variable. As a result, it was concluded that the FDI variable was the Granger cause of the GDP variables among all countries in the period examined.

In the third and last stage of the study; The relationships between FDI (independent variable) and GDP (dependent variable) is estimated. STATA v.14 program was used for estimation.

Table 5. Panel Model Results with GDP and FDI Variables

```
. xtsc lgdplfdi, fe
Regression with Driscoll-Kraay standard errors   Number of obs   =   156
Method: Fixed-effects regression               Number of groups =    6
Group variable (i): id                         F( 1, 5)        =   35.09
maximum lag: 2                                Prob > F         =   0.0020
                                                within R-squared =   0.5829
```

lgdp	Drisc/Kraay			t	P> t	[95% Conf. Interval]	
	Coef.	Std. Err.					
lfdi	.4056213	.068477	5.92	0.002	.2295955	.5816471	
_cons	17.97084	1.557947	11.53	0.000	13.96601	21.97567	

When Table 5 is examined; the model is completely statistically significant. [F value = 35.09 and P value = 0.0020 $\alpha = 0.05$] Both constant term and FDI variables are statistically significant in the model. [P α]

Explanation power of the model is $R^2 = 0.58$. In other words, 58% of the change that will occur in GDP is explained by FDI.

The β value of the FDI variable was found to be = 0.4056213. This value increases GDP by 0.41%, with a 1% change in FDI.

In the model, as a result of Breusch - Godfrey Serial Correlation LM Test, F value = 1.352 and P value = 0.28. In other words, it was concluded that there is no autocorrelation in the model. Similarly, as a result of the Breusch - Pagan-Godfrey variance test, the F value = 0.351 and the P value = 0.56. In other words, the model has constant variance. Since the model is univariate, the multicollinearity problem was not taken into consideration, and as a result of the tests, no econometric problems were found in the model.

When we look at the results of the model, the foreign capital investment (FDI) affects the gross national product (GDP).

Conclusions

With the implementation of liberal economic policies preventing intervention in the economy as of the second half of the 19th century, the obstacles to trade and capital movements in the international arena started to gradually disappear. With the elimination of these obstacles, countries have begun to integrate with the world and foreign direct investments have become the focus of attention, especially for developing countries. These investments can create significant positive externalities such as closing domestic savings deficits especially in developing countries with savings-investment bottlenecks, developing new technologies, increasing production, decreasing unemployment, transferring the capital into the real sector in the long term, and the development of economic growth and making this growth sustainable. In other words, foreign direct investments are expected to cause economic growth in

countries as they may have some positive effects such as improving technology and business knowledge, decreasing unemployment.

Therefore, in this study, the effect of foreign direct investment on economic growth, for the period of 1992 – 2017, in the BRICS group, and Turkey is tested empirically. The results of the causality analysis and panel data analysis applied for six emerging economies support the theory that direct investments and economic growth tend to move together in the long run. In addition, the Granger causality test results show the presence of a strong and positive relationship from foreign direct investment to economic growth.

In this respect, we suggest that foreign direct investments are important for economic growth and the sustainability of economic growth. In many developing countries, there are a number of deficits in savings, and current account etc. Savings deficit in question can rather be closed by borrowing from other countries or institutions. It can also be compensated by attracting foreign direct investment. However, external borrowing may cause some additional costs due to the higher risk premiums of developing countries. Thus, foreign direct investment gains further importance. However, attracting FDI to any country cannot be sufficient alone to ensure economic growth. At this point; the magnitude of the impact that investments will have on growth is also important. The magnitude of the impact of investments is closely related to the productivity increase that these investments may provide. In this sense, attracting FDI to production areas where there are additional productivity gains; then FDI's on economic growth may be significant. To that end, developing countries should clearly define their development targets, major sectors, resource availability, international market competitiveness etc. within a comprehensive strategic perspective to take additional measurements to attract FDI. From this perspective, it is also important to focus on issues such as efforts to attract more greenfield FDI rather than FDI in the form of acquisitions over privatization etc.

References

Abbes, S.M., Belmokkadem, M., Seghir G.M., Ghouali Y.Z., (2015). Causal interaction between FDI, and economic growth: Evidence from dynamic panel co-integration. *Procedia Economics and Finance*, (23), 276-290.

Ağayev, S. (2010). Doğrudan Yabancı Sermaye Yatırımları ve Ekonomik Büyüme İlişkisi: Geçiş Ekonomileri Örneğinde Panel Eş Tümlleşme ve Panel Nedensellik analizleri Gazi Üniversitesi İktisadi ve İdari Bilimler Fakültesi Dergisi 12/1, 159-184.

Acaravcı, A., Akyol, M (2017). Türkiye’de Doğrudan Yabancı Yatırımlar, Dış Ticaret ve Ekonomik Büyüme İlişkisi. *Uluslararası Ekonomi ve Yenilik Dergisi*, 3 (1),17-33.

Baltagi, B. H. and B. Raj (1992). “A Survey of Recent Theoretical Developments in the Econometrics of Panel Data”, *Empirical Economics*, 17, 85-109.

Baltagi, B. H. (2005). *Econometric Analysis of Panel Data*, 3rd Ed. Chichester: John Wiley.

Bakırtaş, T., Gündoğan, H (2017). BRIC-T Ülkelerinde Doğrudan Yabancı Yatırım ile Ekonomik Büyüme İlişkisi: Panel Nedensellik.V. Anadolu International Conference in Economics,1-11.

Behname, M. (2012). Foreign Direct Investment and Economic Growth: Evidence from Southern Asia, *Atlantic Review of Economics*, Vol. 2.

Belloumi M. (2014). The relationship between trade, FDI and economic growth in Tunisia: An application of the autoregressive distributed lag model. *Economic System*, sciencedirect V (38), I (2), 269-287

Benli, Keskin, Y., Yenisu, E (2017). Doğrudan Yabancı Sermaye Yatırımlarının Ekonomik Büyüme Etkisi: Türkiye için Eşbütünlük ve Nedensellik Analizi. *Gazi İktisat ve İşletme Dergisi (Gazi Journal of Economics Business)*, 3(2), 49-71.

Bostan, A., Kelleci, S., Yılmaz, A., (2016). Doğrudan Yabancı Sermaye Yatırımları ve Ekonomik Büyüme Arasındaki İlişki: Avrasya Ekonomileri Örneği. *MANAS Sosyal Araştırmalar Dergisi*, (5), 5, 24-36.

Breitung, J., (2000). The Local Power of Some Unit Root Tests for Panel Data, in: B. Baltagi (ed.), *Nonstationary Panels, Panel Cointegration, and Dynamic Panels*, *Advances in Econometrics*, Vol. 15, JAI: Amsterdam, 161-178

Dinh, T. and others, (2019). “Foreign Direct Investment and Economic Growth in the Short Run and Long Run: Empirical Evidence from Developing Countries” *Journal of Risk and Financial Management (MDPI)*, 12,176

Feridun, M., Sissoko, Y (2011). Impact of FDI on Economic Development: A Causality Analysis for Singapore 1976-2002. *International Journal of Economic Sciences and Applied Research*, (4),1,7-17

Gerçekler, M (2015). The Relationship between Foreign Direct Investments and Economic Growth in Turkish Economy: An empirical Analysis for the Period of 1998-2014. *Journal of Economics, Finance and Accounting*,(2),2, 253-265.

Hsiao, C. (1985): “Benefits and Limitations of Panel Data”, *Econometric Reviews*, 4, 121-174.

Hult, T (2009). The BRIC Countries. *Global EDGE Business Review*, (3), 4, 1

Hussain M.E. and others, (2016). Foreign Direct Investment, Trade, and Economic Growth: An Empirical Analysis of Bangladesh, V (4), 2, 1-14

Iamsiraroj, S. and Ulubaşoğlu, M.A., (2015). "Foreign direct investment and economic growth: A real relationship or wishful thinking?," *Economic Modelling*, Elsevier, vol. 51(C), pages 200-213.

Im, K., Pesaran, M. ve Shin, Y. (2003) “Testing for Unit Roots in Heterogeneous Panels”, *Journal of Econometrics*,

115, 53 - 74.

IMF - International Monetary Fund (2017). India. IMFCountry Report No 17/55, 1-63 (Erişim Tarihi: 03.09.2018 <https://www.imf.org/en/Publications/CR/Issues/2017/02/22/India-Selected-Issues-44671>)

Karimi, M.G., Hamid H. Z., (2014). The Study of the Relationship Between Good Governance and Foreign Direct Investment in Countries with Middle-Income. *Indian J.Sci.Resarch* 4 (6),742-752.

Kottaridi, C., Stengos, T (2010). Foreign Direct Investment, Human Capital and Non-Linearities in Economic Growth. *Journal of Macroeconomics*, 32,858 - 871.

Levin, A., Lin, C. ve Chu, C. (2002). "Unit Root Tests in Panel Data: Asymtotic and Finite-Sample Properties", *Journal of Econometrics*, 108, 1- 24.

Ludoşean, B. M., (2012). A VAR Analysis of the Connection between FDI and Economic Growth in Romania. *Theoretical and applied economics: GAER review*, 19(10), 115-130.

Najabat A. and others, (2017). Impact of Foreign Direct Investment on the Economic Growth of Pakistan, *American Journal of Economics* 2017, 7(4)

Nlandu M. and others, (2018). "Foreign direct investment and growth in developing countries: evidence from the countries of the Organisation of Eastern Caribbean States", *Digital Repository - Economic Commission for Latin America and the Caribbean - CEPAL Review* No: 124

Sichei, M., Kinyondo, G., (2012). Determinants of Foreign Direct Investment in Africa: A Panel Data Analysis, *Global Journal of Management and Business Research*, Volume: 12, Number: .18, 85-97.

Simionescu, M., (2016).The relation between economic growth and foreign direct investment during the economic crisis in the European Union.*Zbornik Radova Ekonomskog Fakulteta u Rijeci*, 34(1): 187-213.

Sinha M. and others, (2019). FDI Inflow, ICT Expansion and Economic Growth: An Empirical Study on Asia-Pacific Developing Countries, *Global Business Reviw*e, (2),3

Sothan, S., (2017). "Causality between foreign direct investment and economic growth for Cambodia" *Cogent*

Economic and Finance V(5), I(1) 1-13

Sridharan P. and others, (2009). Causal Relationship between Foreign Direct Investment and Growth: Evidence from BRICS Countries, *International Business Reserch*, V(2),4

Szkorupová, Z., (2014). A Causal Relationship Between Foreign Direct Investment, Economic Growth and Export for Slovakia. *Procedia Economics and Finance*, V(15), 123-128

Şahin, D., (2015). Türkiye’de Doğrudan Yabancı Sermaye Yatırımları ve Ekonomik Büyüme İlişkisi: ARDL Sınır Testi Yaklaşımı. *Akademik Sosyal Araştırmalar Dergisi*, Yıl: 3, Sayı: 19, 159-172

T.C. Dış İşleri Bakanlığı, (2018). (Erişim Tarihi: 04.12.2018, (<https://eb.ticaret.gov.tr>))

Topallı, N., (2016). Doğrudan Sermaye Yatırımları, Ticari Dışa Açıklık Ve Ekonomik Büyüme Arasındaki İlişki: Türkiye Ve BRICS Ülkeleri Örneği. *Doğuş Üniversitesi Dergisi*, Cilt 17, sayı 1, 83-95.

UNCTAD, (2021). *World Investment Report 2021*, United Nations Conference on Trade and Development, Geneva.

Xing, Y., Pradhananga M., (2013). How Important are Exports and Foreign Direct Investment for Economic Growth in the People’s Republic of China? *ADB Working Paper Series* No. 427, 1-16.

Yaffee, R. (2005). *Primer for Panel Data Analysis* Connect: Information Technology at NYU. Available online at: http://www.nyu.edu/its/pubs/connect/fall03/yaffee_primer.html.

Yılmaz, M., (2010). Doğrudan Yabancı Yatırımlar, Dış Ticaret ve Ekonomik Büyüme İlişkisi: Türkiye Üzerine Bir Deneme. *Sosyal Bilimler Dergisi*, 8,1.241-260.

Vásquez, M. and others, (2019); "Foreign direct investment, economic opening and economic growth in Lat," *Contaduría y Administración, Accounting and Management*, V 64(1), p 15-16.

WTO (2008). "Meeting of experts at the WTO 12 November 2008", Web site: http://www.wto.org/english/news_e/news08_e/trade_financ_e_12nov08_e.htm

The Influence of Covid-19 on Digital Transformation and Sustainability of Small & Medium Scale Enterprises in Nigeria

Patrick Ekpenyong Eyamba, Okan University, Istanbul, Turkey
Halit Targan Ünal, Doğuş University, Istanbul, Turkey

The study examined the impact of Covid 19 on digital transformation and sustainability of small and medium scale enterprises in Nigeria in the south-south region in Nigeria. The study adopted the survey design the choice of the design was based on the people behavioral approach on the impact of Covid-19 on the sustainability of SMEs. The study adopted the simple random sampling techniques to select the sample size. The target sample size of 400 SMEs in the South-South of Nigeria. The questionnaires were administered to the business owners, customers, managers, accountants of the SMEs. The study found that intensive completion does not impact on the sustainability of SMEs in Nigeria. It was revealed that integrated e-wallet impact on the sustainability of SMEs in Nigeria. The study found out that the use of social media impact on the sustainability of SMEs in Nigeria. The study found out that transaction monitoring impact on the sustainability of SMEs in Nigeria. The study concluded that the study concludes that Covid-19 has both negative and positive impact on the sustainability of SMEs in South South geo political zone of Nigeria. The study suggested that the government and stakeholders can encourage business actors to develop through various policies, such as dispensation in loan installments and tax exemption, set aside emergency fund targeting SMEs in the country and deferment of taxes or waiver of taxes, lower interest rate could also be embarked on by the appropriate policy makers to make SMEs remain afloat during and after COVID-19 pandemic.

Keywords: Digital transformation, Sustainability, Small Medium Enterprises, South South region, Covid-19, Nigeria

Introduction

Small and medium-sized enterprises (SMEs) constitute a major part of the economies of both developed and developing countries (Cosenz and Noto, 2015; Heinicke, 2018; Jiang and Li, 2010). SMEs are defined by the European Commission as having less than 250 persons employed. They should also have an annual turnover of up to EUR 50 million, or a balance sheet total of no more than

EUR 43 million (Commission Recommendation of 6 May 2003). On average, SMEs contribute 42% to a country's gross domestic product (GDP) and provide work for 54% of its labour force (Ayyagari et al., 2007). Although SMEs, especially those operating in manufacturing sector, in one hand contribute significantly to the GDP of a country, on the other hand, they also generate negative impacts on the environment as predominantly these companies have not included environmentally sustainable practices in their processes, strategies, or long-term vision (Rita et al., 2018). Environmental practices in SMEs are argued to be expensive and hard to adopt. It has been estimated that SMEs contribute up to 70 percent of global pollution collectively (Hillary, 2000; 2004). Especially manufacturing SMEs are reported to account for 64% of air pollution whereas only a small portion of 0.4% of these SMEs complies with an environmental management system (Behjati, 2017). Therefore, SMEs need to start adopting more environmentally-friendly practices to ensure a better future for the generations to come. However, their business is challenging from both demand and supply sides due to numerous competitions

The global spread of the Covid-19 epidemic has had a significant influence on health and the economy in terms of commerce, investment, and tourism. Similarly, in Indonesia, the application of social distancing causes individuals to be very cautious by restricting their activities outside their house, which has an influence on many business operators, including SMEs. SMEs have long been seen to be capable of driving a country's economy. However, since the covid-19 epidemic, SMEs have been the most susceptible when compared to other types of businesses because this form of business is so reliant on the velocity of money from goods sales, a fall in demand disrupts the company's cash flow (Barann, Hermann, Cordes, Chasin, Becker, 2019)

Government policy imposes social and physical barriers to mobility and consumption. As a result, it has an influence on market transactions. Restaurants, marketplaces, retail malls, internet transportation, and SMEs are all affected. As a result, people in many places have altered their purchasing habits and satisfied their fundamental necessities online. Some SMEs are concerned about the government's regulation requiring them to stay at home or work from home

(WFH), which they believe would reduce productivity. Because some SMEs are unaware of digital abilities that are relevant to business, this situation drives them to study online business. The problem caused by the covid-19 epidemic has provided an excellent opportunity for SMEs to enhance the quality of their products or services and to devise new strategies for selling goods or services depending on their business's concerns. Covid-19 should not be an impediment to SMEs increasing sales because SMEs actors may promote their businesses through digital marketing (Barann, Hermann, Cordes, Chasin, Becker, 2019).

The digital strategy will function successfully if SMEs undergo digital transformation in order to compete effectively. For the purpose of safety and convenience, the aim is to transition their offline business to online transactions. During this epidemic, SMEs may ramp up their marketing efforts by utilizing internet apps for both sales and logistics. Because SMEs are part of the digital economic ecosystem, digital skills transformation and innovation are required to ensure company viability now and in the future. Sustainability is not a new concept. It has been overused and sometimes even misused by many scholars. Sustainability has been taken to refer simply to continuous ability. For instance, business sustainability is applied to longstanding firms' resistance towards external shocks. This usage is not entirely false. However, sustainability has wider scope, and is not limited to business management. It also considers present as well as future interests (Jiang and Li, 2010).

Some studies have analyzed SMEs' sustainability applications, both in larger and smaller firms, but no research has used a comprehensive measure of sustainability. Fortunately, various methods and criteria have been developed to review firms' sustainability. For examples, Borga et al. (2009) have constructed detailed criteria for sustainability in SMEs, and Belu (2009) has ranked industrial sustainability practices. In addition, Lawrence et al. (2006) focused on sustainability applications in SMEs in New Zealand settings. The purpose of this study is to provide basic and comprehensive criteria to measure SMEs' sustainability levels as a result of the impact of Covid-19.

Literature Review

Conceptual Clarification

Covid-19

Covid-19, a contagious and viral sickness, became widespread around the end of 2019. The origins of this one-of-a-kind virus were unknown; nevertheless, it was revealed to have arisen from a clustering pneumonia of unknown cause in Wuhan, China. Without regard for borders, this unnamed virus spread virally to other regions of the world. COVID-19, according to medical experts, affects the entire respiratory system of the body by first collapsing the lungs,

producing shortness of breath, and then collapsing all of the body's functional organs (Aderemi et al. (2020)

To halt the virus's spread, federal officials adopted a number of measures, including a countrywide shutdown. This policy became a significant hindrance to business, particularly SMEs, due to movement constraints on market places, transit restrictions, and social distancing regulations. As a result, because the activities of SMEs are vital to economic growth and development, efforts should be made to protect them from collapsing or becoming extinct (Aderemi et al. (2020).

Concepts of small and medium scale enterprises

Small and medium-sized companies (SME) were incorporated into the development landscape as early as the late 1940s, with the primary goal of improving commerce and industrialization in today's industrialized countries. OECD (2004). Definitions of SME are typically derived in each nation, depending on the function of SME in the economy, policies and programs created by specific organizations or institutions tasked with developing SME. A tiny business in established economies such as Japan, Germany, and the United States of America (USA) may be a medium or large-scaled enterprise in a developing country such as Nigeria (Abayomi et al. 2021). In its 2005 guideline on Small and Medium Firm Investment Scheme (SMEIS), the Central Bank of Nigeria defined SME as any enterprise with a maximum asset base of 200 million naira (excluding land and working capital) and no lower or upper limit on workers (Aderemi et al. 2020).

Digital Transformation

In general, digital transformation refers to a significant and comprehensive movement in the usage of technology with the purpose of improving corporate performance. (Kaplan, Truex, Wastell, Wood-Harper, & Degross, 2010) define digital transformation as a transition caused or influenced by the use of digital technology in all aspects of human existence. In contrast, digital transformation refers to the use of technology to improve a company's overall performance or reach. Digital transformation, according to (Lankshear & Knobel, 2008), is the third and greatest level of digital abilities gained. It occurs when the use of digital technology supports innovation and creativity while also encouraging significant changes in professional or knowledge areas. Furthermore, digital transformation is characterized as "a quick transition in all strategies due to changing demands, digital operations, and enhanced supply chain connections."The goal of digital transformation is to accelerate a firm by employing technical tools and looking for opportunities that can help business operations in order to extend the target market. When businesses are forced to relocate due to a pandemic, they have the advantage of increasing promotion through web applications. As a result, they may deal with problems in the sales and logistics

channels. Digital transformation may be effective if SMEs make a commitment, such as through marketing products on social media or offering discounts, among other things. There are four digital transformation strategies that may be implemented: (Barann, Hermann, Cordes, Chasin, & Becker, 2019) maintaining corporate competitiveness, and (Dholakia & Ksheri, 2004) increasing efficiency in business operations. (Kaplan et al., 2010; Truex et al., 2010) making different strategic decisions simpler for company executives.

SMEs sustainability

Bansal and DesJardine (2014) define business sustainability as ‘...the ability of firms to respond to their short term financial needs without compromising their (or others’) ability to meet their future needs. Thus, time is central to the notion of sustainability’. In explaining the concept, the duo authors opine that most managers would like their firm’s profits to be at least as good as the past, and that it continues to grow. In addition, just as most people want to live as well as their parents, so do they want their children to enjoy similar opportunities? In essence, Bansal and DesJardine (2014) are of the opinion that time is central to the concept of sustainability. Incentives abound in extant literature for Small and Medium-sized Enterprises (SMEs) to optimize their sustainability for the businesses’ long term existence; for instance, Moore and Manring (2009) contend that, among other incentives, SMEs may: become valuable investment targets for larger firms, be able to create a highly competitive network of sustainable SMEs in existing market spaces where larger firms may be unsuccessful, and become highly efficient suppliers within the global supply chains. Given these benefits among others, it is expected that businesses would attempt to focus on areas that are deemed core to their continued existence and performance.

Effect of the Covid-19 on SMEs

The few studies show that the last millennium's major historical pandemics have typically been associated with subsequent low returns as assets (Jorda, Singh and Taylor, 2020). SMEs have a lack of financial resources as the biggest challenge to short and long term recovery in the Covid19 situation (Cumbie, 2017). Bartik, Bertrand, Cullen, Gbeser, Luca, and Stanton (2020), conducted a survey of more than 580 SMEs, between March 28 and April 4, 2020. The result revealed that there were mass layoffs, closure of business, different beliefs about the likely duration of the COVID related disruptions, many businesses are financially on the brink, and most businesses planned to seek funding. COVID 19 has caused a significant economic shock (Seth, Ganaie, and Zafar 2020).The consequence of Covid-19 on the economy and financial markets in Nigeria: economic lockdown of major cities (Abuja, Lagos, and Ogun State) on March 30, 2020, leading to economic loss especially for daily income earners from small-medium scale businesses, withdrawal of money by investors from the stock exchange

market and fall in oil prices (Ozili, 2020). Some of the impacts of the Covid-19 include disruption of business cash flow, missing important compliance deadlines, employees working from home, an employee working outside their country because of the travel ban, restriction for directors to attend board meetings as a result of the travel ban, disruptions in supply chains (KPMG, 2020). The lockdown of the major cities in Nigeria and the current foreign exchange devaluation due to a drop in crude oil prices arising from the Covid-19 Pandemic has impacted all sectors in Nigeria.

Theoretical foundation

Many ideas on economic shock, terrorism, and pandemics have been proposed. Real options theory, event systems theory, resource dependence theory, institutional theory, structural inertia, resources or orchestrated theory, Prospect theory, and Game theory are a few examples. Craighead et al. (2020) investigated the role of games theory on SMEs' decision-making during a pandemic of this type. Two theories connected to this research study will be reviewed: prospect and games theories.

Empirical review

Aladejebi (2020) investigates the effect and survival strategies for Nigerian SMEs during the ongoing COVID-19 problems. They used a survey study approach in which 360 questionnaires were delivered to 360 SME owners in Lagos. 342 of the 360 surveys were valid. One of the repercussions of the COVID-19 pandemic, according to the participants, was a decrease in revenue as well as a fall in pay, as well as the government failing to do anything to stop the spread of the epidemic. They also noticed that the difficulty of SMEs to repay loans, rent, and salaries is a big issue. Respondents proposed that the government cut interest rates, relax loan and tax payback requirements.

Fatoki (2014) examined the current literature on New SMEs in South Africa and concluded that the variables contributing to SMEs failures are classified into two categories: internal and external. Internal factors include a lack of managerial experience, a lack of functional skills, poor employee training and development, and inappropriate customer attitudes; external factors include, but are not limited to, poor logistics, intolerable distribution costs, unhealthy competition, rising business costs, a lack of finance, and crime. It may be claimed that with such localized contacts, African businesses are more vulnerable to a high-risk business climate that could jeopardize their long-term growth and viability.

In another research, Borga et al. (2009) created sustainability reporting requirements for SMEs that they stated were "simpler and clearer" than Global Reporting

Initiatives (GRI) and Company Environmental Reports (CERs), which are routinely used by large corporations like Coca-Cola.

Collins (2020) used differential analysis to investigate the influence of the COVID-19 pandemic on the stock market values of China, Europe, and the United States. The authors claimed that the COVID-19 pandemic had varying effects on the financial markets in the regions studied.

Ganale and Zafar (2020) assessed the effects of Coronavirus (COVID-19) on Pakistani Small and Medium Enterprises (SMEs). According to the authors, COVID-19 caused a decrease in operations, a disruption in the supply chain, and a financial crisis for the majority of the chosen SMEs in the nation. COVID-19, on the other hand, resulted in a decrease in export orders and the layoff of workers in a minority of the country's SMEs.

Similarly, Chen et al. (2018) explored how the SARS pandemic impacted the connectivity that existed between four Asian stock exchange markets and China. According to the findings of the study, the decline in the link between the Chinese stock market and four Asian markets was fueled by the SARs outbreak.

Abbeh (2017) assessed the difficulties, prospects, and government activities in Nigeria, as well as the effects they have on SMEs. The descriptive research design was used. The statistical program for the social sciences (SPSS) version 23 and descriptive statistics were used to examine the data (frequencies and percentages). The study discovered that SMEs' issues have a major impact on their growth and development. Government initiatives were discovered to have a substantial impact on the growth and development of SMEs in Nigeria. The prospects of SMEs in Nigeria, on the other hand, have a considerable impact on their growth and development.

Aleksandr, Jaroslav, Ludmila, and Pavla (2016) researched the entrepreneurial opinion of the quality of the SME business environment in the Czech Republic and discovered that 45.49 percent of entrepreneurs believe that SMEs have difficulty accessing external sources of finance (financial markets, banks, loans from the State). The findings also revealed that the business environment is more difficult for microenterprises.

Methodology and Data

Research design

This study used a survey research design as its research design. The study's population included 6,966,348 Small and Medium Scale Enterprises in Nigeria's South South Geopolitical Zone. The study was conducted in South South Geo Political Zone of Nigeria. Since the entire 6,966,348 SMEs were not feasible to be reached upon, the researcher selected by means of random sampling 400 SMEs to form the sample size of the study. The researcher utilized both primary sources of data in the course of this study.

Method of data analysis

The multiple regression analysis with the aids of Statistical package for social sciences (SPSS) used to analyze the collected data.

Model specification

The model for analyzing the collected data was a simple linear model.

$$DTSMEs = f(IMCOVID-19)$$

$$DTSMEs = a + bIMCovid-19 = e$$

Where, DTSMEs = Digital Transformation and Sustainability of SMEs

$$IMCovid-19 = \text{Impact of Covid-19}$$

$$b = \text{co-efficient}$$

$$e = \text{error terms}$$

Result and Discussions

From Table 4 below, the LR value for both the probit and logit models at 73.76 and 76.61 respectively have probability values less than 1%, however, because the result of both models are very close, we focus on either probit or logit result for analysis and to draw implications there from. From the logit model result, the coefficients of Intensive completion (INC) (-0.09) is negative and not significant at 5 percent level (the probability of t-values is greater than 0.05). The general implication of this result is that INC failed the significance test and therefore does not contribute significantly to the sustainability of SMEs during Covid-19. The coefficient of Integrated E-Wallet (IEW) (0.605) is positive and significant (4.356) at less than 1 percent level ($p = 0.0000$). This shows that IEW tend to undermine sustainability of SMEs during Covid-19 pandemic. Similarly, Social Media (SOM) has negative (-0.313) but significant ($z = -3.847$, $p = 0.0001$) social media's relationship with Covid-19 pandemic. This suggests that social media contributes to low sustainability of SMEs during Covid-19 pandemic. Also, from the logit model result, the coefficient of Transaction Monitoring (TRM) is positive and significant (4.394) at less than 1 percent level ($p = 0.0000$). This shows that TRM has positive and significant relationship with the sustainability of SMEs during Covid-19 pandemic.

Discussion

The result revealed that Intensive completion does not impact on the sustainability of SMEs in Nigeria. The coefficient of AMS is negative (-0.09) but not significant ($z = -0.703$) at 5 percent level ($p = 0.482$). This implies that INC has a positive but no significant relationship with the sustainability of SMEs in Nigeria.. This finding negates the findings of Aleksandr, Jaroslav, Ludmila, and Pavla (2016)

who find that intensive completion as marketing strategies has positive but insignificant effect on the sustainability of SMEs. Abbeh (2017) confirms that intensive completion by SMEs' have a major impact on their growth and development. Government initiatives were discovered to have a substantial impact on the growth and development of SMEs in Nigeria. The prospects of SMEs in Nigeria, on the other hand, have a considerable impact on their growth and development.

Also, it was found that integrated e-wallet does not impact on the sustainability of SMEs in Nigeria. The result shows that the coefficient of integrated e-wallet is positive (0.605) and significant ($z = 4.356$) at less than 1 percent level ($p = 0.0000$), implying that integrated e-wallet impact on the sustainability of SMEs in Nigeria significantly and in a positive way. This result is in tandem with the findings of Aladejebi (2020) whose result shows that integrated e-wallet impact on the sustainability of SMEs. Fatoki (2014) argued that with such localized contacts, African businesses are more vulnerable to a high-risk business climate that could jeopardize their long-term growth and viability hence the use of integrated e-wallet by SMEs may significant impact on their sustainability.

The result also reveals that the coefficient of Social media is negative (-0.558) and significant ($z = -3.847$) at less than 1 percent level ($p = 0.0001$), implying that the use of social media impact on the sustainability of SMEs in Nigeria significantly and positively too. Aleksandr, Jaroslav, Ludmila, and Pavla (2016) supported this finding when they posited that social media have significant and positive influence on the sustainability of SMEs.

Hypothesis four tested that Transaction monitoring does not impact on the sustainability of SMEs in Nigeria. The result reveals that the coefficient of Transaction monitoring (TRM) is significantly positive at less than 1% (0.456, $z = 4.394$, $p = 0.0001$), implying that there is significant impact

between Transaction monitoring and sustainability of SMEs in Nigeria. This finding is in line with findings of Ganale and Zafar (2020).

Conclusion

The study investigated the impact of Covid-19 on digital transformation and sustainability of Small and medium scale enterprises in Nigeria. From the analysis of data and the results of the hypotheses tests conducted, the study concludes that Covid-19 has both negative and positive impact on the sustainability of SMEs in South South geo political zone of Nigeria.

Recommendations

The study recommended that the government and stakeholders can encourage business actor to develop through various policies, such as dispensation in loan installments and tax exemption. Monitoring company's transaction, including the ability for business owners to instantly reconcile bank accounts on all cash and bank accounts. Furthermore, in terms of unrecorded cash and bank balances and matching transactions based on the same number, date, or description of transactions, to expedite the reconciliation process. Government should set aside emergency fund targeting SMEs in the country. Deferment of taxes or waiver of taxes, lower interest rate could also be embarked on by the appropriate policy makers to make SMEs remain afloat during and after COVID-19 pandemic. The management of SMEs should strategies their effort in the use of intensive completion in sustaining their business during the pandemic period. Also, the use of social media should be welled coin to ensure it success and sustainability of SMEs.

Table 1. Regression Results

Variable	Probit			Logit			Extreme value		
	Co-eff.	z-Stat.	Prob.	Co-eff.	z-Stat.	Prob.	Co-eff.	z-Stat.	Prob.
INC	-0.054	-0.737	0.461	-0.09	-0.703	0.482	-0.022	-0.284	0.776
IEW	0.328	4.178	0.0000	0.605	4.356	0.0000	0.349	4.301	0.0000
SOM	-0.313	-3.891	0.0001	-0.558	-3.847	0.0001	-0.332	-3.907	0.0000
TRM	0.363	3.634	0.0001	0.456	4.394	0.0001	0.453	4.608	0.0001
SSMEs	0.474	4.674	0.0001	0.472	5.961	0.0001	0.512	5.346	0.0001
Pseudo R-squared	0.10			0.105			0.09		
LR statistic	73.76		0.0000	76.61		0.0000	67.23		0.0000

Source: Researchers' computation (2022) from E-view

References

- Abayomi, A., Angioha, P. U., & Abang, T. (2021). Covid 19 Pandemic and Entrepreneurship Enterprise in Calabar, Cross River State, Nigeria. *Journal of Good Governance and Sustainable Development in Africa*, 6, 23-29.
- Abeh, S. (2017) The Problems and prospects of small and medium scale enterprises growth and development in Nigeria: A study of selected SMEs in Delta State. *International Journal of Scientific Research in Education*, 10(3), 278-294
- Aderemi, T.A.; Adenirana, A.A.; Amusa, B.O. & Ebere, C.E. (2020). Globalization and Corona Virus (COVID-19) Pandemic; the Vulnerability of Africa is the Opportunity of China. *Arabian Journal of Business and Management Review*, 9(2), 27-30.
- Aladejebi, O. (2020). Managing small businesses in Nigeria during Covid-19 crisis: Impact and survival strategies. *IOSR Journal of Business and Management (IOSR-JBM)*, 22 (8), 24- 34.
- Aleksandr, K., Jaroslav, B., Ludmila, K., & Pavla, P. (2016) Entrepreneurial perception of SME business environment quality in the Czech Republic. *Journal of Competitiveness*, 8(1), 66 – 78
- Barann, B., Hermann, A., Cordes, A.K., Chasin, F., Becker, J. (2019) Supporting digital transformation in small and medium-sized enterprises: a procedure model involving publicly funded support units. In: *Proceedings of the 52nd Hawaii International Conference on System Sciences*, 2(1), 4977–4986
<https://scholarspace.manoa.hawaii.edu/handle/10125/59935>
- Bartik, A., Bertrand, M., Cullen, Z.O., Glaeser, E. L. Luca, M. and Stanton, C. (2020). The impact of COVID-19 on small business outcomes and expectations. Working Paper 20-102. Retrieved from www.ssrn.com
- Bartik, W.A., Bertrand, M., Cullen, B. Z., Glaeser, L.E., & Luca, M. (2020). How are small businesses adjusting to COVID-19? Early Evidence from a survey (No. w26989). National Bureau of Economic Research. <https://doi.org/10.3386/w26989>.
- Behjati, B.S. (2017). Critical Remarks about Environmentalism Implication by Iranian SMEs. *European Journal of Sustainable Development*, 6(3), 209-219.
- Borga, F., A. Citterio, G. Noci and E. Pizzurno, (2009). Sustainability report in small enterprises: Case studies in Italian furniture companies. *Business Strategy and the Environment*, 18(3): 162-176.
- Collins C.N. (2020). Effect of COVID-19 Pandemic on Global Stock Market Values: A Differential Analysis. *Acta Universitatis Danubius. (Economica)*, 16,(2), 261-275.
- Cosenz, F. and Noto, L. (2015). Combining system dynamics modelling and management control systems to support strategic learning processes in SMEs: A dynamic performance management approach. *Journal of Management Control*, 26, 225–248.
- Craighead, C. W Ketchen, D. J. and Darby, J. L (2020). Pandemics and supply chain management research: Toward a theoretical toolbox. *Decision Sciences*. doi: 10.1111/deci.12468
- Cumbie, B. (2017). The essential components of disaster recovery methods: A Delphi study among small businesses. In *Proceedings of the Americas Conference on Information Systems (AMCIS)*, 17. 1-16. doi: 10.1.1.1024.6656
- Del Rio, C., Collins, L. F., & Malani, P. (2020). Long-Term Health Consequences of COVID-19. *JAMA*, 324, 1723-1724. <https://doi.org/10.1001/jama.2020.19719>
- Dholakia, R., Kshetri, N. (2004) Factors impacting the adoption of the internet among SMEs. *Small Bus. Econ.*, 23(4), 311–322
- Fatoki, O. (2014). Entrepreneurial Orientation, Debt Finance and Performance of Small and Medium Enterprises in South Africa. *Journal of Social Science*. 32(2), 121-131.
- Ganale, M.A. & Zafar, F. (2020). Impact of COVID-19 (Coronavirus) on Small and Medium Enterprises (SMEs) in Pakistan. *Small and Medium Enterprises Development Authority (SMEDA). SMEDA Research Journal View project*.
- Gao, H. N., Lu, H. Z., Cao, B., Du, B., Shang, H., Gan, J. H., Li, L. J. et al. (2013). Clinical Findings in 111 Cases of Influenza A (H7N9) Virus Infection. *New England Journal of Medicine*, 368, 2277-2285. <https://doi.org/10.1056/NEJMoa1305584>
- Heinicke, A. (2018). Performance measurement systems in small and medium-sized enterprises and family firms: a systematic literature review. *Journal of Management Control*, 28, 457–502.
- Jiang, L. and Li, X. (2010). Discussions on the improvement of the internal control in SMEs. *International Journal of Business and Management*, 5(9), 214–216.
- Jorda, O., Singh, S. R., & Taylor, A. M. (2020). Longer-run economic consequences of pandemics. National Bureau of Economic Research. Retrieved from www.frbsf.org
- Kaplan, B., Truex, D.P., Wastell, D., Wood-Harper, A.T., DeGross, J. (2010) *Information Systems Research: Relevant Theory and Informed Practice*. Springer, Heidelberg
- Kaplan, B., Truex, D.P., Wastell, D., Wood-Harper, A.T., DeGross, J. (2010) *Information Systems Research: Relevant Theory and Informed Practice*. Springer, Heidelberg
- KPMG (2020). Coronavirus: Global and domestic impact. KPMG International. Retrieved from www.KPMG/ng
- Kuckertz, A., Brandle, L., Gaudig, A., Hinderer, S., Reyes, A. M., Prochotta, A., Steinbrink, K. M. and Berger, E.S.C (2020). Startups in times of crisis. A rapid response to the COVID-19 pandemic. *Journal of Business Venturing Insights*, 13(e00169). doi:10.1016/j.jbvi.2020.e00169
- Lankshear, C., Knobel, M. (2008) *Digital Literacies:*

Concepts, Policies and Practices. Peter Lang Publishing Inc. Lankshear, C., Knobel, M. (2008) Digital Literacies: Concepts, Policies and Practices. Peter Lang Publishing Inc., New York.

Ozili, P. (2020). Covid-19 pandemic and economic crisis: The Nigerian experience and structural causes. SSRN Electronic Journal, 1-19. doi:10.2139/ssrn.3567419

Radu, S. (2020). How global media covers the coronavirus. Retrieved from www.usnews.com

Seth, D., Williams, C.A., Boardman, L. (2018) Digital transformation of business models-best practice, enabler, and roadmap. *Int. J. Innov. Manag.* 21(8), 14-17

Truex ML, Divinagracia L, Divinagracia R (2010), Evaluating firm's sustainable production indicators in uncertainty. *Computers and Industrial Engineering* 57: 1393–1403.

Afşar, M. (2008). The causality relationship between economic growth and foreign direct investment in Turkey. *Selçuk Üniversitesi Sosyal Bilimler Enstitüsü Dergisi*, (20), 1-9.

Akinkugbe, O. (2003). Flow of Foreign Direct Investment to Hitherto Neglected Developing Countries. *WIDER Discussion Paper 2*. Helsinki: United Nations University.

Alagöz M., Erdoğan, S. and Topallı N. (2008). "Doğrudan Yabancı Sermaye Yatırımları ve Ekonomik Büyüme: Türkiye Deneyimi 1992-2007", *Gaziantep Üniversitesi Sosyal Bilimler Dergisi*, (7), 1, ISSN: 1303-0094 / 2149-5459

Ayten, E. C. (2021). *Doğrudan Yabancı Yatırımların Belirleyicilerine İlişkin Ekonometrik Bir Analiz: Türkiye Örneği*. [Doctoral dissertation, Hacettepe University, Ankara]. Accessed online: <http://www.openaccess.hacettepe.edu.tr:8080/xmlui/bitstream/handle/11655/24979/openaccess.%20tez.pdf?sequence=1>

B. Cambazoğlu and H. S. Karaalp Orhan, "Does Foreign Direct Investment Affect Economic Growth The Case of Turkey," *International Journal of Social Economics*, vol. 41, no. 6, pp. 0–0, Jun. 2014.

Bayar, Y. (2014). "Effects of Foreign Direct Investment Inflows and Domestic Investment on Economic Growth Evidence from Turkey", *International Journal of Economics and Finance*, Vol. 6, No. 4, <https://dx.doi.org/10.5539/ijef.v6n4p69>

Christiansen, H., C. Oman and A. Charlton (2003), "Incentives-based Competition for Foreign Direct Investment: The Case of Brazil", *OECD Working Papers on International Investment*, 2003/01, OECD Publishing. <http://dx.doi.org/10.1787/631632456403>

Dilaveroğlu, A., & Ersin İ. (2021) Kamu Yönetim Etkinliği ve Yolsuzluğun Doğrudan Yabancı Yatırımlar ile İlişkinin İncelenmesi: E7 Ülkeleri Üzerine Bir Analiz. *İstatistik ve Uygulamalı Bilimler Dergisi*, 2(1), 43-54.

Enders, W. (1995). *Applied Econometric Time Series*:

Wiley Series in Probability and Mathematical Statistics, New York, John Wiley Inc.

Gherghina, Ş. C., Simionescu, L. N., & Hudea, O. S. (2019). Exploring foreign direct investment–economic growth nexus—empirical evidence from central and eastern European countries. *Sustainability*, 11(19), 5421.

Glaister, K.W.; Atanasova, H. (1998). Foreign direct investment in Bulgaria: patterns and prospects. *European Business Review* 98(2): 122-134.

Gokmen, O. (2021) The Relationship between Foreign Direct Investment and Economic Growth: A Case of Turkey, *International Journal of Economics and Finance*, 13 (7), 202

Güllü İ. and Beşer, N. Ö. "An Evaluation on the Attractiveness of Turkish Economy in Terms of Foreign Direct Investments," *European Journal of Sustainable Development Research*, vol. 1, no. 2, pp. 70–79, Mar. 2017.

Jeffrey Sachs, (2005). *The End of Poverty: Economic Possibilities for our Time*. New York: The Penguin Press.

Johansen, S. (1988). Statistical Analysis of Cointegration Vectors, *Journal of Economic Dynamics and Control*, 12, 231-254.

Johansen, S. ve Juselius, K. (1990). Maximum Likelihood Estimation and Inferences on Cointegration-with Applications to the Demand for Money, *Oxford Bulletin of Economics and Statistics*, 52, 169-210.

Kurul, Z. (2021) Türkiye'de Doğrudan Yabancı Yatırım Girişleri ve Yurtiçi Yatırım İlişkisi: Doğrusal Olmayan ARDL Yaklaşımı. *Sosyoekonomi*, 29(49), 271-292.

Mangir, Fatih; Ay, Ahmet; Saraç, Taha Bahadır (2012) : Determinants of foreign direct investment: A comparative analysis of Turkey and Poland, *Economic and Environmental Studies (E&ES)*, ISSN 2081-8319, Opole University, Faculty of Economics, Opole, Vol. 12, Iss. 1, pp. 65-86

Mucuk, M., & Demirel, M. T. (2009). Foreign direct investment in turkey and economic performance. *Selçuk University Institute of Social Sciences Journal*, 21(1), 363–373.

Ozturk, I., & Kalyoncu, H. (2007). Foreign direct investment and growth: An empirical investigation based on cross-country comparison. *MPRA Paper No. 9636* online at: <https://mpra.ub.uni-muenchen.de/9636/>

Özel, H. & Akaner, U.(2020) Seçilmiş Değişkenlerin Doğrudan Yabancı Yatırımlara Etkisi: Türkiye Örneği. *Girişimcilik ve Kalkınma Dergisi*, 15(2), 95-110.

Sinani, E. and Meyer, K., (2004), Spillovers of technology transfer from FDI: the case of Estonia, *Journal of Comparative Economics*, 32, issue 3, p. 445-466, <https://EconPapers.repec.org/RePEc:eee:jcecon:v:32:y:2004:i:3:p:445-466>.

Tosevska-Trpcevska, K. & Makrevska, E. & Kikerkova, I. (2018). Vector Error Correction Model on FDI and their Impact in the Republic of Macedonia. *Zagreb International Review of Economics and Business*. 21. 19-35. 10.2478/zireb-2018-0012.

UNCTAD;
<https://stats.unctad.org/handbook/EconomicTrends/Fdi.html>
Wint, G.W. and Williams, D.A. (2002). Attracting FDI to developing countries: a changing role for government? *The International Journal of Public Sector Management* 15(5): 361-374.
Wordbank, <https://data.worldbank.org/indicator/BX.KL.T.DINV.CD.WD?end=2019&locations=TR&start=1970&view=chart>
YASED; Investment Report, 2020, [\[api.yased.org.tr/Uploads/Reports/yased-2020-UDY-Raporu_r05_OPT.pdf\]\(https://yased-api.yased.org.tr/Uploads/Reports/yased-2020-UDY-Raporu_r05_OPT.pdf\)](https://yased-</p></div><div data-bbox=)

YASED; Kuresel Yatırım Günleri Özet Raporu, 2020, <https://yased-api.yased.org.tr/Uploads/Reports/Kuresel-Yatirim-Gunleri-Ozet-Raporu.pdf>

Zengin, S & Yüksel, S& Kartal, M T. (2018). Understanding The Factors That Affect Foreign Direct Investment in Turkey By Using MARS Method. 10. 177-192. 10.14784/marufacd.460693.

Decision-Making Styles in Managerial Accounting - A Research Note

Björn Baltzer, University of Applied Sciences Würzburg-Schweinfurt, Germany

The existence of different decision-making styles is an established concept in many academic disciplines. Despite its obvious importance for managerial accounting, only few research results are available so far. In this article, the existing findings are presented and enhanced with the results of a recently conducted study. As a consequence, suggestions for future research are made.

Introduction

Decision-making is a pivotal management activity (Griffin, 2011, pp. 5-10) and one of the most important perspectives on business administration in general (Schanz, 2019, pp. 58-69). Among the fundamental strategic decisions that companies need to make is whether and how to go international (Vahs & Schäfer-Kunz, p. 99). The process of internationalization then requires to make many operational decisions (Daniels, Radebaugh & Sullivan, 2007, pp. 396-401).

One of the main tasks of managerial accountants is to support managers throughout all phases of the decision-making process (Horngren et al., 2005, pp. 302-303). Managerial accountants provide decision support to managers concerning both strategic and operational decisions (Rieg, 2020, pp. 16-17). Given that managerial accountants interpret their role as management's business partner, then the goal of their decision support is to improve the quality of managerial decisions (ICV, 2021, pp. 82-83). Over the past decades, research in managerial accounting has accumulated a large body of knowledge concerning the decision support task. Among the most popular research questions are the identification of the decision-relevant information in order to avoid information overload, the alignment of the managers' goals with the companies' goals and the implementation of debiasing techniques to avoid or reduce cognitive biases (Vanini, 2009, pp. 18-19). The managerial accountants' role as business partner requires them to understand how managers are making their decisions. This is important because more than one decision-making style exists, i. e. different managers might approach the same decision situation in different ways. In multinational companies, this is especially relevant because managerial accountants need to consider that managers with

different cultural backgrounds are likely to approach similar decision situations in different ways (Engelhard & Kerner, 2019, pp. 137-138). At the same time, one manager might approach different types of decision situations in different ways. Keeping in mind that the goal of decision support is to improve the quality of decisions, the importance of managerial accountants knowing about managers' decision-making styles becomes obvious with the claim that some decision-making styles are considered to be beneficial for decision-quality, while others are considered to be neutral or even disadvantageous (Fischer, Soyez & Gurtner, 2015, p. 525).

However, as we will see in the following literature review, managerial accounting research has paid only little attention to the topic of decision-making styles so far. The first aim of this article is therefore to gather the existing findings on decision-making styles from a managerial accounting perspective. Secondly, this article presents results of a survey conducted by the author on decision-making styles and compares those results with the findings of previous studies. The article closes with suggestions for future research.

Literature Review

Decision-Making Styles

The concept of decision-making styles originates from the analysis of career decisions in the late 1970s (Harren, 1979). Since then, the concept of decision-making-styles has been generalized and applied to various disciplines, among them business administration. A decision-making style is typically defined "as the learned, habitual response pattern exhibited by an individual when confronted with a decision situation" (Scott & Bruce, 1995, p. 820). Based on this definition, several aspects need to be highlighted:

- The individual's *response pattern* encompasses the perception of the decision situation, the processing of information and the making of the decision.
- A decision-making style is a *learned habit* and not a congenital trait of personality. Therefore, it is possible to influence the decision-making style(s) an individual is using. Factors that are typically assumed to be influential for the use of one or another decision making

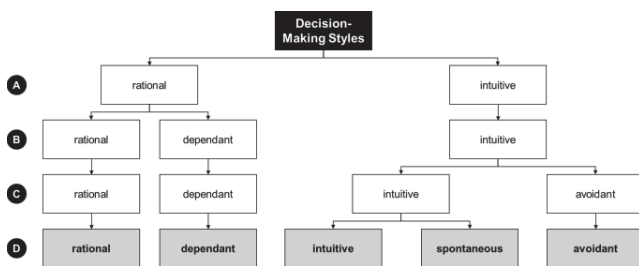
style are age and experience, culture and nationality as well as gender.

- Decision-making styles are discussed on the level of *individuals*. At the same time, decisions made by groups will be influenced by the decision-making styles of the group members.
- The concrete *decision situation* can influence the individual's response. For example, an individual might use a different decision-making style for operational decisions as opposed to strategic decisions. This also means that individuals do not exclusively use just one decision-making style. While every individual will prefer one primary decision-making style, he or she can switch to backup styles if the situation requires. The inclination to use different styles varies between individuals (Kerner, 2018, p. 156)

While there seems to be a common understanding concerning the concept of decision-making styles, various models have been developed over time that differ concerning the number and names of decision-making styles. Below, four models (named A, B, C and D) will be presented (Spicer & Sadler-Smith, 2005, pp. 139-140).

In model A, only two decision-making styles are distinguished: the rational style on the one hand and the intuitive style on the other hand. A well-known example of model A is the Cognitive Style Index that was developed by Allinson & Hayes (1996). In his seminal work, Harren (1979) used model B with three decision-making styles: rational, dependant and intuitive. Based on the work of Harren and others, Scott & Bruce (1995) initially developed model C with four decision-making styles: rational, dependant, intuitive and avoidant. At the end of their research process, Scott & Bruce came to the conclusion however that model D with five decision-making styles is more adequate, so they added the spontaneous style. Figure 1 summarizes the relationships between the models and the decision-making styles.

Figure 1. Models of Decision-Making Styles



It is worth noting that besides the models presented above, further models exist. Rowe & Boulgarides (1992), for example, use the distinction between rational and intuitive thinking, but add the tolerance for ambiguity as a second dimension to derive four decision-making styles.

By now, Scott & Bruce's final model D is considered to be the best known (Wolf, 2019, p. 99) and the most widely used model in research (Fischer, Soyeze & Gurtner, 2015, p. 525). For this reason, it was used in the survey whose results will be presented later. Due to its broad applicability, it is typically referred to as the General Decision Making Styles (GDMS) model. The reliability and validity of the GDMS model has been scrutinized and confirmed by other researchers (Spicer & Sadler-Smith, 2005). The five decision-making styles that are distinguished in the GDMS model can briefly be summarized as follows (Fischer, Soyeze & Gurtner, 2015, p. 526):

- *rational*: Thorough search for information and logical evaluation of optional alternatives. Analytic, sequential information processing and systematic appraisal.
- *dependant*: Extensive advice seeking, consulting, and directions from relevant others.
- *intuitive*: Simultaneous information processing and strong reliance on emotions, presentiments, hunches, and gut feelings.
- *spontaneous*: Sense of immediacy and desire to finish the decision process as quickly as possible.
- *avoidant*: Attempt to escape the decision situation by avoiding or delaying the decision.

Decision-Making Styles in Managerial Accounting

Despite the obvious usefulness for managerial accountants to know about the decision-making styles of managers, the concept of decision-making styles has so far only been used sparsely in managerial accounting research. In most cases, only the simple model A has been used. Schäffer & Steiners (2004) claim to have used a simplified version of the Cognitive Style Index in their survey on the usage of managerial accounting information by managers (Schäffer, 2007, pp. 64-65.). In the corresponding publication itself, no detailed results are presented however. Flacke (2006) distinguished a fact-based and an intuitive decision-making style to test the usage intensity of managerial accounting tools. He argues that a fact-based decision-making style should foster the usage of management accounting information and finds his hypothesis confirmed. Becker, Ulrich & Botzkowski (2016) distinguish a rational and an intuitive decision-making style in their study on the use of data analytics in medium-sized companies. The authors find out that top managers tend to employ a rational decision-making style, but that many managers choose their decision-making style depending on the concrete decision situation. Wolf (2019) argues that the rational vs. the intuitive decision-making style should influence the managers' level of satisfaction with the quality of their strategic decisions, however she does not find her hypothesis supported by the data (p. 194). Similarly, she does not find a relation between the decision-making style

and company size, management level nor business function (p. 163). Becker et al. (2020) also distinguish a rational and an intuitive decision-making style in their analysis of Industry 4.0 projects. They find out that rational decision making is predominant, irrespective of company size (small vs. medium-sized) and irrespective of ownership (family vs. non-family ownership).

The only work that the author of this article identified that used the GDMS model was Kerner (2018) and Engelhard & Kerner (2019) respectively, where the decision-making styles of managers from Taiwan, Germany, the US and France was analyzed. It turns out that the rational decision-making style is overall and in all countries the most important style. For the other styles, there are notable differences between the countries (Engelhard & Kerner, 2019, pp. 136-137). The intuitive style is quite important in France and rather unimportant in Taiwan. The avoidant style is quite important in Taiwan and rather unimportant in Germany – overall it is the least important style. The dependant style is quite important in Taiwan and France and rather unimportant in Germany and in the US. Finally, the spontaneous style is quite important in France, but not so much in the other countries.

Survey Results

Survey Setting

The survey was conducted in summer 2022 with undergraduate students of business administration at a German University of Applied Sciences. This follows the logic that many of today's business students will become business managers in the near future (Ding et al., 2020, p. 352).

The survey was integrated into a third-year lecture on management. The survey was performed as an online questionnaire during class and participation was voluntary. To reduce the influence of social desirability on answers, only a very brief introduction to the survey topic was given beforehand. The topic of decision-making styles was explained in detail only in the following lecture, together with presenting the survey results.

As the lecture was given in German language, the statements of the GDMS model needed to be translated into German. The translation was based on the original statements used by Scott & Bruce (1995, pp. 825-826), with five statements for each of the five decision-making styles. The translation was done by the author of this article and was then checked by a university lecturer for English language (for similar procedures, cf. Fischer, Soyez & Gurtner, 2015, p. 526 and Ding et al., 2020, p. 354). Afterwards, the questionnaire was pre-tested with several fourth-year business students to ensure understandability.

Survey Participation

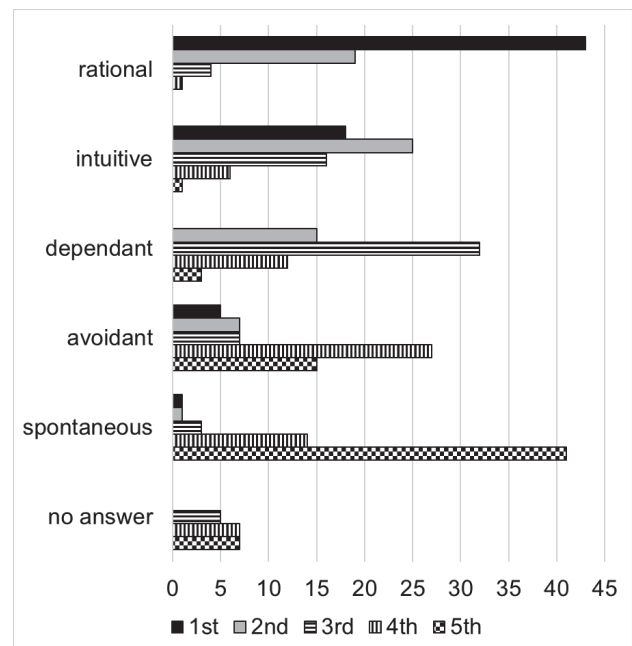
While 76 students started the survey, only 70 students

completed the questionnaire. Two of the 70 data sets were excluded, as the respondents did not confirm that they are students of business administration.

As explained before, decision-making styles are understood as learned habits, so the socialization in a national culture is considered to be an important influencing factor. In order to ensure a homogeneous data base from a cultural point of view, one more data set was excluded because the respondent stated that he or she had not spent all of his/her youth in Germany, but had stayed abroad for several years. All of the remaining 67 respondents confirmed that they possess the German nationality.

Among the 67 respondents were 40 females (60 %) and 27 males (40 %). While an analysis by gender is available, the selected survey results presented next will focus on the type of decision situation and the status as undergraduate business students.

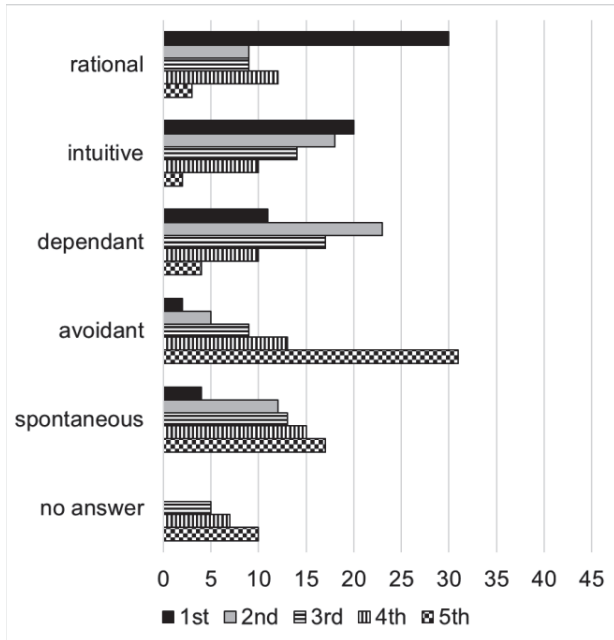
Figure 2. Ranking of Decision-Making Styles for the Strategic Decision Situation



Discussion of Survey Results

Wolf (2019, p. 151) did not find significant differences in decision-making styles between operational and strategic decision situations, but she had used the simple model A in her study. Kerner (2018, p. 348) found her hypotheses confirmed that in strategic decision situations, the rational decision-making style is more likely and both the intuitive and the spontaneous decision-making styles are less likely to be used than in operational decision situations. She did not formulate hypotheses about the avoidant and the dependant decision-making styles, however.

Figure 3. Ranking of Decision-Making Styles for the Operational Decision Situation



In order to further investigate the aspect of different decision situations, two specific situations were presented to the participants of the present study, however without indicating them explicitly as operational or strategic. The choice of the first work place after the end of studies was used as an example of a strategic decision. The choice of the next holiday destination was used as an example of an operational decision. The five decision-making styles of the GDMS model were offered as answering options, however not indicated explicitly with their names, but phrased as a one sentence statement each. In order to be able to identify primary and secondary decision-making styles, the respondents were not asked to select one statement only, but to rank the statements from most preferred (1st rank) to least preferred (5th rank). Figures 2 and 3 show the results for the strategic and the operational decision situations.

The *rational decision-making style* is clearly the respondents' primary decision-making style for both the strategic and the operational decision. However, the dominance of the rational style is much lower in the case of the operational decision situation. The *intuitive decision-making style* is the preferred backup style for the strategic as well as for the operational decision. Its importance is higher for the operational than for the strategic decision, however. While the *dependant decision-making style* is only of medium importance for the strategic decision, it can be considered a second backup style for the operational decision. The *avoidant decision-making style* is of low importance for the strategic decision, and it is even the least

important decision-making style for the operational decision. For the strategic decision, the *spontaneous decision-making style* is clearly the least important, while it is more important than the avoidant style for the operational decision. Summing up, contrary to the findings of Wolf (2019), there is evidence that the preference for decision-making styles differs between strategic and operational decision situations. The findings of Kerner (2018) are confirmed that in a strategic decision situation, the rational style gains importance and the intuitive and spontaneous styles lose importance compared to an operational decision situation.

The results of the respondents' attitude towards the five styles of the GDMS model can be seen from table 1, sorted by means in descending order. The five-point rating scale ranging from full disagreement to full agreement proposed by Scott & Bruce (1995) was used and the statements were aggregated to the decision-making styles using the Likert-method. For these questions, no specific decision situation was presented to the survey participants.

Table 1. Importance of Decisions-Making Styles

Decision-making style	mean	standard deviation
rational	3,86	0,54
dependant	3,75	0,70
intuitive	3,73	0,57
avoidant	2,98	1,10
spontaneous	2,76	0,71

In line with the results of the previous questions, the rational is the most important decision-making style, showing both the highest mean and the lowest standard deviation. The dependant and the intuitive styles are the two most important backup styles with similar mean values. The intuitive style had a high importance for both the strategic and the operational decision situation, which is confirmed by the low standard deviation. The dependant style was more important for the operational than for the strategic decision situation, however, which is confirmed by its higher standard deviation. The importance of the avoidant and of the spontaneous styles clearly falls behind, with the spontaneous style showing the smallest mean, but the avoidant style showing the highest standard deviation.

It is interesting to compare these results of German undergraduate business students with the results of Kerner's study (2018), as she had addressed her questionnaire to MBA students of four different German universities (2018, pp. 268-276). As opposed to undergraduate business students, students that seek the Master of Business Administration degree need to have work experience and are on average

older. Table 2 compares the means of the five decision-making styles from the two studies, sorted by the present study.

Table 2. Comparison between German Undergraduate Business Students and German MBA Students

Decision-making style	Present study (undergrads)	Kerner (2018) (MBA)
rational	3,86	3,96
dependant	3,75	3,42
intuitive	3,73	3,33
avoidant	2,98	2,59
spontaneous	2,76	2,77

The rational decision-making style has the highest importance in both studies, while the mean is slightly higher for the MBA students. The dependant and the intuitive styles are in both studies the relevant backup styles. For the MBA students, the distance of the intuitive style to the dependant style is slightly larger, and the distance of both styles to the rational style is much larger. In both studies, the avoidant and the spontaneous style considerably fall behind in importance. While the spontaneous style shows almost identical means for the undergraduate and the MBA students, the avoidant style has the least importance for the MBA students. It needs to be kept in mind, however, that the avoidant style by far showed the highest standard deviation in the present study.

While Spicer & Sadler-Smith (2005, p. 141) did not find an influence of the year of studies on decision-making styles in their two surveys among UK undergraduate business students, the comparison of the present study with Kerner's study suggests that there are differences between undergraduate and MBA students. This is in line with results of the study by Ding et al. (2020, p. 352) among Chinese undergraduate business students, where the influence of work experience was analyzed. In this study, the use of the rational decision-making style was higher in case of work experience, while the use of the dependant, the avoidant and the spontaneous styles was lower. For the rational, dependant and avoidant styles, this finding can be confirmed by comparing the present study with Kerner's study.

Survey Limitations

Selected results of the survey were presented and discussed in the previous chapter. There are several limitations to this survey, however, that need to be kept in mind when interpreting these results. First, the number of participants in the study was rather small, and they were all students of just one German university. Therefore, it cannot

be assumed that the findings can be generalized. Second, when analyzing the influence of the type of decision situation, just one specific example for each type was presented to the survey participants. This was considered to be a better approach than to use generic explanations of the terms strategic and operational (cf. Kerner, 2018, p. 261 and Wolf, 2019, p. 218). Nevertheless, it is possible that the results looked different if other examples had been used (e. g. are more business-related example for operational decisions). Third, although the German translation of the statements of the GDMS model was done to the best of our knowledge, every translation entails the risk that subtleties are lost. This needs to be kept in mind when interpreting the results of this study with the results of studies from other countries.


Outlook

It has been argued that the topic of decision-making styles is highly relevant for managerial accounting research. In order to best fulfill their decision support task, managerial accountants should understand how managers' decisions come about. Despite this reasoning, the amount of knowledge about decision-making styles from a managerial accounting perspective is rather limited as of today. This opens the opportunity to conduct further research in various directions. Among the most interesting questions for future research are - according to the author's opinion - the following:

- What does the (primary) decision-making style of a managers mean for the concept of decision-relevant information?
- How can managerial accountants best fulfill their decision support task in case of group decisions with different decision-making styles involved? Considering the influence of national cultures, this question is specifically relevant for multinational companies.
- Are managers that prefer specific decision-making styles more prone to fall for certain cognitive biases than others? If so, what are the best debiasing methods for each decision-making style?

References

- Allinson, C.W. and Hayes, J. (1996). The Cognitive Style Index: A Measure of Intuition-Analysis for Organizational Research. *Journal of Management Studies*, 33, 119-153.
- Becker, W., Ulrich, P. and Botzkowski, T. (2016). *Data Analytics im Mittelstand*, Wiesbaden.
- Becker, W., Ulrich, P., Schmid, O. and Feichtinger, C. (2020). *Industrielle Digitalisierung*, Wiesbaden.
- Daniels, J.D., Radebaugh, L.H. and Sullivan, D.P. (11th

- ed. 2007). *International Business*. Upper Saddle River.
- Ding, N., Xu, X., Yang, H., Li, Y. and van Heughten, P. (2020). Decision-making styles of Chinese business students. *Journal of Education for Business*, 95, 351-358.
- Engelhard, J. and Kerner, L. (2019): Meta-Controlling als Erfolgsfaktor des Controllings internationaler Unternehmen, In: Ulrich, P. and Baltzer, B. (Eds.), *Wertschöpfung in der Betriebswirtschaftslehre* (pp. 133-135), Wiesbaden.
- Fischer, S., Soyezy, K. and Gurtner, S. (2015). Adapting Scott and Bruce's General Decision-Making Style Inventory to Patient Decision Making in Provider Choice. *Medical Decision Making*, 35, 525–532.
- Flacke, K. (2006). *Controlling in mittelständischen Unternehmen*, Münster.
- Griffin, R.W. (10th ed. 2011). *Management*.
- Harren, V.A. (1979). *A model of career decision making for college students*. *Journal of Vocational Behavior*, 14, 119-133.
- Horngren, C.T., Bhimani, A., Datar, S.M. and Foster, G. (3rd ed. 2005). *Management and Cost Accounting*, Upper Saddle River.
- Internationaler Controller Verein e.V. (Ed., 2021). *Entscheidungsvorlagen für die Unternehmensführung*, Freiburg/München.
- Kerner, L. (2018). *Universale Logik in heterogenen Kulturräumen*, Wiesbaden.
- Rieg, R. (2020). *Internationales Controlling*, München.
- Rowe, A. and Boulgarides, J. (1992). *Managerial Decision Making*, Upper Saddle River.
- Schäffer, U. (2007). *Management Accounting & Control Scales Handbook*, Wiesbaden.
- Schäffer, U. and Steiners, D. (2004). Zur Nutzung von Controllinginformationen. *Zeitschrift für Planung und Unternehmenssteuerung*, 15, 377-404.
- Schanz, G. (2019). *Die BWL-Story*, München.
- Scott, S.G. and Bruce, R.A. (1995). Decision-making style: The development and assessment of a new measure. *Educational and Psychological Measurement*, 55, 818–831.
- Spicer, D.P. and Sadler-Smith, E. (2005). An examination of the general decision making style questionnaire in two UK samples. *Journal of Managerial Psychology*, 20, 137–149.
- Vahs, D. and Schäfer-Kunz, J. (7th ed. 2015). *Einführung in die Betriebswirtschaftslehre*, Stuttgart.
- Vanini, U. (2009). *Controlling*, Stuttgart.
- Wolf, M. (2019). *Stress, Informationen und Entscheidungen im Management*, Wiesbaden. 

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Simultaneous Equation Model of Thai Economic Growth

Adirek Vajrapatkul, Sukhothai Thammathirat Open University, Thailand

Economic growth has received considerable attention thus far. Theoretically, it is stated that economic growth has been determined by several sources. Also, other macroeconomic variables have been expected to have effects on this growth. To investigate such effects, this study is designed to investigate some determinants of growth by using the simultaneous equations system. In addition, the traditional multiple linear equation is tested for result comparison. The estimation was conducted by using the data of Thailand obtained from the World Bank database and covers the period from 1995 to 2019. The results of OLS estimation show that only the number of salaried workers affects GDP significantly and positively. The current account balance did not significantly affect GDP but shows the negative relationship with GDP. The result from 3SLS estimations shows that the number of salaried workers affects GDP significantly and positively. However, foreign direct investment and the number of salaried workers do not significantly affect GDP but relate positively to GDP. The results from the other two equations show that the consumer price index affects the current account balance significantly and negatively, and GDP affects the number of salaried workers significantly and positively. Consequently, the government can increase economic growth by increasing the number of jobs available for citizens.

1. Introduction

The growth of the economy is continuously studied to discover its determinants and the structure of the relationship between those determinants and economic growth. A model that scholars widely use for this purpose is the simultaneous equation. The recent work that investigated the growth of the economy by this model created a system of equations that are composed of, e.g., GDP per capita, CO₂ emission, and renewable energy consumption (Radmehr et al., 2021), economic growth, technological innovation, and pollution emissions (Zeng & Zhou, 2021), GDP, CO₂, and emission of petroleum consumption (Adewuyi & Awodumi, 2021), and economic growth, energy consumption, and environmental quality (Malik, 2021). This work also uses this model to learn the structure of the relationship between GDP and its determinants with an application of the Three-Stage Least Squares (3SLS) estimation technique. Referring to this estimation technique, it is argued that it is superior to

the traditional OLS estimation, which often faces the endogeneity problem in data series. That is, the Three-Stage Least Squares (3SLS) can overcome such an endogeneity problem by an implication of Instrumental Variables (IV). Compared to the 2SLS approach, which separately estimates the slope coefficients of each equation, the 3SLS methodology estimates all coefficients instantaneously (Murshed & Mredula, 2019). Thus, the 3SLS can gain more information to estimate the model parameters than the 2SLS.

As state above, this work will learn the determinants of economic growth, proxied by gross domestic product, for the benefits of policy design. The determinants include in this work include foreign direct investment, salaried workers, current account balance, and consumer prices index which are expects to pass their effects to GDP. As these determinants, at some level, can be controlled by policies designed by government, e.g., fiscal and monetary policy, thus the knowledge of their relationship and impact on GDP should be the valuable ingredient for policy decision.

To meet the study objective, the rest of the works will be organized as follows. Next section will provide the concepts and some empirical evidences supporting for research hypothesis. Then the model will be present in the subsequent section. It will be follow by the result of analysis, policy recommendation, and conclusion, respectively.

2. Literature Review

2.1 The Relationship between Current Account and Economic Growth

Current account balance measures the inflow and outflow of goods and services as well as investment incomes, unrequited transfers and compensation of employees. The current account balance mirrors a country's performance in foreign trade in goods and services and could be in surplus or deficit. A surplus position indicates that a country is exporting more goods and services than is importing, while a deficit shows that a country's import from the rest of the world exceeds its exports. Also, current account balance can be expressed as the difference between national savings and investment. In this case of a deficit in current account, it signifies low levels of national savings for financing economic activities. On the other hand, a current account

surplus will reflect a high level of national savings. The current account balance is an important indicator of competitiveness as it is used by international creditors to determine the creditworthiness of a particular economy (Sanni, G. K. et al., 2019). Thus the variation of saving and competitiveness level can affect the growth of economy.

The direction of the relationship between current account balance and economic growth can be varied according to the stage of the economic growth. During the early stages, the less developed countries will import a large quantity of capital and thus run into current account deficit. After their economic become larger, their current account balance will improve as they can export their products to the rest of the world. However this export may cause economic problem via current account. That is if the major income from the export of countries are relied on goods and service that their prices are sensitive to the negative external shocks, this will translate to the current account deficit which will have negative impacts on economic growth (Brissimis et al., 2010) (Ogunniyi et al., 2018).

In the Keynesian model: increase of national income that lead to increase in import consumption and decreases private saving can cause a higher current account deficit. However, in a Ricardian manner, if national income is increased unsustainable, then it will lead to decreases in import consumption and increases saving. This would lead to a lower current account deficit (Brissimis et al., 2010).

In the empirical studies, it found that the growth of economy can cause an increase in import which can cause current account deficit. Although, there is an inverse relation between economic growth and the current account, it show that current account deficit have no significant effect on the growth of economy (Süreççi Yamaçlı, 2015). However, the evident for some works show that current account deficit negatively impact economic growth in the long-run and short run and this deficit is recognized as harmful factor for the overall health of the economy (Zafar, 2020). On the other hand, the current account surplus have a positive relationship with economic growth (Rahman & Dilanchiev, 2021). However the growth rate of economy can be slowed when the current account balance is surplus (Dayioğlu & Aydın, 2021).

Based on the above information, the first hypothesis is stated as follows:

H₁: CAB is positively affect GDP

2.2 The Relationship between Foreign Direct Investment and Economic Growth

In theoretical literature, both neoclassical growth theory and endogenous growth theory have stressed the importance of capital as an important source of growth. Neoclassical theory lays emphasis on tangible capital formation as the driver of economic growth. In neo-classical growth model, growth of output is achieved in the short run through higher

rate of savings and therefore higher rate of capital formation which foreign investment also constitute. However, diminishing returns to capital limit economic growth in the model. As a result of the deficiencies in neo-classical growth theory, endogenous growth theory sought to supply the missing explanation of long run growth. Endogenous growth opined that growth may go on indefinitely since the returns on investment in a broad class of capital goods, which includes human capital, and technology does not necessarily diminish as economics develop. Endogenous growth theory explains long-run growth as emanating from economic activities that create new technological knowledge. Foreign direct investment constitutes an important component in endogenous growth model by having direct impact on capital accumulation, and indirectly through technology transfer (Dada & Abanikanda, 2022).

FDI has both positive and negative impacts on economic growth. FDI inflow had a positive impact on development. FDI flows represent real fixed investment, creating employment and adding new equipment and infrastructure. However, the positive effect is temporary, and that growth slows as accumulated FDI stocks represent a large share of domestic GDP. FDI penetration creates uneven growth across sectors and concentrates in capital-intensive industry, which boosts productivity but provides relatively few jobs. Over time, penetrated sectors become more productive and develop, but this productivity does not diffuse to other sectors. The persistently low productivity and wages in traditional sectors allow foreign firms to pay only a minimal amount more to attract the best workers—"wages can be low in productive sectors because they must be low in unproductive ones". Finally, disarticulation leads to over-urbanization, where large streams of migrants flow into urban centers, only to find marginal employment in the service or informal sectors. Further, transnational corporations often expatriate profits from their subsidiaries in developing countries rather than reinvest in the local economy. FDI penetration limits the formation of backward and forward linkages between foreign and domestic sectors, and generates "extraversion," where large segments of penetrated economies orient "outward" toward developed economies. This extraversion limits demand growth for domestically produced manufactures, and creates disincentives for state policies that might otherwise stimulate domestic consumption. Alternatively, others argue that FDI penetration should promote growth, particularly for less developed countries. The classic Harrod-Domer model of economic growth provides a starting point for why foreign capital should spur growth. Here, output is largely a function of capital and is therefore a linear function of investment. If we assume that penetrated economies lack a sufficient capital stock, then foreign investment represents a substitute for domestic investment and should promote growth relative to the case of zero capital. Similarly, FDI also brings with it new technology to the host economy, which increases

productivity. And, contrary to the disarticulation thesis, some argue that this technology transfer does spill over to other sectors, which might make domestic investment more efficient than it would be in the absence of FDI. Thus, FDI could increase the pace and/or productivity of domestic investment, with obvious implications for growth. Similarly, FDI may transfer managerial expertise and provide domestic actors with access to foreign markets that would otherwise remain out of reach. In short, both rationales agree that FDI boosts productivity in host economies and grants the host economy access to foreign markets (Curwin & Mahutga, 2014).

FDI is an important factor for economic growth in a long run, especially for emerging and developing economies. The impact of FDI on economic growth is not always positive, as it depends on characteristics of the investment resulting from FDI, such as type, sector, scope, duration, proportion of domestic businesses in the sector, and so on (Dinh et al., 2019).

In the empirical studies, it found that FDI are the statistically significant variables that positively impact the changes in GDP (Srivastava & Talwar, 2020) (Desmintari et al., 2021). However, FDI can affect economic growth negatively if the country do not have sufficient absorptive capacity which indicate by institution quality within the country (Dada & Abanikanda, 2022).

Based on the above information, the second hypothesis is stated as follows:

H₂: FDI is positively affect GDP

2.3 The Relationship between Labor Supply and Economic Growth

GDP changes can be explained by alterations in the labor force and capital formation as in the traditional framework of the Cobb-Douglas function (Simionescu et al., 2021).

Additional workers contribute to higher total output in the country. from the standard Solow model increasing population *ceteris paribus* contributes negatively to per capita growth due to decreasing marginal factor productivity and the dilution of capital (Strzelecki et al., 2022).

In the empirical studies, it found the existence of a long-run relationship between the real GDP and employment. Also, there exists a bi-causality relationship between real GDP and employment (Akcoraoglu, 2010). Also There is a bi-directional relationship between capital input and economic growth as well as labor force input and economic growth. However, in service sector, the correlation between economic growth and the input of capital and labor force is low. for other industrial area, the economic growth is highly correlated with labor force input and fixed asset input with a bi-directional relationship (Zhao et al., 2016).

Based on the above information, the third hypothesis is stated as follows:

H₃: WSW is positively affect GDP

Conversely, Workers can be affected by macroeconomic fluctuations and the number of employment can be varied according to the stage of business cycle. If a particular type of workers is sensitive to the business cycle, then it would expect employment to decrease largely in the stage of economic recession period as jobs disappeared and the ability to generate new jobs is extremely limited, especially in regional/remote areas (Hunter, 2010).

There is a relationship between economic growth and female labor force participation. As the country goes through the U-shaped curve with the variation of income inequality, it will induce greater impact on women's employment. female labor force participation also support by social transformation and an increase in woman's education (Suh, 2017).

Based on the above information, the fourth hypothesis is stated as follows:

H₄: GDP is positively affect WSW

2.4 The Relationship between Inflation and Current Account

Domestic inflation which indicates the rising of general price with in the country not only affects the internal stability of countries but also the external one. In term of the external stability, inflation can increase or decrease the cost of service and goods export. In the case of raising the level of inflation, it can affect the purchasing power of foreign buyers and hence reduce their willing to import. At the same time, the raising of inflation level, which makes the domestic price higher than import price, will encourage more domestic consumers import goods and service from abroad. Thus a decrease in export and increase of import will result in the current account deficit (Alawin & Oqaily, 2017).

In the empirical studies, it found a relationship between current account balances, exchange rate movements and inflation. In the process, emerging market economies with higher current account deficits faced larger currency depreciations and, consequently, higher consumer prices. High current account deficits combined with strong inflationary pressures created a twin problem of financial and price stability. Exchange rate pass-through turned out to be an important parameter of this twin problem with a high degree of pass-through amplifying the relationship between current account deficits and inflationary pressures (Kılınc et al., 2014).

For some countries, inflation rate (CPI) representing macroeconomic stability is found to have positive and statistically significant relations with current account balances. If inflation is low more financial capital will enter the country, cause local currency appreciate, which will cause to increase the current balance deficit. So a positive relationship is expected between CPI, which reflect

macroeconomic stability, and current account balances for developing countries. A rise inflation rate reduces the current account deficits. However, for industrial countries, inflation rate have the opposite effect on current account balances (Altayligil & Çetrez, 2020).

Based on the above information, the fifth hypothesis is stated as follows:

H₅: CPI is negatively affect CAB

3. Model Formulation

To investigate the structural effects of the variables on GDP, this work presents a following system of simultaneous equation:

$$GDP_t = f(CAB_t, FDI_t, WSW_t)$$

$$CAB_t = g(CPI_t)$$

$$WSW_t = h(GDP_t)$$

where GDP is the gross domestic product. FDI and WSW are foreign direct investment and salaried workers, respectively. CAB denotes current account balance and CPI is consumer prices index. The yearly data covered the period of 1995 to 2019, which is 25 observations, of Thailand for estimating the model are downloaded from World Bank database and the method for estimating is the three stage least square (3SLS).

Table 1: Descriptive Statistics

	GDP	CAB	FDI	WSW	CPI
Mean	9.39E+12	3.213268	7.00E+09	43.02120	2.637027
Median	9.08E+12	3.367324	6.10E+09	43.71000	2.184886
Maximum	1.69E+13	12.52905	1.59E+10	49.72000	7.994729
Minimum	4.22E+12	-8.026588	2.07E+09	35.65000	-0.900425
Std. Dev.	4.14E+12	5.411894	3.88E+09	4.194126	2.319119
Skewness	0.334751	-0.423154	0.817513	0.007587	0.478701
Kurtosis	1.773819	2.626465	2.830925	2.011052	2.438283
Jarque-Bera	2.033076	0.891424	2.814476	1.019009	1.283482
Probability	0.361846	0.640368	0.244819	0.600793	0.526375
Sum	2.35E+14	80.33171	1.75E+11	1075.530	65.92567
Sum Sq. Dev.	4.12E+26	702.9264	3.62E+20	422.1767	129.0795
Observations	25	25	25	25	25

Source: author's calculation

4. Result

The results shown in Table 1 are the summary of indicators, and Table 2, which is obtained from OLS estimation, indicates that only the number of salaried workers affects significantly and positively GDP. Although

the current account balance did not significantly affect GDP, it showed a negative relationship with GDP, which seems to contradict the theoretical perspective.

Nevertheless, by using the 3SLS estimations, the results of the estimations shown in Table 3-4 indicate that salaried workers affect GDP significantly and positively. Although FDI and WSW do not significantly affect GDP, they show a positive relationship with GDP. The results from the other two equations go along with the directions expressed by this research hypothesis, i.e., CPI affects CAB significantly and negatively; and GDP affects WSW significantly and positively.

Table 2: Result of OLS, GDP as Dependent Variable

Variable	Coefficient	Std. Error	t-Statistic	Prob.
CAB	-2.21E+10	6.94E+10	-0.318764	0.7531
FDI	135.5216	96.65713	1.402086	0.1755
WSW	8.69E+11	9.63E+10	9.023336	0.0000
C	-2.89E+13	3.87E+12	-7.464814	0.0000
R-squared	0.853242	Mean dependent var		9.39E+12
Adjusted R-squared	0.832276	S.D. dependent var		4.14E+12
S.E. of regression	1.70E+12	Akaike info criterion		59.30361
Sum squared resid	6.05E+25	Schwarz criterion		59.49863
Log likelihood	-737.2951	Hannan-Quinn criter.		59.35770
F-statistic	40.69750	Durbin-Watson stat		0.679641
Prob(F-statistic)	0.000000			

Source: author's calculation

Table 3: Result of a system of simultaneous equation

Coff.	Coefficient	Std. Error	t-Statistic	Prob.
C(1)	-2.97E+13	3.46E+12	-8.577552	0.0000
C(2)	2.44E+09	7.09E+10	0.034442	0.9726
C(3)	21.38739	31.70697	0.674533	0.5023
C(4)	9.05E+11	8.18E+10	11.05628	0.0000
C(5)	6.395536	1.387507	4.609372	0.0000
C(6)	-1.206764	0.398577	-3.027678	0.0035
C(7)	32.86467	0.954000	34.44934	0.0000
C(8)	1.08E-12	9.44E-14	11.46714	0.0000

Source: author's calculation

Table 4: Result of each equation

Stat.	$GDP_t = f(CAB_t, FDI_t, WSW_t)$	$CAB_t = g(CPI_t)$	$WSW_t = h(GDP_t)$
R-squared	0.841685	0.270496	0.814177
Adjusted R-squared	0.819068	0.238778	0.806098
S.E. of regression	1.76E+12	4.721772	1.846856
Durbin-Watson stat	0.608112	1.223588	0.632932
Mean dependent var	9.39E+12	3.213268	43.02120
S.D. dependent var	4.14E+12	5.411894	4.194126
Sum squared resid	6.53E+25	512.7879	78.45015

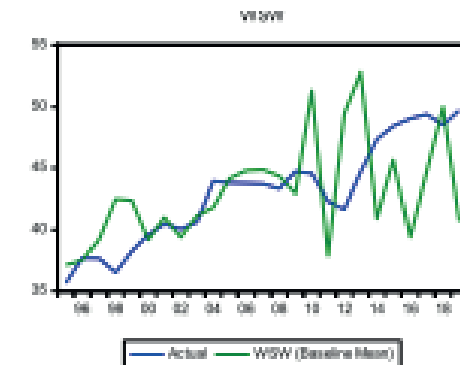
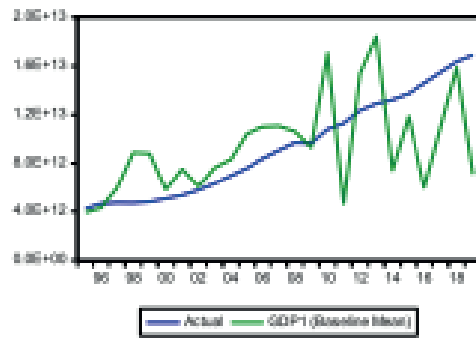
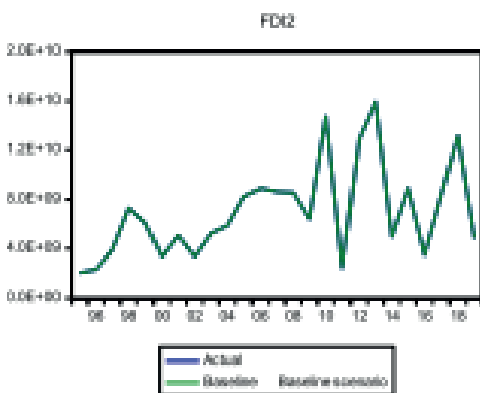
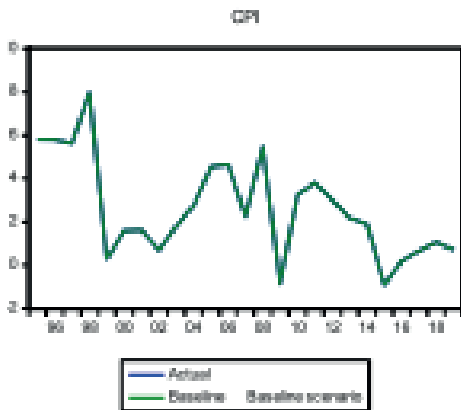
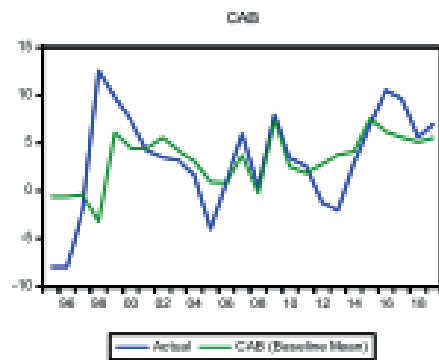
Source: author's calculation

The result from table 3 and Table 4 can be written precisely in the following form:

$$\begin{aligned} \text{GDP} &= -2.96881508798\text{e}+13 + 2442614107.46(\text{CAB}) \\ &\quad + 21.3873874761(\text{FDI})+ 904615894342(\text{WSW}), \\ \text{CAB} &= 6.39553625228- 1.20676354388(\text{CPI}), \\ \text{WSW} &= 32.8646734462+ 1.08196420018\text{e}-12(\text{GDP}). \end{aligned}$$

The estimation of CAB, WSW, and GDP are graphically presented by Figure 1.

Figure 1: Estimation of GDP, CAB, and WSW (Author's presentation)



5. Policy Recommendation

The policy recommendations derived from the results of the analysis based on the 3SLS suggest that government authorities may increase the growth of the economy by increasing the number of jobs available for citizens.

6. Conclusion

This work is designed to study the determinants of GDP, namely foreign direct investment, the number of salaried workers, current account balance, and consumer price index. The estimation technique used in this study is 3SLS incorporated with the simultaneous equation system. However, the OLS estimation incorporated with a traditional multiple linear function is also conducted for comparison purposes. Thailand's yearly data covering the period from 1995 to 2019, totaling 25 observations were downloaded from the World Bank database in order to estimate the model. According to OLS estimation, only the number of salaried workers affects GDP significantly and positively, whereas current account balance does not affect GDP but has a negative relationship with GDP. By using the 3SLS estimations, it shows that the number of salaried workers affects GDP significantly and positively. Although foreign direct investment and the number of salaried workers do not significantly affect GDP, they show a positive relationship with GDP. The results from the other two equations show that the consumer price index affects the current account

balance significantly and negatively. GDP affects significantly and positively the number of salaried workers. Therefore, the government can increase economic growth by increasing the number of jobs available for citizens.

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References

- Adewuyi, A. O., & Awodumi, O. B. (2021). Environmental pollution, energy import, and economic growth: Evidence of sustainable growth in South Africa and Nigeria. *Environmental Science and Pollution Research*, 28(12), 14434–14468. <https://doi.org/10.1007/s11356-020-11446-z>
- Akcoraoglu, A. (2010). EMPLOYMENT, ECONOMIC GROWTH AND LABOR MARKET PERFORMANCE: THE CASE OF TURKEY. *Ekonomik Yaklasim*, 21(77), 101. <https://doi.org/10.5455/ey.20038>
- Alawin, M., & Oqaily, M. (2017). CURRENT ACCOUNT BALANCE, INFLATION, INDUSTRY AND SUSTAINABLE DEVELOPMENT IN JORDAN. *Revista Galega de Economía*, 26(3), 45–56. <https://doi.org/10.15304/rge.26.3.4459>
- Altayligil, Y. B., & Çetrez, M. (2020). Macroeconomic, institutional and financial determinants of current account balances: A panel data assessment. *Journal of Economic Structures*, 9(1), 49. <https://doi.org/10.1186/s40008-020-00225-1>
- Brissimis, S. N., Hondroyiannis, G., Papazoglou, C., Tsaveas, N. T., & Vasardani, M. A. (2010). Current account determinants and external sustainability in periods of structural change. European Central Bank, Working Paper Series No 1243, 1–38.
- Curwin, K. D., & Mahutga, M. C. (2014). Foreign Direct Investment and Economic Growth: New Evidence from Post-Socialist Transition Countries. *Social Forces*, 92(3), 1159–1187. <https://doi.org/10.1093/sf/sot128>
- Dada, J. T., & Abanikanda, E. O. (2022). The moderating effect of institutions in foreign direct investment led growth hypothesis in Nigeria. *Economic Change and Restructuring*, 55(2), 903–929. <https://doi.org/10.1007/s10644-021-09332-w>
- Dayioğlu, T., & Aydın, Y. (2021). Relationship between Economic Growth, Unemployment, Inflation and Current Account Balance: Theory and Case of Turkey. In M. Kenan Terzioğlu & G. Djurovic (Eds.), *Linear and Non-Linear Financial Econometrics -Theory and Practice*. IntechOpen. <https://doi.org/10.5772/intechopen.93833>
- Desmintari, Renea Shinta Aminda, & Renaldy Rekagriya Pratama. (2021). The Influence Of Singapore Investment Investment In Indonesia's Economic Growth. *REVIEW OF INTERNATIONAL GEOGRAPHICAL EDUCATION*, 11(3), 494–502.
- Dinh, T. T.-H., Vo, D. H., The Vo, A., & Nguyen, T. C. (2019). Foreign Direct Investment and Economic Growth in the Short Run and Long Run: Empirical Evidence from Developing Countries. *Journal of Risk and Financial Management*, 12(4), 176. <https://doi.org/10.3390/jrfm12040176>
- Hunter, B. (2010). Revisiting the Relationship Between the Macroeconomy and Indigenous Labour Force Status: MACROECONOMY AND INDIGENOUS LABOUR FORCE STATUS. *Economic Papers: A Journal of Applied Economics and Policy*, 29(3), 320–332. <https://doi.org/10.1111/j.1759-3441.2010.00081.x>
- Kılınc, M., Tunç, C., & Yörükoğlu, M. (2014). Twin stability problem: Joint issue of high current account deficit and high inflation. *Central Bank of the Republic of Turkey*, 89, 361–371.
- Malik, M. A. (2021). Economic growth, energy consumption, and environmental quality nexus in Turkey: Evidence from simultaneous equation models. *Environmental Science and Pollution Research*, 28(31), 41988–41999. <https://doi.org/10.1007/s11356-021-13468-7>
- Murshed, M., & Mredula, F. A. (2019). Impacts of Corruption on Sustainable Development: A Simultaneous Equations Model Estimation Approach. MPRA Paper No. 97419, 1–28.
- Ogunniyi, M. B., Iwegbu, O., & Adekoya, K. I. (2018). A comparative analysis of the impact of current account balances on economic growth of sane countries. *International Journal of Development and Sustainability*, 7(3), 1220–1237.
- Radmehr, R., Henneberry, S. R., & Shayanmehr, S. (2021). Renewable Energy Consumption, CO2 Emissions, and Economic Growth Nexus: A Simultaneity Spatial Modeling Analysis of EU Countries. *Structural Change and Economic Dynamics*, 57, 13–27. <https://doi.org/10.1016/j.strueco.2021.01.006>
- Rahman, H., & Dilanchiev, A. (2021). Does Current Account Increase the Economic Growth in Bangladesh? The Analysis of GMM Technique. *European Online Journal of Natural and Social Sciences*, 10(1), 52–69.
- Sanni, G. K., Musa, A. U., & Sani, Z. (2019). Current Account Balance and Economic Growth in Nigeria: An Empirical Investigation. *Central Bank of Nigeria Economic and Financial Review*, 52(2), 83–106.
- Simionescu, M., Pelinescu, E., Khouri, S., & Bilan, S. (2021). The Main Drivers of Competitiveness in the EU-28 Countries. *Journal of Competitiveness*, 13(1), 129–145. <https://doi.org/10.7441/joc.2021.01.08>
- Srivastava, S., & Talwar, S. (2020). Decrypting The Dependency Relationship Between The Triad Of Foreign Direct Investment, Economic Growth And Human

Development. *The Journal of Developing Areas*, 54(2). <https://doi.org/10.1353/jda.2020.0012>

Strzelecki, P., Growiec, J., & Wyszynski, R. (2022). The contribution of immigration from Ukraine to economic growth in Poland. *Review of World Economics*, 158(2), 365–399. <https://doi.org/10.1007/s10290-021-00437-y>

Suh, M.-G. (2017). Determinants of Female Labor Force Participation in South Korea: Tracing out the U-shaped Curve by Economic Growth. *Social Indicators Research*, 131(1), 255–269. <https://doi.org/10.1007/s11205-016-1245-1>

Sürekċi Yamaçlı, D. (2015). THE RELATIVE SENSITIVITIES ANALYSIS BETWEEN THE ECONOMIC GROWTH RATE AND SELECTED MACROECONOMIC VARIABLES: TURKEY CASE. *Uluslararası İktisadi ve İdari İncelemeler Dergisi*, 0(15). <https://doi.org/10.18092/ijeas.26511>

Zafar, K. M. (2020). ARDL – Analysis of the

Relationship among Exports, FDI, Current Account Deficit and Economic Growth in Pakistan. Iran. *Econ. Rev.*, 24(2), 393–414.

Zeng, S., & Zhou, Y. (2021). Foreign Direct Investment's Impact on China's Economic Growth, Technological Innovation and Pollution. *International Journal of Environmental Research and Public Health*, 18(6), 2839. <https://doi.org/10.3390/ijerph18062839>

Zhao, H., Zhao, H., Han, X., He, Z., & Guo, S. (2016). Economic Growth, Electricity Consumption, Labor Force and Capital Input: A More Comprehensive Analysis on North China Using Panel Data. *Energies*, 9(11), 891. <https://doi.org/10.3390/en9110891>

Sustainability as a driver for innovation in the apparel industry

Laura Schmiedle, University of Stuttgart, Germany

Sustainability is becoming increasingly important in the apparel industry due to rising challenges such as climate change and scarcity of resources. Overall, the pursuit of sustainability in various industries is accompanied by changing competitive landscapes, forcing companies to rethink the way they do business. This requires innovative approaches to promote solutions that enable sustainable economic activity. The aim of this paper is to make a scientific contribution by examining the role of sustainability for innovation activities and the resulting structural effects. Therefore, 18 expert interviews with companies in the apparel industry were conducted. The results show that sustainability has a major impact on the development of innovative approaches for efficient processes and sustainable products. Focusing on the sustainable further development of one's core business and simultaneously promoting innovations is essential for companies to stay competitive.

Introduction

In recent years economic growth has often been achieved at the expense of the environment and with disregard for corporate sustainability. In this context, particularly the apparel industry stands out as it ranks second worldwide after the oil industry as the most polluting sector. The use of environmentally harmful chemicals, production sites in low-wage countries as well as mass production of cheap goods, promoting a 'throwaway mentality', is increasingly discussed in public (Thorisdottir & Johannsdottir, 2019; Yang et al., 2017). Public reporting on negative impacts on the ecosystem is a trigger for rethinking about corporate actions and consumer behavior (Todeschini et al., 2017). In particular, consumers are becoming increasingly aware of sustainability issues, thus their consumption behavior puts pressure on companies to operate more sustainably (Jia et al., 2020; Lundblad & Davies, 2016). In order to respond to this, sustainability can be used as a driver for the development of innovative approaches (Joyce & Paquin, 2016). The improvement of manufacturing processes saves time and resources and brings both, ecological and economic benefits. In addition, innovative business models offer the opportunity to quickly respond to trends such as the concept of circularity. Furthermore, the integration of sustainability into the core business enables a

reduction of the ecological footprint and the expansion of competitive advantages through sustainable developments (Todeschini et al., 2017). However, for organizations to survive successfully on the market in the long term, a balance between the development of innovations as well as the improvement of the core business is of great importance. This strategic focus on exploration through innovation and exploitation through the further development of existing capabilities is described by the term 'ambidexterity' (Duncan, 1976; Tushman & O'Reilly, 1996). Companies seek to balance exploration and exploitation in order to respond to changing conditions. The increasing importance of ambidexterity in companies is reflected in the growing number of studies, particularly in innovation research (Raisch et al., 2009). However, the current studies predominantly shed light on the importance of sustainability and innovations for entrepreneurial performance in combination with ambidexterity (Van Holt et al., 2020, p. 2; Chang & Gotcher, 2020, p. 2; Maletič et al., 2014, p. 22). The importance of sustainability for innovation based on ambidexterity has not yet been sufficiently studied in the context of the apparel industry (Chang & Gotcher, 2020, p. 5; Maletič et al., 2016, p. 4). Therefore, the aim of this paper is to make a scientific contribution to the development of existing approaches by investigating the importance of sustainability for innovations, especially in the context of the apparel industry. Furthermore, these relationships are studied by examining the structural effects that result from the strategic orientation of exploration and exploitation within the organization. This paper addresses the following research question: *How does sustainability influence innovation activity and what are the structural implications for companies in the apparel industry?*

Theoretical background of sustainability

Responsible management of natural resources is necessary to safeguard the natural basis of life for future generations. Organizations can make a decisive contribution to this by pursuing sustainable management in the ecological, economic and social dimensions.

Three dimensions of sustainability

Hans Carl von Carlowitz (1645-1714) is considered as

the forefather and creator of the term sustainability. He criticized the orientation of economic activity (forestry) towards short-term profits and called for a "continuous, steady and sustained use" of the forest (von Carlowitz & von Rohr, 1732, p. 105). He emphasized the focus on consistent economic growth through sustainable, ecological resource management. The sustainability debate emerged with the founding of the "Club of Rome" in 1968 and the "Limits to Growth" study in 1972, which questioned the consequences of continuous economic growth. Additionally, the Brundtland Report (1987) achieved an expansion of the concept of sustainability by the term 'sustainable development' and the triad of social justice, economic growth and the protection of the environment. The report addresses the issue of protecting and obtaining resources for future generations on a global scale and highlighted the need for a long-term environmental strategy for sustainable development. This triad was later referred to as the 'triple bottom line' (Elkington, 1994, p. 90, Milne & Gray, 2013, p. 14). It is assumed that sustainable management and long-term success can only be achieved by simultaneously addressing three dimensions: the ecological, the economic and the social dimension.

The *ecological dimension* of sustainability involves improving human well-being by conserving soils, protecting biodiversity and water as natural capital and livelihoods. It is the responsibility of society and, above all, of companies as major economic players to take responsibility for the protection of the natural environment and the conscious use of limited resources (Jennings & Zandbergen, 1995; Gladwin et al., 1995).

The *social dimension* comprises minimum standards that contribute to an assured quality of life for society. This means to ensure that every individual has the opportunity to meet its own basic needs and has access to resources (Bansal, 2005). The social dimension also includes ensuring human rights (Barnett et al., 2020). From an economic context, companies are required to provide fair, humane working conditions and create development opportunities for employees (Labuschagne et al., 2005).

Livelihood security, an adequate standard of living and prosperity are part of the *economic dimension* of sustainability. Economic performance is achieved through the production of goods and services, which is the prerequisite for generating global prosperity (Bansal, 2005). Economic performance is underpinned by the principle of maximizing profits while minimizing the use of resources, which, according to Freeman and Gilbert Jr. (1992), is the supreme maxim of economic activity. In this context, the two authors state that the ecological and social dimension is often subordinated to the economic dimension. Shrivastava (1995) supports this statement, adding that this principle is inherently limited in its ability to consider all three dimensions at the same level. However, Steurer and Konrad (2009) disconfirm these statements and argue that this

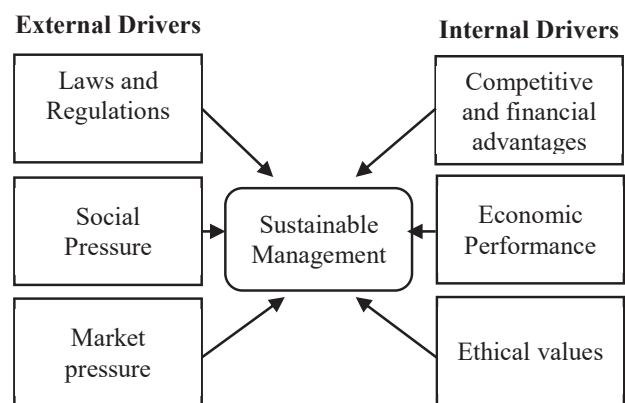
conflict needs to be resolved in the context of sustainable management. This can be done by ensuring that profit maximization is not designed for the short term, but aims at long-term and consistent profit. Dyllick and Hockerts (2002) add that economic sustainability can only be successful in the long term if all three dimensions are considered equally and simultaneously.

This debate shows that sustainability is more than just environmental protection. Rather, it is about relating the economic, ecological and social dimension to one another and giving equal consideration to all three of them. Each individual dimension contributes to the overall concept of sustainable management. Economic activity must not endanger nature as an ecological system and must be based on the premise that economic success is achieved while taking social responsibility and the responsible use of resources into account.

Drivers of sustainability

A distinction of the drivers of sustainability can be made between external and internal drivers. Internal drivers describe the intrinsic motivation of companies to operate sustainably. External drivers are factors that affect the company from the outside and force it to operate sustainably (Johannsdottir, 2015). Following Johannsdottir (2015), Bansal und Roth, (2000), Lozano (2015) and Hart (1995) Figure 1 presents an overview of the most frequently cited external and internal drivers for sustainable business.

Figure 1: External and internal drivers



External drivers for sustainable management include legal requirements and regulations by politicians, social pressure through active demands by interest groups, and market pressure with regard to competitiveness. Sustainable business practices are demanded and promoted by the government through the introduction of laws and regulations (Reinhardt, 1999). One example is the so-called 'Supply

Chain Act', which is intended to encourage companies to align values and supply chains with environmental standards and compliance. This is intended to prevent companies from relocating their production to countries with low environmental standards or unfavorable production conditions. Social pressure from interest groups can also be seen as an external driver. Hörisch et al. (2014) argue that stakeholders nowadays not only pay attention to economic performance, but also to social and environmental responsibility. Schrettle et al. (2014) identify various interest groups, including non-governmental organizations (NGOs), the media and environmental protection movements, and describe them as important social drivers of sustainable business. The opportunities for these stakeholders to exert influence predominantly relate to mobilizing public opinion for or against the company's performance (Clarkson, 1995). Changing consumer buying behavior also increases pressure on companies (Banerjee, 2001; Shrivastava, 1995). To meet this changing demand, companies are forced to innovate their production and services in a sustainable way to remain competitive. The communication of negative effects of economic activity also means that companies are increasingly having to face up to market pressures.

According to Schrettle et al. (2014), market pressure exerts a strong influence on companies and can be identified as another external driver. The requirements of the various interest groups also influence the market context in which the company operates. Investors, consumers, suppliers and competitors represent such interest groups that have a significant influence (Delmas & Toffel, 2008). De Villiers et al. (2011) identify investors as a key factor related to market pressure. Companies may face problems in staying competitive if investors withdraw because of an expected risk due to poor environmental practices and the associated loss of the company's image.

Just like consumers, suppliers can also influence the company with regard to sustainable business practices. (Henriques & Sadorsky, 1999). Poor environmental standards of the company to be supplied can also cause suppliers to lose their reputation and subsequently stop supplying. In this context, Sarkis et al. (2010) note that companies that do not give attention to pressure from interest groups and their demands risk losing customers. In contrast, companies that meet consumer demands for sustainable products are better positioned in the market.

In addition to external drivers, internal drivers can also be identified as motives for sustainable business practices. Companies that follow these internal motives are able to reduce operating costs through ecological efficiency (Shrivastava, 1995; Hart & Milstein, 2003). King and Lenox (2001) and Johannsdottir (2015) add that profitability increases through savings in energy and materials as well as through emission and waste reduction. In this context, Shrivastava (1995) notes that consumers increasingly value environmentally friendly products, packaging materials, and

a sustainable corporate image, representing a growing segment that prefers products from companies with strong sustainability credentials. De Villiers et al. (2011) examine increased economic performance of companies as a further motive. Companies with a corresponding commitment to sustainability are very likely to achieve better economic performance (De Villiers et al., 2011). In addition to improved economic performance, ethical values can also be seen as a motive for sustainable business practices (Johannsdottir, 2015; Aragón-Correa & Rubio-Lopez, 2007). In this context, corporate culture is shaped by the personal value system of managers as well as employees (Bansal & Roth, 2000; Lozano, 2012).

Apparel industry in transition

Hardly any other industry has come under more critical scrutiny in recent years than the apparel industry. Media reports about severe environmental pollution as well as working conditions in developing countries that violate human rights have led numerous companies to create more environmentally friendly production methods. Sustainability is playing an increasingly important role in the development of new, innovative products and is a decisive factor in the economic success of companies (Banerjee, 2001). Due to intense price wars as well as rapid consumption and an associated 'throwaway mentality', the apparel industry has developed into an industry that at first glance has little to do with sustainability. These problems are caused by complex manufacturing processes and long supply chains. Predominantly, it is polluting chemicals and non-renewable natural resources that contribute to a large extent to environmental pollution (De Brito et al., 2008). With an average consumption of 2,700 liters of water per t-shirt, the apparel industry is one of the largest water consumers worldwide and contributes a total of 20 percent to global water waste (United Nations Economic Commission for Europe, 2018). However, trends such as the circular economy or sharing economy have been observed for some time, indicating a shift toward greater sustainability awareness through innovative business activities (Todeschini et al., 2017). Companies' engagement with social and environmental issues often leads to innovative solutions. Thus, the focus on sustainability is not only described as a significant driver of innovation activities (Dangelico et al., 2013; Nidumolu et al., 2009; Hopkins, 2010). Nidumolu et al. (2009) note that a focus on sustainable business strengthens innovation and thus increases competitiveness. Hart and Milstein (2003) add that sustainability-oriented innovations offer companies the opportunity to gain a strategic advantage in entering new markets by aligning their competencies with more sustainable technologies. Additionally, the development of innovative business models and strategies contribute to essential sustainability solutions in the apparel industry

through new processes and products. Baumgartner (2014) emphasizes that both innovation and a management strategy are essential components for integrating sustainability. In this context, Dangelico et al. (2013) state that innovative development processes are accompanied by structural effects in the company as well as the need for new resources.

Structural effects of exploration and exploitation

A major contribution in the context of strategic organization and management research is March's (1991) study of the meaning of exploration and exploitation. According to March (1991, p. 71), exploration is characterized as search, variation, risk taking, experimentation, flexibility, as well as innovation. Exploitation, on the other hand, involves the exploitation of existing knowledge potential and is associated with concepts such as refinement, production, efficiency, implementation, and execution (March, 1991, p. 71). March (1991) emphasizes the importance of both strategies to be considered. In fact, creating a balance between the two strategies is essential to enable adjustments to dynamic markets and thus ensure long-term success. Resource scarcity in companies often leads to conflicts between the two strategies (March 1991). Gupta et al. (2006) state that as resources become scarcer, conflicts increase proportionally. While the exploitative approach focuses on increasing efficiency by leveraging existing knowledge, capabilities and further developing the core business, the explorative approach focuses on generating new knowledge to develop innovations and therefore requires a particularly high amount of resources (March, 1991; Jansen et al., 2006; Molina-Castillo et al., 2011). In particular, innovations that develop new products, services, or markets can be described as explorative (Benner & Tushman, 2003; Levinthal & March, 1993).

The environment in which the organization operates also plays an important role. In the study by Uotila et al. (2009) they describe the importance of balancing the two approaches, which depends on the intensity of research and development-intensive industries. Accordingly, the pursuit of balance becomes increasingly important when organizations operate in environments with high technological dynamics (Uotila et al., 2009). In dynamic environments, an explorative approach is beneficial because of the risk of obsolescence due to technological changes or changing consumer demands (Jansen et al., 2006). Benner and Tushman (2003) and Tushman and O'Reilly (1996) also describe a relationship between organizational structures. In this context, they show that decentralized structures and a more open corporate culture premise explorative units. Exploitative units, on the other hand, require centralized and hierarchical structures and a more closed culture (Benner & Tushman, 2003; Tushman & O'Reilly, 1996). Following these arguments, it is evident that a balance

between exploration and exploitation is necessary for the long-term survival of organizations and must be adapted to the circumstances of the environment in which they operate and to the organizational structure and culture.

Forms of ambidexterity

To establish and maintain this balance, ambidextrous capabilities of organizations are of particular importance. Duncan (1976) was one of the first to introduce the term 'ambidextrous organization', which has dual organizational structures as a characteristic. An ambidextrous organization or 'ambidexterity' describes the ability, on the one hand, to exploit the competencies available in the company and to develop them further, and, on the other hand, to develop new ideas and to give equal consideration to the exploration of new opportunities (Lubatkin et al., 2006, p. 647; Tushman & O'Reilly, 1996, p. 24). Ambidexterity can be achieved and implemented in the organization by the three forms: contextual, structural, and sequential ambidexterity (O'Reilly & Tushman, 2013; Andriopoulos & Lewis, 2009; Jansen et al., 2009).

Contextual ambidexterity corresponds to the simultaneous execution of exploration and exploitation within a business unit that enables the management of a variety of contingencies that arise (McDonough & Leifer, 1983; Gibson & Birkinshaw, 2004). According to O'Reilly and Tushman (2013), contextual ambidexterity is characteristic of large companies that operate in volatile environments and are exposed to technological change.

Structural ambidexterity is characterized by dual structures (Duncan, 1976). Both approaches are pursued simultaneously in an organization, with the difference that, unlike contextual ambidexterity, there is a spatial separation. The structures in a business unit are set up in a way that the units are focused on either exploration or exploitation, with the units being spatially separated. The previously mentioned tensions are minimized by structural ambidexterity as the problem of resource allocation is mitigated by simultaneous execution in separate units (O'Reilly & Tushman, 2004).

Simsek et al. (2009) describe *sequential ambidexterity* as an alternation of exploration and exploitation at different points in time, which is why this form is also referred to as temporal ambidexterity. It occurs in temporal cycles, alternating between long exploitation phases and short exploration periods. By focusing on the temporary aspect, this form is associated with a change in organizational structure and resource allocation. O'Reilly and Tushman (2013) argue that sequential ambidexterity is specifically suited for organizations that do not have the necessary resources to implement a contextual approach. Typically, these are small organizations that operate in a very stable environment but can adapt to changing circumstances through short periods of exploration.

Method

This paper is based on a qualitative research design. A total of 18 expert interviews were conducted with 13 different companies in the apparel industry. The author classified experts as those employees of the selected companies whose job title provided information about employment in management positions in the areas of strategy, sustainability or innovation. Thus, managing directors, material and product development managers, innovation managers and sustainability managers were selected. The total duration of the interviews corresponds to 661 minutes. The expert interviews were conducted as semi-structured interviews. The interviews were transcribed using the program MAXQDA2020 which provided the basis for the subsequent data analysis. The data were analyzed inductively according to the approach of Gioia et al. (2012). In the first step, the author created first-order codes that closely matched the terms used by the interviewees (Gioia et al., 2012). In the second step, the second-order coding was performed, merging the first-order concepts into second-order concepts. In this process, the total number of categories was reduced, they were examined for similarities, and the subcategories were assigned to main categories. This allowed the amount of data to be pooled and reduced. The third and final step was to extract the second-order concepts into overarching aggregate dimensions (Gioia et al., 2012). These map the characteristics that emerged from the first- and second-order codes.

Sustainability as a driver for innovations

The aggregate dimensions from the Gioia analysis include the motivations for sustainable management, explorative and exploitative activities, and the structural embeddedness of sustainability and innovation in the organization.

Motives for sustainable management

The analysis of the interviews shows that sustainability is of great importance. On the one hand, it is perceived as significant due to intrinsic motivation and on the other hand, it is driven by external forces serving as a prerequisite for the company's existence. According to the data, a division can be made into internal and external drivers for sustainable management, which is consistent with the explanations in the theoretical section.

The internal drivers for sustainable management include corporate responsibility, corporate performance and intrinsic motivation. Long-term thinking and action in connection with sustainability were mentioned most frequently. Furthermore, the data shows that companies see opportunities in increased performance as well as in increased competitiveness through increased sustainability activities. Companies hope to gain greater market

opportunities and competitive advantages through a sustainable business orientation. The interviewees also stated that they try to implement sustainable solutions out of their own motivation and self-interest. One important aspect mentioned in this context is quality features associated with durability. Sustainable materials can be used to produce high-quality and long-lasting products for customers.

External drivers that emerged from the analysis include responding to customer needs, government requirements through legislation and social pressure. Accordingly, companies feel compelled to respond to and meet external pressure exerted by customers and their expectations. Companies are trying to reach new target groups with innovative sustainable products in order to remain future-proof and competitive. Likewise, the interviewees indicated that there is increased interest from stakeholders demanding more sustainability efforts. These demands are also enforced by government through laws and regulations. Finally, societal pressure was cited as another external driver. Companies are being forced to rethink their sustainability strategies, especially by environmental movements such as Fridays for Future.

Strategic alignment in organizations

A central element of corporate strategies is sustainable management, which is firmly anchored in most corporate philosophies. Accordingly, the analysis of the interviews revealed that the companies surveyed refer to the three-pillar model of sustainability and take measures in the social, ecological and economic dimensions to pursue sustainable corporate development. Furthermore, the implemented sustainability measures in the companies have not only led to improvements in products and processes, but also to innovations or new business areas. As mentioned above, exploration and exploitation in the strategic context is an important aspect of strategic corporate alignment in this context. Thus, according to March (1991), the improvement of what already exists is referred to as exploitation and the development of something new is referred to as exploration. Hence, a link can be drawn between the sustainability measures carried out by companies and exploration and exploitation activities. This connection is also evident in the Gioia analysis. Exploration as a second-order concept represents innovations as well as the developments of new business areas that have resulted from sustainability efforts. Exploitation as a second-order concept includes sustainable improvements to existing products or processes. Based on the three-pillar model of sustainability, Table 1 shows the sustainability measures mentioned by the interview partners in connection with exploration and exploitation.

Social Dimension

Explorative activities that companies carry out as part of

the social dimension of sustainability relate to partnerships with aid agencies abroad to support social development processes. In this context, one company interviewed stated that they support people from developing countries by paying them fair wages for collecting PET bottles. The company then recycles these collected bottles and reuses them as polyester fibers in its products.

Exploitative activities include supplier and social audits, memberships in initiatives, compliance, and expanding feedback loops for employees. Conducting social audits in the supply chain was mentioned by all of the interviewees. Regular audits of production facilities and suppliers can ensure that all standards are met and that production takes place under humane conditions. Social audits allow the identification of existing deficiencies and thus enable an improvement approach in quality as well as in supplier relations. In this context, the interviewees also mentioned fair working conditions and occupational safety as part of the Code of Conduct. It includes measures that are implemented as part of the social dimension and contribute to securing and improving social standards. In addition, the interviews revealed that the companies are seeking membership or are already members of initiatives such as the Business Social Compliance Initiative (BSCI) to enable fair working conditions for employees. Another outcome of the data related to improving social sustainability is the development of a feedback loop for employees that enables extended accessibility to a contact person in case of violations or policy breaches.

Ecological Dimension

The data show that within the ecological dimension companies have established explorative activities which are implemented in sustainable innovations. In particular, the circular economy, the development of protein-based silk and cellulose fibers, but also eco-washes for efficient washing processes and avatars for digital product previews can be identified as such. The collected data show a trend that is in line with the argumentation of Todeschini et al. (2017, p. 760) and is practically confirmed by the data analysis of the present research. This trend is called 'circular economy', which belongs to sustainable innovations in the sense of exploration. Thus, the life cycle of products is extended by recycling or reusing materials. According to the interviewees, the concept of the circular economy can also be expanded on the explorative level by focusing not only on the aspect of recycling, but also on biodegradability of a product. Materials and products are designed and developed to be partially or even fully recyclable. Protein-based silk is one material innovation that one company interviewed used in a shoe which is fully compostable and leaves no biological footprint at the end of its life cycle. Furthermore, the development of innovative and efficient techniques was also mentioned. The enormous amount of water used in washing textiles can be reduced by developing efficient machines.

Moreover, 3D technology and the development of avatars for digital product previews represent resource-saving opportunities for the apparel industry. Products can be replicated in the showroom and presented to sales virtually. A similar process can be enabled through the development of avatars, where style and colors can be tested on a virtual person (avatar).

Exploitative activities aim to optimize the core business and include ensuring a climate-neutral company location, seals for more sustainable materials and products, reducing packaging waste, and increasing product safety and quality. Ten of the 13 companies surveyed stated that they were taking measures to achieve greater climate neutrality at their business location. These measures include reduction of plastic and disposable tableware as well as installing heat recovery systems and an electric vehicle fleet. All interview partners emphasized that they are taking steps to improve sustainable materials and products. An existing product, such as a t-shirt, can be sustainably improved by replacing conventional cotton with organic cotton. Although the basic material does not change, the replacement leads to a reduction in water consumption as well as a massive reduction in pesticide use. Sustainability labels such as the Global Organic Textile Standard (GOTS) or the Better Cotton Initiative (BCI) also promote corporate sustainability and were frequently mentioned as an ecological measure.

Economic Dimension

The third sustainability dimension examined describes the economically sustainable measures and contributes to securing the company's long-term existence and profit maximization. The companies surveyed have developed new business models based on the concept of circular economy. These include repair and reuse concepts for materials and products, that strengthen sustainability awareness and help to prevent the throwaway mentality (Todeschini et al., 2017, p. 760). The recycling concept of one company surveyed is based on the cost-benefit aspect, so that customers can purchase the fabric scraps from cutting processes as cleaning rags or sewing fabrics. In this way, remnants are recycled and returned to the life cycle, which offers the company an economic advantage in addition to the ecological aspect. Other economic measures that can be assigned to exploration also include the development of a new sales concept and a classification system for sustainable products and collections. For example, one company developed a new concept for innovative flagship stores that specifically focuses on sustainably produced collections. Another company developed an internal classification system as a management and sales tool, which classifies and evaluates its products according to ecological and social criteria that must be met in production processes. The development of a new B2B concept was also mentioned. For example, one company has launched its own academy for sustainable management, where other companies have the opportunity to

learn more about how to sustainably manage a business.

Exploitative activities, which can be assigned to the economic dimension, include cost savings due to more efficient technologies and machinery. Furthermore, customer loyalty can be increased through improved product quality. One interviewee stated that cost-efficient production can be achieved through regular investments in new technologies and is related to the company's future viability as well as increased customer loyalty. Ensuring corporate sustainability by implementing economically sustainable measures was also emphasized by other interviewees. This increases the longevity of the high-quality products, which ultimately pays off in long-term customer loyalty.

Structural embeddedness of sustainability and innovation

The aggregated dimension ‘structural embedding’ shows how sustainability and innovation units are located in the organization. The data revealed four different alternatives as to how the companies integrate these two units organizationally. Some companies have a separate innovation department and a separate sustainability department. Others have only one of the two departments and others have no separate organizational units for the areas of innovation and sustainability at all.

According to the first option, three of the interviewed companies each have a sustainability department as well as an innovation department. However, in-depth data analysis showed that this does not imply that both topics are only considered separately in both departments. Rather, all interview partners for the three companies stated that the two departments are in exchange. Thus, innovation topics are not only discussed in the innovation department but also find their way in the sustainability department and vice versa.

Only one interviewed company stated that it does not have its own sustainability department but does have an innovation department. The reason for this is that the company sees sustainable management as part of its corporate philosophy and therefore doesn't need a separate department. In order to ensure the exchange of information between all departments with regard to sustainability-related topics, meetings are held twice a month with employees from all areas of the company, forming an interdisciplinary CSR team. Cross-departmental information on sustainability is disseminated throughout the company in that way.

Six of the companies surveyed have no innovation department, but a sustainability department. In these companies, innovations are primarily developed by the sustainability department. This department is usually located as part of strategy, supply chain, management or quality management.

In connection with the fourth alternative, a total of three companies stated that they had neither their own sustainability department nor their own innovation department. In these companies, sustainability topics extend

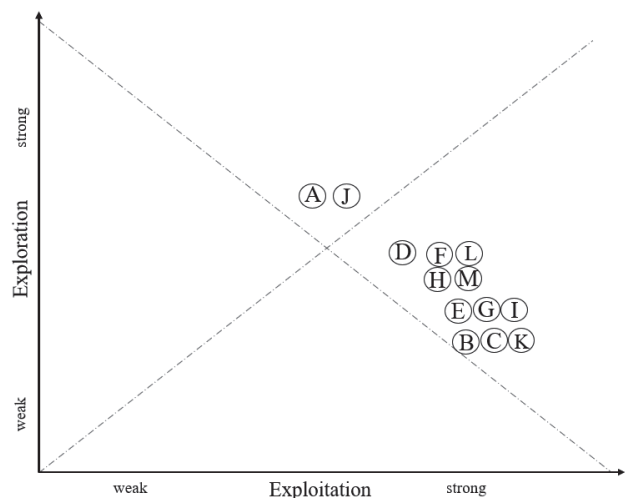
across all areas and are dealt with in all departments. Innovation-related topics are primarily located in the product or material development department, but also extend across all other areas. Consequently, there is a cross-departmental exchange of both topics in the company.

Critical discussion of the findings

The findings show that, in addition to maximizing profits, companies in the apparel industry consider cost-effective, sustainable management to be an important factor in maintaining competitiveness. According to the data, all companies see opportunities in sustainability-oriented management and constantly expanding and developing them. These developments take two forms. On the one hand, the companies' sustainability measures lead to improvements within the company and on the other hand, to innovations and new business models.

As part of the analysis, the author classified the surveyed companies according to their explorative and exploitative characteristics. The results show that the companies primarily focus on exploitation. However, two companies deviate from this classification, as they show a stronger explorative characteristic at the same time.

Figure 2: Strategic orientation towards exploration and exploitation



One reason for the predominantly exploitative focus of the companies can be derived from the company history. Considering the year of foundation of the companies surveyed, it is noticeable that they have all been successful on the market for decades. They are established companies that consistently focus on their core business and continuously develop it. Thus, their focus is on the long-term planning and the secure development of earnings. Hence, it

can be stated that established companies see their market opportunities primarily in the stable and consistent further development of their core business.

Furthermore, eight of the 13 companies surveyed are family businesses, which, due to their family and traditional orientation, have highly structured and standardized processes. Standardized structures are an indication of an increased exploitative orientation as a basis, since organizational changes in the sense of exploration are difficult to implement with highly structured and rigid processes.

An increased focus on further developing the core business towards sustainability within all three dimensions of sustainability can be observed in all companies and is driven by internal and external factors. However, the fact that a purely exploitative orientation of companies is not sufficient to remain competitive, especially in volatile markets, is shown not only by March's (1991) theoretical assumptions but also by practice. Numerous examples show that companies that focused exclusively on their core business without adapting to volatile markets and changing stakeholder demands were no longer competitive. In this respect, both strategic orientations - exploration and exploitation - should be pursued in the long term. Especially for companies operating in markets with strong technological dynamics, striving for a balance between exploitation and exploration is of great importance (Uotila et al., 2009). The apparel industry is characterized by technological dynamics to a limited extent, but has to deal with frequently changing fashion trends (Cachon & Swinney, 2011).

Furthermore, the analysis shows that there are small deviations within the more exploitative grouping. For companies D, F, H, L and M, sustainable further development is elementary and describes the core business. At the same time, exploratory activities are slightly higher for these companies, as the development of innovations is based on the company's sustainability principles and thus integrated into the core business. The interviewee from Company D states that innovation is attempted to be integrated into the core business. However, this is a process which cannot be implemented immediately, but takes time. Accordingly, Company D is positioned closer to the center of the graph with medium to strong exploitation as its base. The tendency of companies D, F, H, L and M is thus towards a balance between further development of the core business as exploitative activities and innovations as explorative activities.

Companies B, C, E, G, I and K attribute the highest priority to their core business and its further development. Nevertheless, they try to strike a balance between exploration and exploitation by pursuing explorative activities as well. This grouping is therefore classified in the strong exploitation and weak to medium exploration range. In addition, Figure 2 shows that the companies D, F, H, L,

and M have a slightly higher strategic orientation towards exploration compared to companies B, C, E, G, I, and K. This can be explained by the temporal aspect of their sustainability orientation. Thus, a critical examination of these companies clearly shows that they have anchored the sustainability principle in their corporate philosophy. Thus, the core business has been sustainably improved and further developed over time, resulting in a solid basis on which to build exploratively. In contrast, companies B, C, E, G, I and K have only been focusing on sustainability for a few years or is only currently playing an increasingly important role. These companies focus primarily on their core business and its sustainable further development. Nevertheless, they are trying to tackle innovations that make their products or processes more sustainable.

In addition to the predominantly exploitative nature of the companies surveyed, the data also show that two companies show more explorative activities, which enables them to take advantage of new market opportunities and to respond more quickly and precisely to fashion trends and technological changes. Companies A and J deviate from the highly exploitative and medium explorative classification due to an increased commitment to innovation. These two companies focus equally on the improvement of the core business and on new, innovative products and business ideas. Both companies see innovation as the core business and describe sustainability as the DNA of the company. No distinction is made between core business, sustainability and innovation. Rather, these aspects go hand in hand and are holistically addressed throughout the company. This strategic orientation is based on many years of experience and has diverse backgrounds. For example, the consumer group of both companies is heterogeneous, but tends to have younger consumer groups. They are well informed about current trends and strongly committed to sustainability. They are developing a greater awareness of sustainability. This is reflected in their mobility, eating and consumer behavior and not least in the purchase of clothing (Gazzola et al., 2020). Discussion drivers and opinion leaders emerge from this consumer group, who have built up an emotional bond to the company and its brand. Their extensive networking challenges companies to quickly respond to new trends and changing consumer demands. In order to meet these challenges, a close connection between innovation and core business as well as the availability of necessary resources is important. This enables companies to position themselves as innovation and opinion leaders in the market and to respond to requirements accordingly.

The following section discusses how sustainability and innovation activities are structurally embedded in the companies and can be correspondingly associated with the forms of ambidexterity.

Three of the 13 companies surveyed have a separate sustainability department and a separate innovation

department. This combination of the two organizational units can be examined in companies A, J and F. Both departments of company A and J are in close exchange with each other and include explorative activities as well as exploitative activities. Despite the existence of a separate innovation department, innovation-related tasks are also processed in the sustainability department. Consequently, there is no spatial separation of exploration and exploitation. This corresponds to the characteristics of contextual ambidexterity and describes the ability to react quickly to changing requirements (McDonough & Leifer, 1983; Gibson & Birkinshaw, 2004). Company F also has its own sustainability department and its own innovation department. There is also a close exchange between the two departments. In contrast to company A and J however, exploratory activities are primarily processed in the innovation department, which is in close contact with the sustainability department. The further development of products as well as the efficient process design with regard to sustainability is the task of the sustainability department. Consequently, there is a spatial separation between exploration and exploitation, which corresponds to the characteristics of structural ambidexterity (O'Reilly & Tushman, 2008).

Companies B, C, H, I, K and M, have a sustainability department but no innovation department. Innovation activities are primarily implemented from within the sustainability department and are also coordinated with the respective higher-level department. Thus, it can be stated that both exploitation and exploration are carried out simultaneously within one unit. This applies to the characteristics of contextual ambidexterity.

No clear assignment can be made for companies D, E, G and L, since the further development of products and processes with regard to sustainability is addressed both holistically in all departments and specifically, for example, in material and product development and in the area of design. Follow-up interviews need to be conducted to provide more detailed information on this.

Taking a closer look at the allocation of the companies to the forms of ambidexterity, it can be noticed that these only relate to two of the three forms. The results indicate that eight of the 13 companies interviewed primarily focus on the contextual form of ambidexterity to achieve a balance between exploration and exploitation. The fact that contextual ambidexterity is most common among the companies surveyed is due to the fact that conducting exploration and exploitation simultaneously within a department allows for shorter communication channels and faster responses to changes or requirements. Only one company strives for balance in the sense of structural ambidexterity. Here, the further development of the core business and the development of innovations are carried out in separate departments. Sequential ambidexterity is not implemented by the companies surveyed. It is characteristic for small organizations that do not have the necessary

resources (O'Reilly & Tushman, 2013). Since the surveyed companies are not small businesses, these practical results confirm the theoretical assumptions.

Conclusion

In summary, it can be stated that sustainability is becoming increasingly important among companies in the apparel industry. A process of rethinking has been taking place within the companies, driven by internal and external drivers. The results show that traditionally managed family businesses in particular are operating in an environmentally friendly and socially responsible manner. Sustainable thinking and action are integral parts of their corporate philosophy. In contrast, it is the capital market-oriented companies that react more strongly to external influences such as changes in consumer behavior. These reactions to change give rise to sustainable innovative solutions that are noticeable in terms of new products, innovative processes or new areas of business. When implementing sustainable developments, companies focus primarily on further developing their core business in order to maintain their market opportunities. At the same time, they are increasingly developing solutions to make processes or products sustainable. It became apparent that the more exploitative oriented companies are established organizations that have been successful in the market for some time. They have standardized structures and, due to their exploitative orientation, see their market opportunities primarily in the sustainable further development of their core business. Nevertheless, it can be observed that despite their exploitative basic orientation, the companies are increasingly adopting an explorative orientation in order to be able to react to market changes. The balance between exploration and exploitation is therefore an important aspect that companies are trying to achieve. The results also show that this is primarily achieved through contextual and structural ambidexterity.

By examining the role of sustainability for innovations in the apparel industry, this research work contributes to the existing literature and offers implications for practice. Accordingly, this work extends existing approaches by referring to the apparel industry as a field of action on the one hand and highlighting the structural implications of sustainability orientation on the other. Furthermore, the structural effects of sustainability orientation were examined through the relationship between exploration and exploitation as well as the forms of ambidexterity. Thus, in addition to contributing to research on sustainability and innovation, the study also makes a theoretical contribution in the research area of ambidexterity. In terms of the structural implications arising from corporate sustainability orientations, this paper also offers implications for practice. It can be deduced from the results of the surveys that companies with standardized organizational structures generally operate successfully on the market using an

exploitative strategy. In more explorative oriented companies, it must be ensured that there are sufficient development opportunities for innovations, e.g. through decentralized structures within the business unit. The results also show that a sustainable orientation of companies is seen as an opportunity to drive sustainable innovations for efficient developments of processes and products.

This paper is subject to limitations and raises avenues for future research. The apparel industry was chosen very specifically as the field of action studied, which is why the results cannot be generalized. Sustainability and the associated innovation activities also play a significant role in other industries. Therefore, other fields of action, such as the automotive industry, are relevant for future studies. Another limitation includes possible biases due to an uneven distribution of interviewees within the companies. In some companies two or three employees from different departments were interviewed, whereas in other companies only one interview partner was available due to capacity constraints. An even distribution of interview partners would have been necessary to eliminate bias due to unequal consideration (Molina-Castillo et al., 2011; Avolio et al., 1991). Limitations also arise in the classification of the companies with regard to the forms of ambidexterity. Due to a lack of information from the interviews, it was not possible to clearly classify the form of ambidexterity for four companies. Follow-up interviews would have been necessary, which were not possible within the scope of this study due to time limitations.

References

Andriopoulos, C., & Lewis, M. W. (2009). Exploitation-exploration tensions and organizational ambidexterity: Managing paradoxes of innovation. *Organization Science*, 20(4), 696-717.

Aragón-Correa, J. A., & Rubio-Lopez, E. A. (2007). Proactive corporate environmental strategies: myths and misunderstandings. *Long Range Planning*, 40(3), 357-381.

Avolio, B. J., Yammarino, F. J., & Bass, B. M. (1991). Identifying common methods variance with data collected from a single source: An unresolved sticky issue. *Journal of Management*, 17(3), 571-587.

Banerjee, S. B. (2001). Managerial perceptions of corporate environmentalism: Interpretations from industry and strategic implications for organizations. *Journal of Management Studies*, 38(4), 489-513.

Bansal, P. (2005). Evolving sustainably: A longitudinal study of corporate sustainable development. *Strategic Management Journal*, 26(3), 197-218.

Bansal, P., & Roth, K. (2000). Why companies go green: A model of ecological responsiveness. *Academy of Management Journal*, 43(4), 717-736.

Bansal, P., & Roth, K. (2000). Why companies go green:

A model of ecological responsiveness. *Academy of Management Journal*, 43(4), 717-736.

Barnett, M. L., Henriques, I., & Husted, B. W. (2020). Beyond good intentions: Designing CSR initiatives for greater social impact. *Journal of Management*, 46(6), 937-964.

Baumgartner, R. J. (2014). Managing corporate sustainability and CSR: A conceptual framework combining values, strategies and instruments contributing to sustainable development. *Corporate Social Responsibility and Environmental Management*, 21(5), 258-271.

Benner, M. J., & Tushman, M. L. (2003). Exploitation, exploration, and process management: The productivity dilemma revisited. *Academy of Management Review*, 28(2), 238-256.

Cachon, G. P., & Swinney, R. (2011). The value of fast fashion: Quick response, enhanced design, and strategic consumer behavior. *Management Science*, 57(4), 778-795.

Chang, K. H., & Gotcher, D. F. (2020). How and when does co-production facilitate eco-innovation in international buyer-supplier relationships? The role of environmental innovation ambidexterity and institutional pressures. *International Business Review*, 29(5), 1-11.

Clarkson, M. E. (1995). A stakeholder framework for analyzing and evaluating corporate social performance. *Academy of Management Review*, 20(1), 92-117.

Dangelico, R. M., Pontrandolfo, P., & Pujari, D. (2013). Developing sustainable new products in the textile and upholstered furniture industries: Role of external integrative capabilities. *Journal of Product Innovation Management*, 30(4), 642-658.

Dangelico, R. M., Pontrandolfo, P., & Pujari, D. (2013). Developing sustainable new products in the textile and upholstered furniture industries: Role of external integrative capabilities. *Journal of Product Innovation Management*, 30(4), 642-658.

De Brito, M. P., Carbone, V., & Blanquart, C. M. (2008). Towards a sustainable fashion retail supply chain in Europe: Organisation and performance. *International Journal of Production Economics*, 114(2), 534-553.

De Villiers, C., Naiker, V., & Van Staden, C. J. (2011). The effect of board characteristics on firm environmental performance. *Journal of Management*, 37(6), 1636-1663.

Delmas, M. A., & Toffel, M. W. (2008). Organizational responses to environmental demands: Opening the black box. *Strategic Management Journal*, 29(10), 1027-1055.

Duncan, R. B. (1976). The ambidextrous organization: Designing dual structures for innovation. In Kilmann, R. H., Pondy, L. R. & Slevin, D. P. (Eds.), *The Management of Organization Design* (pp. 167-188). New York: North-Holland.

Dyllick, T., & Hockerts, K. (2002). Beyond the business case for corporate sustainability. *Business Strategy and the Environment*, 11(2), 130-141.

Elkington, J. (1994). Towards the sustainable

- corporation: Win-win-win business strategies for sustainable development. *California Management Review*, 36(2), 90-100.
- Freeman, R. E., & Gilbert Jr, D. R. (1992). Business, Ethics and Society: A critical agenda. *Business & Society*, 31(1), 9-17.
- Gazzola, P., Pavione, E., Pezzetti, R., & Grechi, D. (2020). Trends in the Fashion Industry. The Perception of Sustainability and Circular Economy: A Gender/Generation Quantitative Approach. *Sustainability*, 12(7), 1-19.
- Gibson, C. B., & Birkinshaw, J. (2004). The antecedents, consequences, and mediating role of organizational ambidexterity. *Academy of Management Journal*, 47(2), 209-226.
- Gioia, D. A., Corley, K. G., & Hamilton, A. L. (2012). Seeking qualitative rigor in inductive research: Notes on the Gioia methodology. *Organizational Research Methods*, 16(1), 15-31.
- Gladwin, T. N., Kennelly, J. J., & Krause, T. S. (1995). Shifting paradigms for sustainable development: Implications for management theory and research. *Academy of Management Review*, 20(4), 874-907.
- Gupta, A. K., Smith, K. G., & Shalley, C. E. (2006). The interplay between exploration and exploitation. *Academy of Management Journal*, 49(4), 693-706.
- Hart, S. L. (1995). A natural-resource-based view of the firm. *Academy of Management Review*, 20(4), 986-1014.
- Henriques, I., & Sadorsky, P. (1999). The relationship between environmental commitment and managerial perceptions of stakeholder importance. *Academy of Management Journal*, 42(1), 87-99.
- Hopkins, M. S. (2010). How sustainability fuels design innovation. *MIT Sloan Management Review*, 52(1), 75.
- Hörisch, J., Freeman, R. E., & Schaltegger, S. (2014). Applying stakeholder theory in sustainability management: Links, similarities, dissimilarities, and a conceptual framework. *Organization & Environment*, 27(4), 328-346.
- Jansen, J. J., Van Den Bosch, F. A., & Volberda, H. W. (2006). Exploratory innovation, exploitative innovation, and performance: Effects of organizational antecedents and environmental moderators. *Management Science*, 52(11), 1661-1674.
- Jennings, P. D., & Zandbergen, P. A. (1995). Ecologically sustainable organizations: An institutional approach. *Academy of Management Review*, 20(4), 1015-1052.
- Jia, F., Yin, S., Chen, L., & Chen, X. (2020). Circular economy in textile and apparel industry: A systematic literature review. *Journal of Cleaner Production*, 1-20.
- Johannsdottir, L. (2015). Drives of proactive environmental actions of small, medium and large Nordic non-life insurance companies—and insurers as a driving force of actions. *Journal of Cleaner Production*, 108, 1-14.
- Johannsdottir, L. (2015). Drives of proactive environmental actions of small, medium and large Nordic non-life insurance companies—and insurers as a driving force of actions. *Journal of Cleaner Production*, 108, 1-14.
- Joyce, A., & Paquin, R. L. (2016). The triple layered business model canvas: A tool to design more sustainable business models. *Journal of Cleaner Production*, 135, 1474-1486.
- King, A. A., & Lenox, M. J. (2001). Lean and green? An empirical examination of the relationship between lean production and environmental performance. *Production and Operations Management*, 10(3), 244-256.
- Labuschagne, C., Brent, A. C., & Van Erck, R. P. (2005). Assessing the sustainability performances of industries. *Journal of Cleaner Production*, 13(4), 373-385.
- Levinthal, D. A., & March, J. G. (1993). The myopia of learning. *Strategic Management Journal*, 14(S2), 95-112.
- Lozano, R. (2012). Towards better embedding sustainability into companies' systems: an analysis of voluntary corporate initiatives. *Journal of Cleaner Production*, 25, 14-26.
- Lozano, R. (2015). A holistic perspective on corporate sustainability drivers. *Corporate Social Responsibility and Environmental Management*, 22(1), 32-44.
- Lubatkin, M. H., Simsek, Z., Ling, Y., & Veiga, J. F. (2006). Ambidexterity and performance in small-to medium-sized firms: The pivotal role of top management team behavioral integration. *Journal of Management*, 32(5), 646-672.
- Lubatkin, M. H., Simsek, Z., Ling, Y., & Veiga, J. F. (2006). Ambidexterity and performance in small-to medium-sized firms: The pivotal role of top management team behavioral integration. *Journal of Management*, 32(5), 646-672.
- Lundblad, L., & Davies, I. A. (2016). The values and motivations behind sustainable fashion consumption. *Journal of Consumer Behaviour*, 15(2), 149-162.
- Maletič, M., Maletič, D., & Gomišček, B. (2016). The impact of sustainability exploration and sustainability exploitation practices on the organisational performance: A cross-country comparison. *Journal of Cleaner Production*, 138, 158-169.
- Maletič, M., Maletič, D., Dahlggaard, J. J., Dahlggaard-Park, S. M., & Gomišček, B. (2014). Sustainability exploration and sustainability exploitation: From a literature review towards a conceptual framework. *Journal of Cleaner Production*, 79, 182-194.
- March, J. G. (1991). Exploration and exploitation in organizational learning. *Organization Science*, 2(1), 71-87.
- McDonough, E. F., & Leifer, R. (1983). Using simultaneous structures to cope with uncertainty. *Academy of Management Journal*, 26(4), 727-735.
- Milne, M. J., & Gray, R. (2013). W(h)ither ecology? The triple bottom line, the global reporting initiative, and corporate sustainability reporting. *Journal of Business Ethics*, 118(1), 13-29.
- Molina-Castillo, F. J., Jimenez-Jimenez, D., &

- Munuera-Aleman, J. L. (2011). Product competence exploitation and exploration strategies: The impact on new product performance through quality and innovativeness. *Industrial Marketing Management*, 40(7), 1172-1182.
- Nidumolu, R., Prahalad, C. K., & Rangaswami, M. R. (2009). Why sustainability is now the key driver of innovation. *Harvard Business Review*, 87(9), 1-12
- Raisch, S., Birkinshaw, J., Probst, G., & Tushman, M. L. (2009). Organizational ambidexterity: Balancing exploitation and exploration for sustained performance. *Organization Science*, 20(4), 685-695.
- Reinhardt, F. (1999). Market failure and the environmental policies of firms: Economic rationales for "beyond compliance" behavior. *Journal of Industrial Ecology*, 3(1), 9-21.
- Sarkis, J., Gonzalez-Torre, P., & Adenso-Diaz, B. (2010). Stakeholder pressure and the adoption of environmental practices: The mediating effect of training. *Journal of Operations Management*, 28(2), 163-176.
- Schrettle, S., Hinz, A., Scherrer-Rathje, M., & Friedli, T. (2014). Turning sustainability into action: Explaining firms' sustainability efforts and their impact on firm performance. *International Journal of Production Economics*, 147, 73-84.
- Shrivastava, P. (1995). The role of corporations in achieving ecological sustainability. *Academy of Management Review*, 20(4), 936-960.
- Simsek, Z., Heavey, C., Veiga, J. F., & Souder, D. (2009). A typology for aligning organizational ambidexterity's conceptualizations, antecedents, and outcomes. *Journal of Management Studies*, 46(5), 864-894.
- Steurer, R., & Konrad, A. (2009). Business-society relations in Central-Eastern and Western Europe: How those who lead in sustainability reporting bridge the gap in corporate (social) responsibility. *Scandinavian Journal of Management*, 25(1), 23-36.
- Thorisdottir, T. S., & Johannsdottir, L. (2019). Sustainability within fashion business models: A systematic literature review. *Sustainability*, 11(8), 1-26.
- Todeschini, B. V., Cortimiglia, M. N., Callegaro-de-Menezes, D., & Ghezzi, A. (2017). Innovative and sustainable business models in the fashion industry: Entrepreneurial drivers, opportunities, and challenges. *Business Horizons*, 60(6), 759-770.
- Todeschini, B. V., Cortimiglia, M. N., Callegaro-de-Menezes, D., & Ghezzi, A. (2017). Innovative and sustainable business models in the fashion industry: Entrepreneurial drivers, opportunities, and challenges. *Business Horizons*, 60(6), 759-770.
- Tushman, M. L., & O'Reilly III, C. A. (1996). Ambidextrous organizations: Managing evolutionary and revolutionary change. *California Management Review*, 38(4), 8-29.
- Tushman, M. L., & O'Reilly III, C. A. (1996). Ambidextrous organizations: Managing evolutionary and revolutionary change. *California Management Review*, 38(4), 8-29.
- United Nations Economic Commission for Europe. (2018). Fashion and the SDGs: What role for the UN? Geneva: ONU. https://www.unece.org/fileadmin/DAM/RCM_Website/RF_SD_2018_Side_event_sustainable_fashion.pdf.
- Uotila, J., Maula, M., Keil, T., & Zahra, S. A. (2009). Exploration, exploitation, and financial performance: analysis of S&P 500 corporations. *Strategic Management Journal*, 30(2), 221-231.
- Van Holt, T., Statler, M., Atz, U., Whelan, T., van Loggerenberg, M., & Cebulla, J. (2020). The cultural consensus of sustainability-driven innovation: Strategies for success. *Business Strategy and the Environment*, 29(8), 1-11.
- Von Carlowitz, H. C., & von Rohr, J. B. (1732). *Sylvicultura Oeconomica*.
- Yang, Z., Sun, J., Zhang, Y., & Wang, Y. (2017). Green, green, it's green: A triad model of technology, culture, and innovation for corporate sustainability. *Sustainability*, 9(8), 1-23.

How is digital transformation related to HR innovations in SMEs?

Jana Blštáková, University of Economics in Bratislava, Slovak Republic
Vanda Čirčová, University of Economics in Bratislava, Slovak Republic

This paper aims to indicate how technological innovations in digitalization impact the application of modern concepts of people management in SMEs. It contains an explorative study and analyses of people management practice in small and medium-sized companies operating in Slovakia, which face the challenge of digital transformation. The study contributes to the literature and practice of management by explaining the relationship between customer and employee-oriented digitalisation and innovations in people management concepts. The study presents that there is a significant influence of digital transformation on the use of innovative HR methods and concepts. More importantly the study indicates that SMEs which are innovative in their HR have gone further on their way to digital transformation.

Introduction

Current megatrends in the context of management undoubtedly contain digital transformation and COVID-19 related phenomena. People management is undergoing huge challenges and innovations and SMEs is one of the areas which are under the influence of the stated changes. In this paper we focus on digital transformation means such as Big Data, analytics, modern platforms, etc., and search for its relations to people management. As HRM developed due to these factors, HR started to use new concepts and methods. Our aim is to explore how SMEs cope with digital transformation. Is HR development a result of technological innovations or is it the development of HR resulting in digital transformation in small companies? We choose SMEs as the most flexible and reactive part of the economy, including start-ups, and the innovative potential of the countries. In Slovakia, SMEs are a significant part of the economy as they represent most of all enterprises. We present a list of customer-oriented as well as employee-oriented innovations and examined how far SMEs in Slovakia have gone on their digital transformation. At the same time, we examine the application of the modern HRM concepts. To confirm the relevance of these two variables we examined their interconnection and add an overview of their interrelations.

Theoretical framework

Innovative HRM concepts and methods

Nowadays enterprises undertake numerous actions due to digital transformation which results in conceptual changes in people management. Authors mention the trend of increasing customer value perception thanks to digitalization. As customer value has become seen by employers, they tend to promote this new concept among their employees. Therefore, the key to a successful understanding of customer value is for the employee to realize which part of their work process creates a certain value for the customers (Lähteenmäki et al., 2022). Research done by Rekettye (2019) proved that customer experience is gaining importance and that digitalization accelerates its meaning. Therefore, customer value and employee experience are essential when the company is undergoing digital transformation. Since social media has become successful amongst the population and mainly millennials and gen Z, HR broadened their agenda and new perspectives have arisen. The customer-oriented approach has become reasonable and companies build their attractiveness on labour market by building the employer brand.

Figurska & Matuska (2013) accent on the fact that employer branding is a significant part of HR practices nowadays as the future success of an enterprise depends on it. Author Backhaus (2016) contributed to the relevance of employer branding in his research noting that it is going to become a very examined field of HRM.

Among other trends in HR connected with digitalization are gamification and virtualization. HR seeks to utilize these innovations within organizations as there are attractive and enhance employees for better performance. Studies have already proven, it couples fun and work together and can be used in training, networking, and other features of employees in order to create improved teamwork (Spanellis et al., 2022).

Another set of HR concepts and methods include so called employee value proposition components. Minchington (2006) defines employee value proposition as offerings provided by an organisation in return for the skills, capabilities and experiences an employee brings to the organisation. It is an employee-centred approach that is aligned to existing, integrated workforce planning strategies

as it has been informed by existing employees and the external target audience. Browne (2012) divides categories of employee value proposition in 5 main areas. These include pay, benefits, work content (structure, autonomy, feedback), affiliation (mission and values, work environment) and career.

In the context of digital transformation, the development of human capital in form of training is an important component of the HRM agenda. The results of Hanaysha (2016) study indicated that employee training also has a significant positive effect on organizational commitment. The development of employees was also a concern of Jehanzeb and Bashir's (2013) study which indicates that increasing the development will lead to loyalty and commitment of employees. Promoting the learning continuum is one of the activities connected with training it also with feedback. Organizations pay attention to constant improvement and innovation and therefore in order to develop their employees and organizational culture, organizational feedback culture is a significant value of modern companies (Baker et al., 2013).

Moreover, the study of Rijt et al. (2012) shed light on informal feedback and confirmed that a workplace supporting a learning environment positively affects feedback seeking. Furthermore, the study shows that there is a need for the psychological safety of an employee when it comes to the reception of the supervisor's feedback. Therefore, we have included employee development and building feedback culture among the variables for measurements of modern HRM concepts.

Lately, freedom and flexibility of employees has become attractive values for employees globally as they seek independence in decision-making. Therefore, perceptive and modern HRM considers increasing their employees' job autonomy in the instances of their retention. Authors draw attention to its purpose as it is a variable that is closely linked with organizational commitment and job satisfaction. The study of Naqvi et al. (2013) confirms the positive significant influence of job autonomy on the mentioned factors. We have also recognized the importance of autonomy in rewarding and its coherence with company values, as a reward system is one of the most powerful HR tools for implementation of strategy and culture management. Pallathadka (2021) explains the nature of organizational culture and its essence which can contribute to overall business efficiency when understood and performed by employees. Therefore, we can conclude that strong organizational culture and correct perception from employees can create a better working environment when employees are aware of the organizational values.

The topic of work-life balance has been discussed even before the COVID-19 pandemic spread. However, this phenomenon started to be the main question when most of the employees were transferred to work from their homes. Remote work creates unexplored working regime for

employees and a number of challenges for HRM and that is why it has become the object of many research studies. Authors Bellmann & Hubler (2020) indicate that companies should extend the possibilities of remote work, restrict it outside of the contracted working hours to a minimum and reduce job-conditioned factors that contribute to work-life imbalances.

More and more attention is drawn to so-called cafeteria plans in relation to the mentioned work-life balance. Companies allow employees to choose any kind of benefit they prefer and need, and this way company contributes to freedom in rewarding (White, 2007). The principle of individual perception and tailored solutions has become reasonable after COVID, as it gives variability for meeting individual needs in both, handling the crises as well as recovery. In course of rewarding flexibility is often underlined by authors and even regarding COVID-19. As the world of business has transformed enormously there is a pressure on flexibility in working hours and rewarding. KPMG (KPMG, 2020) accents on the need of flexible rewarding in these uncertain times. The main advantage of this type of payment is the fact that it can respond to individual needs of an employee. SHRM (Romsey, 2021) also supports flexible rewarding programs as they promote employee engagement when they are customized, timely and fun.

Digitalization towards customers and employees

Analytics is a modern tool for decision-making and it is an increasingly important factor in enterprise performance management. HR analytics is present result as well as essential in digitally transforming companies. Kuriakose (2021) states that the implementation of analytics in HR improves the performance of organizations and contributes to higher business gains.

Big Data potential is a commonly discussed phenomenon of the current period of digitalization. This concept is being adopted by many companies worldwide as they realize its added value to the business processes. Authors emphasise HR predictive analytics to explain the potential of Big Data in HR (Shah et al., 2017). The use of digital forms has been accelerating during COVID-19 pandemic, as the reaction to a turbulent, uncertain business environment with unstable conditions of the physical environment, humans included.

From the employees' perspective, the digital trends include online communication during the pandemics as it replaced the face-to-face form of communication due to multiple regulations and social distancing. Blanchard (2021) mentions the usage of online platforms during COVID-19 by employees as the work turned virtual for a long period of time and is still present partially.

As we discussed in the previous section, employer branding is a substantial part of modern HR concepts and methods. Therefore, to measure the employee-oriented

digital innovations we included the usage of social media. Sivertzen (2013) presented a study that confirms social media is important in HR activities such as recruitment, selection of employees and employer branding. Enterprise social media networking platforms have furthermore the function of innovative performance accelerators in companies (Dittes & Smolnik, 2019). Besides social media, digital networking platforms are widely used by many companies and are often mentioned by numerous authors. For industries, networking is considered to be an effective strategy for future development (Simchenko et al., 2020). As SMEs are typical for their innovative potential and narrow specialization, we recognize networking as one of the essential competences for their future.

Digitalization of Slovak SMEs

In Slovakia, SMEs are supported either directly or indirectly besides digitalization support. The direct support includes non-refundable financial contributions and subsidies and indirect is provided in form of information and counselling, education, organisation and support for participation in internships, exhibitions, etc.). In terms of COVID-19 SMEs have been supported by subsidies, NFAs, grants, bank guarantees and the category of credits or loans. Moreover, individual ministries, Eximbank, Slovak Guarantee and Development Bank and other institutions provided financial help and project development for SMEs in Slovakia due to the pandemic (Slovak Business Agency, 2019).

Industry 4.0 platform tools are a purpose but also a consequence of the changes in the business processes, as previously mentioned. However, when it comes to the SMEs there are still doubts if they are able to adopt this concept due to their size. On the contrary, large sized companies are undoubtedly vastly active in this area. Orzes et al. (2018) states that there are still strategies absent in SMEs for Industry 4.0 implementation and are problematic. Hajduova et al. (2021) mention that SMEs in Slovakia are aware of the innovations importance. However, they warn that SMEs were not prepared for the 2020 pandemic and were unable to react quickly. On the contrary, this could not be considered solely as a disadvantage because now they can work harder on creating a sustainable innovative environment.

As digitalization is undeniably present, SMEs will need to face and are already facing it considering the digital skills of employees. Bogavac et al. (2019) examined SMEs digitalization and accent on the need for securing skilled labour for this digital era.

Among governmental institutions which focus on digitalization of SMEs we can include Ministry of Investments, Regional Development and Informatization of the Slovak Republic. The aim is the support of SMEs in context of digital transformation and its last activity is the program Digital Europe for years 2021-2027 directed by European Union (Ministerstvo investícií, regionálneho

rozvoja a informatizácie SR, 2021).

The Strategy of the Digital Transformation of Slovakia 2019-2030 is a framework strategy defining priorities in the context of already ongoing digital transformation of economy and society providing support of digital era. The transformation focuses on public administration, education, smart cities and economy as a whole which includes all enterprises operating in Slovakia and promotes the essence of innovations (Ministerstvo investícií, regionálneho rozvoja a informatizácie SR, 2021).

Many sources state that SMEs stand at a disadvantage compared to large enterprises which also results from the fact that they have to face high competition with relatively smaller financial resources. Trend (2019) published an article where they promote Cloud technologies which may be a great help for SMEs to face competition challenges and adapt to digitalized environment. Therefore, we find reasonable to look elsewhere, to research the people-oriented specifics of SMEs management, which are creating conditions for the digital transformation of SMEs.

Research methods

The main research question was: How is the level of digital transformation in SMEs in Slovakia related to innovations in HRM concepts and methods? To measure the digital transformation level, we have used an index, and for more detailed overview of the results, we examined how individual components of the digital index influence modern HRM concepts and methods. Lastly, we examined the impact of HR innovations (expressed by individual modern HRM concepts and methods) on the digital index level.

The sample size of the survey was 606 SMEs including micro-sized enterprises, in the Slovak republic that were selected by a random selection. The data collection was done in 2021-2022.

From the stated research areas, we formulated 2 main hypotheses to be confirmed or rejected by a regression analysis:

H1₀: *Digital transformation does not influence the use of innovative HRM concepts and methods.*

H1: *Digital transformation positively influences the use of innovative HRM concepts and methods.*

H2₀: *Innovative HRM concepts and methods do not enhance the level of digital transformation in SMEs*

H2: *Innovative HRM concepts and methods enhance the level of digital transformation in SMEs.*

To create a digitalization index (DI) we made an average value of both employee-oriented as well as customer-

oriented technological innovations. We examined the level of applied digital innovations with these variables:

- digitalization of analog data (DC1),
- digitalization of biometric data (DC2),
- digital networking platforms (DC3),
- Big Data analyses (DC4),
- quick analytics (DC5),
- predictive analytics (DC6),
- GDPR (DC7).

The only difference is that by examining the digitalization manifestation towards employees, the enterprises (expressed by DE1-DE7) had a choice to evaluate three more additional concepts besides those mentioned for customers. These include using social media to find and select employees (DE8), using digital communication and system by working from home (DE9), and employees' awareness of digital innovations (DE10). In each of these factors used, enterprises could have chosen from 1-5 scale, where 1 stands for not using this concept to 5 where the enterprise fully applied the examined concept.

To measure the innovations in HRM, we have focused on basic attributes of employee value proposition (EVP), which aim attractiveness for candidates and retention of employees. We have researched the innovations in people management that influence the attributes of EVP, which are work design, reward, development, and culture. Additionally, we composed an HRM index (HRI) in which we involved all the 16 modern concepts and methods listed below the text. Similarly, as with digitization factors, respondents in enterprises, could choose from 1-5 scale to indicate the level of application:

- Work positions allow maximization of employee's autonomy. (HR1)
- Employee knows the meaning of his job for the added value creation for the customer. (HR2)
- Work system includes work-life balance elements. (HR3)
- Enterprise builds the employer brand. (HR4)
- Enterprise builds its own attractivity as an employer. (HR5)
- Employees' selection is done on the level of executive teams. (HR6)
- Gamification is used. (HR7)
- Virtualization is used. (HR8)
- Employees are rewarded for their behaviour in accordance with the enterprise's values. (HR 9)
- Enterprise allows employees to choose the reward form according to their preferences and needs. (HR10)
- Enterprise uses team rewarding. (HR11)
- Employees obtain informal feedback. (HR12)

- Enterprise takes into account the employees' engagement in rewarding criteria. (HR13)
- Enterprise takes into account the freedom and personal responsibility of an employee by the selection of training. (HR14)
- Employee's training has a key meaning for the enterprise culture and is perceived as a common responsibility. (HR15)
- In the enterprise the benefit of training for employee and for the enterprise is evaluated. (HR16)

To sum up, these are the innovative HR methods and concepts we will discuss in the findings and discussion part of this paper.

Findings

In Table 1 we illustrate the verification of our first hypotheses where we examined the relation of the digital index and dependent variable HRM, including a detailed overview of its impact on individual methods and concepts mentioned in the previous part. As we can see from the table and P-value lower than 0,05, all HR methods together and separately strongly relate to high digitalisation index (DI). This finding confirms hypothesis H1 declaring that higher digitalisation index causes more innovative HRM concepts and methods practiced in enterprises. In case we take into account the separate HR practices there is a relatively strong relation and the strongest ones are HR6, 7, 11, 15 and 16.

Table 1 Impact of DI on HRI

Components of HRI	Coefficient	P-value	*
HR1	0,32839	7,46E-14	***
HR2	0,29521	5,90E-14	***
HR3	0,471319	1,67E-18	***
HR4	0,441186	6,55E-19	***
HR5	0,572033	2,47E-29	***
HR6	0,727245	1,89E-32	***
HR7	0,610126	3,20E-31	***
HR8	0,451298	7,24E-18	***
HR9	0,450554	5,53E-14	***
HR10	0,392686	9,56E-11	***
HR11	0,526769	1,12E-16	***
HR12	0,484538	7,85E-19	***
HR13	0,457467	6,26E-18	***
HR14	0,491698	1,30E-17	***
HR15	0,597994	3,32E-28	***

HR16	0,606814	4,19E-24	***
HRI (all HR together)	0,494083	1,90E-62	***

The results in Table 2 show that not all the variables have a strong impact on the HRI despite the fact that the overall effect is strong. Customer-oriented components of DI with strong influence on the level of HRI are: digitalisation of biometrical data, and quick analytics in the context of customer-oriented digitalisation. Moreover, on the level of employee-oriented components of DI the strongest influence was proven by Big Data Analysis, using of social media, digital communication during Home Office and innovation awareness of employees due to COVID-19.

Table 2 Impact of DI components on HRI

Components of DI	Coefficient	P-value	*
DC1	0,0526019	0,0266	**
DC2	0,0748251	0,0066	***
DC3	-0,0379291	0,1106	-
DC4	0,0166588	0,5552	-
DC5	0,081864	0,0046	***
DC6	-0,00499933	0,8638	-
DC7	0,00369753	0,9043	-
DE1	0,00921085	0,7074	-
DE2	-0,00504762	0,8531	-
DE3	0,0410802	0,1151	-
DE4	0,0875945	0,0017	***
DE5	0,0251621	0,4162	-
DE6	0,0439754	0,1621	-
DE7	0,0267483	0,3358	-
DE8	0,0754462	2,83e-05	***
DE9	0,0713785	2,85e-05	***
DE10	-0,0505033	0,0034	***

In our second hypotheses we focused, vice versa, on the impact of HRI on DI of the examined enterprises. We include the results in Table 3 below this text. From this illustration and P-value lower than 0.05, it is clear that the statistical impact is strong. Therefore, we can confirm H2 and conclude that there is a relation between high HRI and high DI of the examined SMEs.

Table 3 Impact of HRI on DI

Dependent variable	Coefficient	P-value	*
Digitalization index	0,74739	1,9E-62	***

In addition to examining the impact of HRI on DI, we include a detailed overview showing all components of HRI and its correlation with DI, illustrated in Table 4.

Table 4 Impact of HRI components on DI

Components of HRI	Coefficient	P-value	*
HR1	0,0195772	0,5562	
HR2	0,0882244	0,0212	**
HR3	0,0450578	0,0963	*
HR4	0,032467	0,3396	
HR5	0,0904308	0,0091	***
HR6	0,0999693	6,63E-05	***
HR7	0,0970883	0,0018	***
HR8	0,074502	0,0098	***
HR9	-0,0274913	0,2961	
HR10	-0,0131664	0,6017	
HR11	0,0463143	0,0518	*
HR12	0,0934401	0,0007	***
HR13	-0,00375669	0,9019	
HR14	0,0393113	0,1541	
HR15	0,0781564	0,0193	**
HR16	0,00920967	0,7622	

As we can see from the results, the most significant influence on the digital development of SMEs is proven in these HR concepts: customer value creation, employer branding, selection of employees done by executive teams, gamification, virtualization, informal feedback and employees' training. To summarize, all these listed innovative HR methods and concepts increase the DI of the examined SMEs in Slovakia.

Discussion

To answer the research question, the level of digital transformation oriented on customers as well as employees is significantly related innovations in HRM of SMEs. From the overall results, it is clear that most of the examined SMEs have a high digitalisation index which is a very optimistic finding as many literature sources state different. In the theoretical part, we include current implications of authors

on SMEs digitalisation and most of them mentioned the fact that SMEs are in disadvantage in comparison with large-sized companies. Moreover, many authors accent on the fact that SMEs lack investments and during COVID-19 they were not able to adapt to the situation quickly to insufficient level of digital transformation. Possibly a reason for this state is that SMEs nowadays receive great support which we listed in detail in the theoretical part of this paper.

By accepting first hypothesis we find that digitalisation influences implementation of modern concepts of HRM in SMEs. As we can see from the results, when an enterprise is highly digitalised it leads them to use modern HRM concepts and methods, too. When we look at the results in more detail there are no differences in the influence of the digital index on the individual examined HRM approaches. We have chosen 16 innovative HRM practices and all of them are related to DI. A possible explanation for this state could be that digitalised enterprises are in general innovative which creates a better working environment encouraging changes implementation. Our study was furthermore focusing on the how are individual digital index components influencing application of modern HRM concepts and methods in SMEs. One of the important findings of our research is that the strongest influence on the HRM practices was proven only in a few digital index components. In customer-oriented digital innovations it was innovations to support utilisation of data. These were digitalisation of biometrical data, quick analytics in the context of customer oriented digitalisation. In case of employee-oriented digital innovations besides data processing it was also innovations in communication. The significant influence was proven by Big Data Analysis, using of social media, digital communication during Home Office and innovation awareness of employees due to COVID-19. We can conclude that these manifestations have impact on the modern HRM of an enterprise.

By accepting second hypothesis we find that more innovative HRM practices lead to a high digital index of SMEs in Slovakia. From this point of view, we can conclude that when enterprises deliver attractive EVP by innovative HRM approaches it leads to employment and retention of the modern and improved workforce which will be reflected in capability for digital transformation. Therefore, developed HR can according to this finding enhance digital features implementation and digital business transformation. As we know human resources are the most important feature of an enterprise in this case they serve as the change administrators under the managerial execution. The results for innovative HRM of the examined enterprises were high, too, similarly as in case of the digital index. We can thus conclude that most of the examined enterprises are modern in their approach to their employees.

Based on our research results we are indicating two managerial implications. Firstly, we contributed to the existing research by drawing attention to the importance of modern HRM methods and concepts and its high impact on

the digital index of enterprises. Building and improving modern HRM practices lead an enterprise to a better digital transformation management. Secondly, and vice versa, implementing digital features to the business processes in general creates a more innovative working environment, affecting HR, too. Enterprises should work on developing their employees and composing a digitally operating workplace in order to support innovativeness and progress. To understand digital transformation, we need to mention that this level of digitalisation (DI) is oriented both ways, including employees and also customer-orientation. As COVID-19 pandemic changed the world in all aspects, including HR of companies, new trends have started to occur besides the previously recognized trends as results of digitalisation. These are for instance remote work, innovations implementation necessity and also online communication platforms.

As listed in the result part of this paper, also innovative HR influence the level of digital transformation of SMEs. To summarize, these are primarily customer value creation, employer branding, selection of employees done by executive teams, gamification, virtualization, informal feedback and employees' training. This means all these increase the digital transformation.

Although many authors state that the digitalisation of SMEs in Slovakia is still problematic due to various mentioned factors, our research is proving the opposite. Based on our research, we see the continuity of digital transformation of SMEs as possible by people-oriented innovations because as we have indicated technological innovation does not overtake people-management innovation. Research results indicate that it is HR innovations that drive digital transformation of SMEs more than digitalisation drives innovations in HR. However, we need to take into account the fact that in case we conducted this survey now the results may differ.

Limitations

First limits of the study are related to the research sample. Using the convenience sampling method, there is a possibility of selection bias. Another limitation is the regional factor of data collection, as the results can only be reviewed for Slovak republic. As the research focus was on SMEs, the results may not be considered as general managerial implication. We would like to add that the results only cover part of the explanation of the relation of the examined variables as the coefficient is sometimes quite low (close to 0). Last but not least, we composed the HRI along with DI using available literature sources and composed them based on it rather than using a standardized HRI or DI.

Conclusion

To summarize, this paper focuses on the highly up-to-date topic which is the digital transformation of companies. We primarily examined SMEs in Slovakia and their challenges and ways to go 'digital'. Many institutions have interest in supporting SMEs including ministries, non-governmental bodies, international organizations, etc. as they are a significant part of world economy.

As the concept Industry 4.0 has become present, many enterprises have been forced to innovate and started the journey of their digital transformation. Our study shows, that digitalisation is related to innovations in HRM. SMEs are innovative in delivering their EVP to cope with trends in digitalisation.

In our research, we examined the relationship between digital transformation and innovative HRM concepts and methods. Based on our results, we can conclude that their relation exists a both ways. We found that it is the innovative HR approach which enhance the digital transformation of SMEs in Slovakia rather than vice versa. This means, that in SMEs the digital transformation is people driven. Nevertheless, also digitalisation of company contributes to the use of innovative HR concepts and methods but the influence is less statistically significant.

In conclusion, according to our study, we recommend enterprises to work on their HR development and innovation towards their employees in order to become more digitalised.

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References

Backhaus, K. (2016). Employer branding revisited. *Organization Management Journal*, 13(4), 193–201.

Baker, A., Perreault, D., Reid, A., & Blanchard, C. M. (2013). Feedback and organizations: Feedback is good, feedback-friendly culture is better. *Canadian Psychology/Psychologie Canadienne*, 54(4), 260.

Bellmann, L., & Hübler, O. (2020). Working from home, job satisfaction and work–life balance – robust or heterogeneous links? *International Journal of Manpower*, ahead-of-print. <https://doi.org/10.1108/IJM-10-2019-0458>

Blanchard, A. L. (2021). The effects of COVID-19 on virtual working within online groups. *Group Processes & Intergroup Relations*, 24(2), 290–296. <https://doi.org/10.1177/1368430220983446>

Verejná správa a regionálny rozvoj: Ekológia a

manažment, no. č. 2, Vysoká škola ekonómie a manažmentu verejnej správy v Bratislave, 15 (2019). <https://portal.issn.org/resource/ISSN/1337-2955>

Browne, R. (2012). Employee value proposition. *Beacon Management Review*, 2, 29–36.

Digitalizácia a cloud pomáhajú malým i stredným firmám udržať krok s konkurenciou. (2019, January 24). <https://www.trend.sk/technologie/digitalizacia-cloud-pomahaju-malym-strednym-firmam-udrzat-krok-konkurenciou>

Dittes, S., & Smolnik, S. (2019). Towards a digital work environment: The influence of collaboration and networking on employee performance within an enterprise social media platform. *Journal of Business Economics*, 89(8–9), 1215–1243. <https://doi.org/10.1007/s11573-019-00951-4>

Figurska, I., & Matuska, E. (2013). Employer branding as a human resources management strategy. *Human Resources Management & Ergonomics*, 7(2).

Hajduova, Z., Peráček, T., Hurajová, J. C., & Bruothová, M. (2021). Determinants of innovativeness of Slovak SMEs. *Problems and Perspectives in Management*, 19(1), 198–208. [https://doi.org/10.21511/ppm.19\(1\).2021.17](https://doi.org/10.21511/ppm.19(1).2021.17)

Hanaysha, J. (2016). Examining the effects of employee empowerment, teamwork, and employee training on organizational commitment. *Procedia-Social and Behavioral Sciences*, 229, 298–306.

Jehanzeb, K., & Bashir, N. A. (2013). Training and development program and its benefits to employee and organization: A conceptual study. *European Journal of Business and Management*, 5(2).

KPMG. (2020, October 21). *Flex Rewards in uncertain times.* KPMG Flex Reward Plan. <https://www.cafeteriaplan.be/latest-updates/posts/2020/october/flex-reward-in-uncertain-times-flexible-rewards-are-even-more-important/>

Kuriakose, A. (2021). *HR ANALYTICS: A MODERN TOOL IN HR FOR PREDICTIVE DECISION MAKING.* 51–63. <https://doi.org/10.18372/2786-5495.1.15737>

Lähteenmäki, I., Nätti, S., & Saraniemi, S. (2022). Digitalization-enabled evolution of customer value creation: An executive view in financial services. *Journal of Business Research*, 146, 504–517. <https://doi.org/10.1016/j.jbusres.2022.04.002>

Minchington, B. (2006). *Your employer brand: Attract, engage, retain.* Collective Learning Australia.

Ministerstvo investícií, regionálneho rozvoja a informatizácie SR. (2021). *Schéma podpory digitálnej transformácie Slovenska* (Bratislava). Ministerstvo investícií, regionálneho rozvoja a informatizácie SR. https://www.mirri.gov.sk/wp-content/uploads/2021/06/Sch%C3%A9ma-podpory-digit%C3%A1lnej-transform%C3%A1cie-Slovenska_publik.pdf

Naqvi, S. M. M. R., Ishtiaq, M., Kanwal, N., & Ali, M. (2013). Impact of Job Autonomy on Organizational

- Commitment and Job Satisfaction: The Moderating Role of Organizational Culture in Fast Food Sector of Pakistan. *International Journal of Business and Management*, 8(17). <https://doi.org/10.5539/ijbm.v8n17p92>.
- Orzes, G., Rauch, E., Bednar, S., & Poklemba, R. (2018). *Industry 4.0 implementation barriers in small and medium sized enterprises: A focus group study*. 1348–1352.
- Pallathadka, H., Mustafa, M., Sanchez, D. T., Sajja, G. S., Gour, S., & Naved, M. (2021). Impact of machine learning on management, healthcare and agriculture. *Materials Today: Proceedings*.
- Rekettye, G., & Rekettye Jr, G. (2019). The effects of digitalization on customer experience. *ENTRENOVA-ENTerprise REsearch InNOVation*, 5(1), 340–346.
- Romsey, J. (2021, February 26). *How Flexible Rewards Programs Boost Employee Engagement*. SHRM. <https://www.shrm.org/resourcesandtools/hr-topics/benefits/pages/how-flexible-rewards-programs-boost-employee-engagement.aspx>
- Shah, N., Irani, Z., & Sharif, A. M. (2017). Big data in an HR context: Exploring organizational change readiness, employee attitudes and behaviors. *Journal of Business Research*, 70, 366–378. <https://doi.org/10.1016/j.jbusres.2016.08.010>
- Simchenko, N., Tsohla, S., & Pavlenko, I. (2020). Digital Platforms of Networking in Industry. *IOP Conference Series: Materials Science and Engineering*, 753(6), 062005. <https://doi.org/10.1088/1757-899X/753/6/062005>
- Sivertzen, A.-M., Nilsen, E. R., & Olafsen, A. H. (2013). Employer branding: Employer attractiveness and the use of social media. *Journal of Product & Brand Management*, 22(7), 473–483. <https://doi.org/10.1108/JPBM-09-2013-0393>
- Slovak Business Agency. (2019). *Analýza bariér malých a stredných podnikov v oblasti digitalizácie* [Report]. http://www.sbagency.sk/sites/default/files/analyza_barier_malych_a_strednych_podnikov_v_oblasti_digitalizacie.pdf
- Spanellis, A., Pyrko, I., & Dörfler, V. (2022). Gamifying situated learning in organisations. *Management Learning*, 53(3), 525–546.
- van der Rijt, J., van de Wiel, M. W. J., Van den Bossche, P., Segers, M. S. R., & Gijssels, W. H. (2012). Contextual antecedents of informal feedback in the workplace. *Human Resource Development Quarterly*, 23(2), 233–257. <https://doi.org/10.1002/hrdq.21129>
- White, G. (2007). Diversity in workplace causes rise in unique employee benefits and changes in cafeteria plans. *Journal of Management & Marketing Research*, 2.

SMEs' Digitization of the Sales Process: Current Status and Future Potentials

Heiko Fischer, Baden-Wuerttemberg Cooperative State University Mosbach, Germany

Sven Seidenstricker, Baden-Wuerttemberg Cooperative State University Mosbach, Germany

Thomas Berger, Baden-Wuerttemberg Cooperative State University Stuttgart, Germany

Due to the megatrend of digitalization, the way in which small and medium enterprises (SMEs) do business has started to change. In this study, we provide insights into the digitization of the customer journey of SMEs. To do this, we conducted a survey of business-to-business salespeople from Germany, India, China, and the USA in order to analyze the current and optimal digitization status of the customer journey. We show that there exist significant differences between countries and between the stages of the customer journey.

Introduction

SMEs have a huge economic impact worldwide and account for approximately 99% of all firms. In the European Union, they are seen as crucial to economic growth, innovation, and job creation. Meanwhile, in the US, small businesses employ almost 50% of the private workforce, and in Asian economies they employ two out of three private workforces (Matt & Rauch, 2020, pp. 11–15).

Furthermore, the megatrend of digitalization plays an important role for companies and offers SMEs new opportunities to expand and succeed in foreign markets (Hervé et al., 2020, p. 28). According to a worldwide survey, 90% of the c-suite and vice presidents believe that delivering value to customers is essential in order to realize growth (Fujitsu Ltd., 2020, p. 5). At the same time, studies indicate that the top outcomes of digital transformation are the improvement of customer experience (Fujitsu Ltd., 2021, p. 10), better customer understanding, the effective design and delivery of customized offers (Mahlamäki et al., 2020, p. 169), and effective and efficient buying by customers (Zoltners et al., 2021, p. 87). Therefore, the megatrend of digitalization profoundly impacts sales (Rodríguez et al., 2020).

Previous research indicates that the digitalization of companies is the result of strategic decisions made by SMEs' management, and that before adopting digital technology, they should understand the required outcome of their digital initiative (Lee et al., 2021, p. 82). Accordingly, companies must define their digital interface in a way that is accessible to customers and design their interactions with buyers in

such a way as to digitally leverage sales (Trenkle, 2019, p. 434).

However, studies on the digitalization of SMEs are scarce and previous studies primarily focus on the adoption of a specific digital technology (e.g., social media, Internet of things, e-commerce) (Lee et al., 2021, p. 82). For this reason, we formulated the following research question: *What is the current digitization status of SMEs' sales process, and what do they consider to be the optimal level of digitization?*

To answer this question, a quantitative survey was conducted to compare the current and optimal digitization status of SMEs in Germany, India, China, and the USA.

Digital Transformation in Sales

The digital transformation has been the subject of increasing research attention, leading to the exponential growth of published articles since 2015 (Hanelt et al., 2021, p. 1165; Rêgo et al., 2021; Reis et al., 2018, p. 414). The literature offers a vast range of definitions of digital transformation (Gong & Ribiere, 2021), looking at in terms of its enablers, required resources and capabilities, transformation processes, and benefits (L. Li et al., 2018, p. 1131). In total, the literature differentiates three phases that build on each other: digitization, digitalization, and digital transformation (Verhoef et al., 2021, p. 890). In particular, Singh et al. (2019, p. 5) propose a description of these terms for sales: First, digitization automates processes by capturing, processing, and organizing marketing data. Second, digitalization, which is more sophisticated, uses digitization as well as artificial intelligence (AI) technologies "to create new strategies and generate novel opportunities to serve customers" (p.5). Third, digital transformation, which is the most developed phase and is a result of digitalization, aids in the rethinking of a company's value proposition.

Digital transformation profoundly impacts the sales environment and, in particular, the customer-sales relationship. On the one hand, digital technologies offer new digital selling capabilities to sales (Mullins & Agnihotri, 2022), and the role of digital technologies in sales is expanding (Singh et al., 2019, p. 4). But, on the other hand, the market is now more demanding due to the digital

possibilities: customers are more knowledgeable (Rodriguez et al., 2012, p. 375) and powerful (Enyinda et al., 2021, p. 992), they want to receive digital information (Diba et al., 2019, p. 1485), and they prefer digital interaction tools instead of in-person meetings (Rangarajan et al., 2021). In addition to this, the way in which customers make purchases has markedly changed in recent years (Steward et al., 2019). Today it is essential to design a customer journey that creates additional value for the customer and to guide the customer through said journey (Edelman & Singer, 2015). Thus, in the digital age, sales should operate on the digital level and consider the new customer demands.

To apply this finding into practice and to benefit from these changes, the literature suggests several transformation processes (Guenzi & Habel, 2020, p. 63; Parviainen et al., 2017, pp. 70–74; Zoltners et al., 2021). These processes emphasize the importance of strategic clarity in regards to the transformation goals before a digital initiative is chosen and implemented. For this reason, a successful digital transformation requires not only technical resources but—even more—a redesigned business process (L. Li et al., 2018, p. 1131).

Study Design and Data Collection

The customer journey with the following stages builds the fundament for our research: (Edelman & Singer, 2015, p. 90; Fischer et al., 2021, p. 370):

- 1) “Consideration”: The customers perceive a set of brands.
- 2) “Evaluation”: Brands are included or rejected based on evaluation criteria.
- 3) “Buy”: A specific brand is selected and bought by the customer.
- 4) “Loyalty loop”: The customer experiences the product and builds expectations for the future relationship.

We collected the salespeople’s most relevant tasks and assigned them to the appropriate customer journey step. Taking into account the work of Parviainen et al. (2017, pp. 70–74), who suggest that a company should review its current and desired future position before moving toward the desired position, we formulated two main questions: “What is the current digitization status of these tasks at your company?” and “What do you see as the optimal level of digitization of these tasks at your company?”

As part of a research project, the survey was conducted in the world’s three most populous countries (China, India, and the USA) as well as in Germany, which is the most populous country in the European Union. We provided the questionnaire in English, German, and simplified Chinese. Podsakoff et al. (2003) report several biases that can arise from the research method. Therefore, we ensured the respondents’ anonymity, avoided leading questions, and used established scales to avoid research biases. We gathered data from salespeople that were employed in the B2B sector

working for companies with 10 to 249 employees. After deleting invalid or incomplete datasets, we were left with a final sample of 248 salespeople. The salespeople’s characteristics are depicted in Table 1.

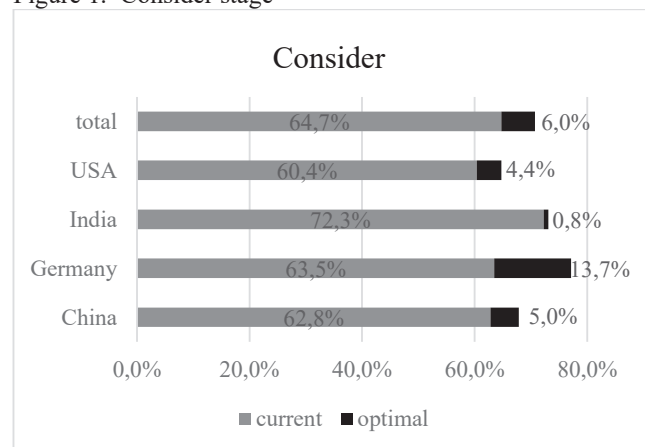
Table 1. Sample Characteristics

Description	Frequency	Percent
Country of origin		
China	43	17.3
Germany	49	19.8
India	100	40.3
USA	56	22.6
Age		
≤24	20	8.1
25 to 34	151	60.9
35 to 44	47	19.0
>45	23	9.3
Most frequent industries		
Manufacturing	41	16.5
Information & communication	37	14.9
Wholesale & retail trade; repair of motor vehicles & motorcycles	29	11.7
Professional, scientific, technical activities	22	8.9
Financial & insurance	20	8.1

Findings

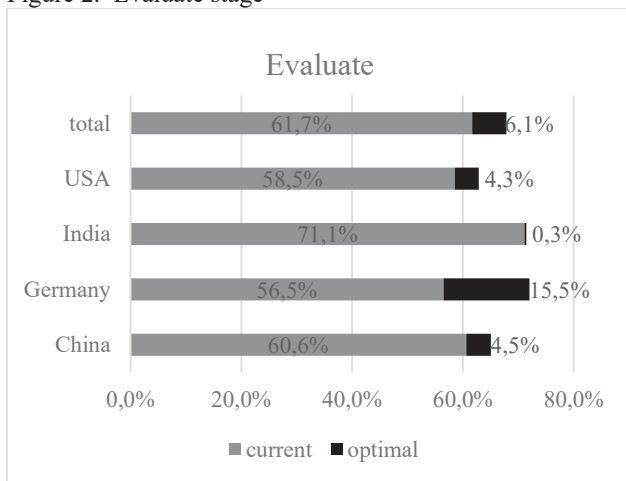
Each figure in this chapter shows the current and optimal status of digitizing the customer journey by country and a conclusive view (total) that combines the evaluations of Germany, the USA, India, and China.

Figure 1. Consider stage



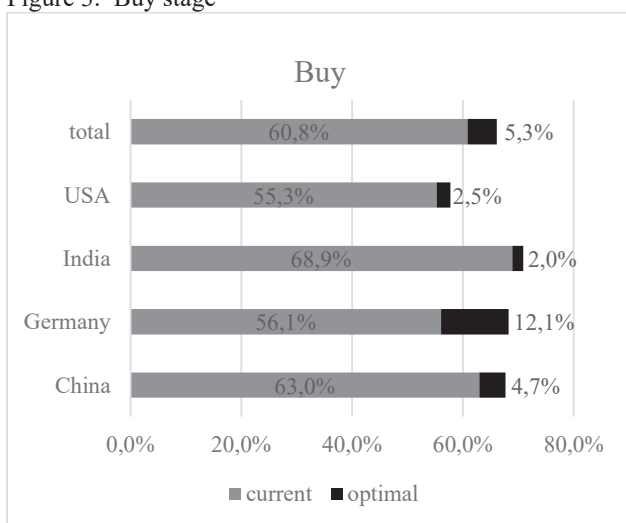
Firstly, Figure 1 shows the results for the “consider” stage. While currently 64.7% of the “consider” stage is already digitized, the optimal status is 6 percentage points higher. Thus, 70.7% of the “consider” stage should be digitized. China and the USA have the lowest current status, while India has the highest. Germany sees the highest potential development, resulting in an almost 14-percentage-point difference between its current and optimal status. Moreover, Germany seeks the greatest degree of digitization of the consider stage out of the surveyed countries.

Figure 2. Evaluate stage



Secondly, Figure 2 depicts the current and optimal status of the “evaluate” stage. Currently, Germany lags behind the other countries in the study, but it has the highest optimal status with 72%. As in the “consider” stage, India has the highest current digitization status, and the USA the lowest. China perceives its current and optimal status to be only slightly higher than the USA’s.

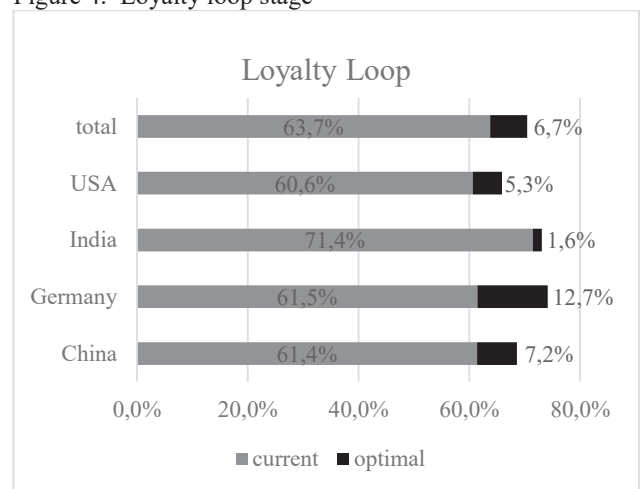
Figure 3. Buy stage



Thirdly, Figure 3 provides an overview of the “buy” stage. Again, the USA has the lowest current and optimal digitizing status. China has the second-highest current digitization status and assesses the optimal status in a similar way to Germany. India has the lowest development potential but the highest current digitization status within the “buy” stage.

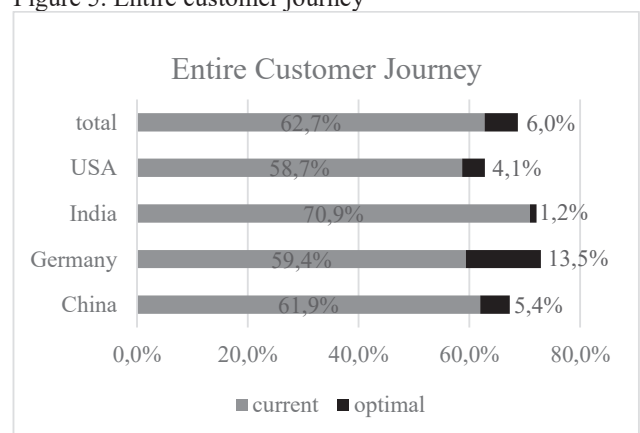
Fourthly, the results of the loyalty loop are presented in Figure 4. Here it can be seen that Germany has the lowest current digitization status but wants to digitize an additional 12.7% of its loyalty loop. The USA lags behind China, Germany, and India in terms of its optimal digitizing status.

Figure 4. Loyalty loop stage



Comparing the steps’ total view, one can recognize that the “evaluate” (61.7%) and the “buy” (60.8%) stages are currently the least digitized stages within the customer journey. The “consider” stage, by contrast, is currently the most digitized stage (64.7%) and holds this position in the optimal status (70.7%).

Figure 5. Entire customer journey



Lastly, the entire view shows the extent to which the entire customer journey should be digitized by calculating the average of all customer journey steps (consider, evaluate, buy, loyalty loop) (Figure 5). More specifically, the total view shows that salespeople believe that 62.7% of the entire customer journey is already digitized, and that they judge the optimal digitization status to be 68.8%. While Germany is currently in the second to last position in relation to the current digitization of the customer journey, it should be noted that it perceives there to be the highest development potential and that it estimates that 72.9% of the customer journey should be digitized. This is 0.8 percentage points more than India, which has the highest current digitization status. In terms of current status, only India is above average, while in regard to optimal status, Germany is above average too. Finally, it seems that the USA sees the lowest relevance in digitizing the customer journey.

Discussion

Our findings show that there exist significant differences between the surveyed countries as well as between the stages of the customer journey regarding digitization. The presented findings support previous research that assumes that stages with non-complex tasks are easier to automate. For instance, it is difficult for AI to manage complex buying centers (Syam & Sharma, 2018, p. 140), which could explain the low current digitization status of the “buy” stage. The same applies to the “evaluate” stage, wherein salespeople must build strong relationships with customers. Moreover, the low optimal digitization status of these stages indicates the need for the human touch at this stage. In other words, salespeople must ensure a trustful and advantageous relationship between customers and sales.

In contrast to this, the “consider” and “loyalty loop” stages have the highest current and optimal digitization status. They mainly consist of routine tasks such as lead management that are easier and more reasonable to automate. In both stages, the salespeople are expected to spend the majority of their time analyzing collected data, which is useful to automate, as opposed to having actual human contact with customers.

When considering the country view, we can see that Germany and the USA (developed markets) lag behind China and India (emerging markets) in terms of their current digitization status. One explanation for this finding could be cultural differences. Sharma (2016, p. 98) suggests that there are large differences between developed and emerging markets in terms of selling techniques and sales strategies. Accordingly, different markets require different sales approaches and thus a different infusion of digitization in order to achieve success. Hence, a low digitization status may not necessarily be disadvantageous as it can be required by specific markets.

However, Germany’s current digitization status

confirms previous research that attests to Germany's poor performance by integrating digital technologies and a low IT investment (Zimmermann, 2021). At the same time, it is surprising that our findings reveal that Germany and the USA have practically the same current digitization status in regard to sales. The European Investment Bank (EIB) shows that the adoption of digital technologies is much higher in the USA than in Germany (EIB, 2020, p. 53). Moreover, in contrast to the USA, Germany wants to become a top performer in our comparison, aiming to digitize approximately 73% of its customer journey. This could be a result of the COVID-19 pandemic.

Conclusion and Limitations

In summary, our findings indicate that the current and optimal digitization status of the customer journey differs between countries and journey stages. We assume that the complexity of tasks and the need for human touch can influence the digitization of the customer journey. Moreover, we suppose that cultural differences can explain the divergent views on the digitized customer journey—and thus, a low digitized customer journey may be required in some markets. Based on this assumption, salespeople should take into account cultural differences by formulating sales strategies and implementing the majority of digitization within the customer journey.

Besides that, previous research implies that a digitized customer journey is not an isolated initiative but rather that it goes deeper and affects a company’s value proposition too. This change requires organizational re-alignment (Fischer et al., 2021, pp. 372–373), and new disciplines such as that of the customer success manager (Seidenstricker et al., 2021, pp. 24–25).

We must also acknowledge that our study has several limitations. These can, however, be used as starting points for future research. First of all, we defined SMEs only on the basis of their number of employees, thus neglecting to factor in financial factors such as annual turnover. Second, the literature implies that to successfully make use of digital technologies, the customers’ point of view needs to be considered (Fischer et al., 2021, p. 373). For this reason, future research could investigate to what extent the customer desires digitization in the customer journey. Third, this research focused solely on SMEs. Accordingly, future research could compare SMEs with large enterprises concerning the digitization of the customer journey.

References

- Diba, H., Vella, J. M., & Abratt, R. (2019). Social media influence on the B2B buying process. *Journal of Business & Industrial Marketing*, 34(7), 1482–1496. <https://doi.org/10.1108/JBIM-12-2018-0403>
- Edelman, D. C., & Singer, M. (2015). Competing on

- Customer Journeys. *Harvard Business Review* (November), 88–100.
- EIB. (2020). Who is prepared for the new digital age? Evidence from the EIB Investment Survey. EIB.
- Enyinda, C. I., Opute, A. P., Fadahunsi, A., & Mbah, C. H. (2021). Marketing-sales-service interface and social media marketing influence on B2B sales process. *Journal of Business & Industrial Marketing*, 36(6), 990–1009. <https://doi.org/10.1108/JBIM-01-2019-0053>
- Fischer, H., Seidenstricker, S., Berger, T., & Holopainen, T. (2021). Digital Sales in B2B: Status and Application. In E. Markopoulos, R. S. Goonetilleke, A. G. Ho, & Y. Luximon (Eds.), *Lecture Notes in Networks and Systems. Advances in Creativity, Innovation, Entrepreneurship and Communication of Design* (Vol. 276, pp. 369–375). Springer International Publishing. https://doi.org/10.1007/978-3-030-80094-9_44
- Fujitsu Ltd. (Ed.). (2020). *Global Digital Transformation Survey Report 2020: Digital Transformation Contributes to Providing Value to Society*. https://www.fujitsu.com/downloads/GLOBAL/vision/2020/download-center/FTSV2020_Survey_EN_1.pdf
- Fujitsu Ltd. (Ed.). (2021). *Global Digital Transformation Survey Report 2021: Priorities in the post-pandemic world*. https://www.fujitsu.com/downloads/GLOBAL/vision/2021/download-center/FTSV2021_Survey_EN.pdf
- Gong, C., & Ribiere, V. (2021). Developing a unified definition of digital transformation. *Technovation*, 102, 102217. <https://doi.org/10.1016/j.technovation.2020.102217>
- Guenzi, P., & Habel, J. (2020). Mastering the Digital Transformation of Sales. *California Management Review*, 62(4), 57–85. <https://doi.org/10.1177/0008125620931857>
- Hanelt, A., Bohnsack, R., Marz, D., & Antunes Marante, C. (2021). A Systematic Review of the Literature on Digital Transformation: Insights and Implications for Strategy and Organizational Change. *Journal of Management Studies*, 58(5), 1159–1197. <https://doi.org/10.1111/joms.12639>
- Hervé, A., Schmitt, C., & Baldegger, R. (2020). Internationalization and Digitalization: Applying digital technologies to the internationalization process of small and medium-sized enterprises. *Technology Innovation Management Review*, 10(7), 28–40.
- Lee, Y. Y., Falahat, M., & Sia, B. K. (2021). Drivers of digital adoption: a multiple case analysis among low and high-tech industries in Malaysia. *Asia-Pacific Journal of Business Administration*, 13(1), 80–97. <https://doi.org/10.1108/APJBA-05-2019-0093>
- Li, L., Su, F., Zhang, W., & Mao, J.-Y. (2018). Digital transformation by SME entrepreneurs: A capability perspective. *Information Systems Journal*, 28(6), 1129–1157. <https://doi.org/10.1111/isj.12153>
- Mahlamäki, T., Storbacka, K., Pylkkönen, S., & Ojala, M. (2020). Adoption of digital sales force automation tools in supply chain: Customers' acceptance of sales configurators. *Industrial Marketing Management*, 91, 162–173. <https://doi.org/10.1016/j.indmarman.2020.08.024>
- Matt, D. T., & Rauch, E. (2020). *Sme 4.0: The Role of Small- and Medium-Sized Enterprises in the Digital Transformation*. In D. T. Matt (Ed.), *Industry 4.0 for SMEs* (1st ed., pp. 3–36). Springer International Publishing.
- Mullins, R., & Agnihotri, R. (2022). Digital selling: organizational and managerial influences for frontline readiness and effectiveness. *Journal of the Academy of Marketing Science*. Advance online publication. <https://doi.org/10.1007/s11747-021-00836-5>
- Parviainen, P., Tihinen, M., Kääriäinen, J., & Teppola, S. (2017). Tackling the digitalization challenge: how to benefit from digitalization in practice. *International Journal of Information Systems and Project Management*, 5(1), 63–77. <https://doi.org/10.12821/ijispm050104>
- Podsakoff, P. M., MacKenzie, S. B., Lee, J.-Y., & Podsakoff, N. P. (2003). Common method biases in behavioral research: A critical review of the literature and recommended remedies. *The Journal of Applied Psychology*, 88(5), 879–903. <https://doi.org/10.1037/0021-9010.88.5.879>
- Rangarajan, D., Sharma, A., Lyngdoh, T., & Paesbrugge, B. (2021). Business-to-business selling in the post-COVID-19 era: Developing an adaptive sales force. *Business Horizons*, 64(5), 647–658. <https://doi.org/10.1016/j.bushor.2021.02.030>
- Rêgo, B. S., Jayantilal, S., Ferreira, J. J., & Carayannis, E. G. (2021). Digital Transformation and Strategic Management: A Systematic Review of the Literature. *Journal of the Knowledge Economy*. Advance online publication. <https://doi.org/10.1007/s13132-021-00853-3>
- Reis, J., Amorim, M., Melão, N., & Matos, P. (2018). Digital Transformation: A Literature Review and Guidelines for Future Research. In Á. Rocha, H. Adeli, L. P. Reis, & S. Costanzo (Eds.), *Advances in Intelligent Systems and Computing. Trends and Advances in Information Systems and Technologies* (Vol. 745, pp. 411–421). Springer International Publishing. https://doi.org/10.1007/978-3-319-77703-0_41
- Rodríguez, M., Peterson, R. M., & Krishnan, V. (2012). Social Media's Influence on Business-to-Business Sales Performance. *Journal of Personal Selling & Sales Management*, 32(3), 365–378. <https://doi.org/10.2753/PSS0885-3134320306>
- Rodríguez, R., Svensson, G., & Mehl, E. J. (2020). Digitalization process of complex B2B sales processes – Enablers and obstacles. *Technology in Society*, 62, 101324. <https://doi.org/10.1016/j.techsoc.2020.101324>
- Seidenstricker, S., Melzig, S., Fischer, H., & Krause, V. (2021). *Customer Success Management: Success Factors*. In IEM Teaching and Research at the Crossroads of Innovation, *Digitalisation and Sustainability* (pp. 24–29). Verlag der Technischen Universität Graz.
- Sharma, A. (2016). What personal selling and sales

management recommendations from developed markets are relevant in emerging markets? *Journal of Personal Selling & Sales Management*, 36(2), 89–104. <https://doi.org/10.1080/08853134.2016.1185951>

Singh, J., Flaherty, K., Sohi, R. S., Deeter-Schmelz, D., Habel, J., Le Meunier-FitzHugh, K., Malshe, A., Mullins, R., & Onyemah, V. (2019). Sales profession and professionals in the age of digitization and artificial intelligence technologies: concepts, priorities, and questions. *Journal of Personal Selling & Sales Management*, 39(1), 2–22. <https://doi.org/10.1080/08853134.2018.1557525>

Steward, M. D., Narus, J. A., Roehm, M. L., & Ritz, W. (2019). From transactions to journeys and beyond: The evolution of B2B buying process modeling. *Industrial Marketing Management*, 83, 288–300. <https://doi.org/10.1016/j.indmarman.2019.05.002>

Syam, N., & Sharma, A. (2018). Waiting for a sales renaissance in the fourth industrial revolution: Machine learning and artificial intelligence in sales research and practice. *Industrial Marketing Management*, 69, 135–146. <https://doi.org/10.1016/j.indmarman.2017.12.019>

Trenkle, J. (2019). Survival in the digital age - A framework for formulating a Digital Transformation

Strategy in SME. In E. Y. Li & H. Li (Chairs), 19th International conference on Electronic Business (ICEB), Newcastle Upon Tyne, UK.

Verhoef, P. C., Broekhuizen, T., Bart, Y., Bhattacharya, A., Qi Dong, J., Fabian, N., & Haenlein, M. (2021). Digital transformation: A multidisciplinary reflection and research agenda. *Journal of Business Research*, 122, 889–901. <https://doi.org/10.1016/j.jbusres.2019.09.022>

Zimmermann, V. (2021). Digitalisation in international comparison: Germany lags far behind in IT investment. <https://www.kfw.de/PDF/Download-Center/Konzernthemen/Research/PDF-Dokumente-Fokus-Volkswirtschaft/Fokus-englische-Dateien/Fokus-2021-EN/Focus-No.-352-October-2021-IT-investment.pdf>

Zoltners, A. A., Sinha, P., Sahay, D., Shastri, A., & Lorimer, S. E. (2021). Practical insights for sales force digitalization success. *Journal of Personal Selling & Sales Management*, 41(2), 87–102. <https://doi.org/10.1080/08853134.2021.1908144>

Law as a guide to economic decisions and vice versa

- Warranty obligations of the seller within a supply chain according to the Weber/Putz judgment

Artur R. Fabisch, University of Applied Sciences Würzburg-Schweinfurt, Germany

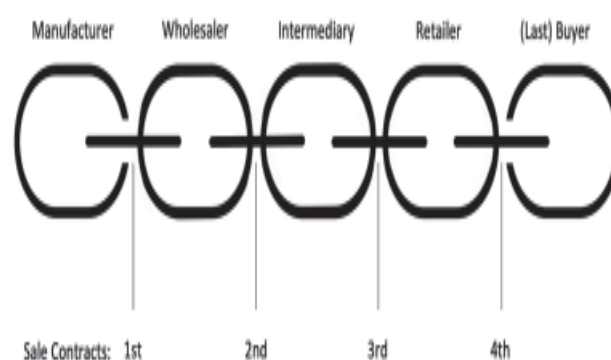
The law imposes certain obligations on the parties involved in a legal transaction. The obligations of one party are accompanied by the rights of the other party. In the context of warranty rights, obligations and rights based on certain defects can reach the point where a previously profitable legal transaction ultimately proves uneconomical for one party. This is particularly the case if the seller delivers a defective item which is installed in another item. This occurred in the decisions to be discussed here, which have far-reaching consequences in particular for the seller's liability and thus ultimately also for their price calculation. For example, if defective tiles are sold and then installed, the question arises as to who is liable for the removal of the defective tiles and the installation of the new tiles. Both positions are relevant as neither of them would have incurred without the poor performance, i.e. the defect. This question becomes particularly relevant if the removal and installation costs are considerably higher than the purchase price of the tiles and the sale is not made by the manufacturer but via suppliers, i.e. in a supply chain.

1. Introduction

From a legal point of view, it must be clarified to what extent the manufacturer, who is responsible for the defect and thus also for the defect-related removal and installation costs, must bear these costs. In turn, this question can be clarified from an economic point of view. A pass-through claim of the buyer who installs the product (last buyer) against the manufacturer then becomes relevant.

The actual issue of a pass-through liability in favor of the last buyer results, at least under the German law, from the fact that the manufacturer only has to compensate for a damage if they have violated an absolute (legal) interests, such as property. For any pecuniary loss, the removal and installation costs are considered as such, liability is generally only possible on the basis of a contract (cp. Bien, 645 et seq.). Within the supply chain however, a contract exists only between the last buyer and his contractual partner, the last seller. A contractual relationship between the manufacturer and the last buyer is almost never present.

Figure 1. Structure of a sales contract



The purpose of this analysis is to demonstrate the approach taken by European law for cases as just outlined, which applies in all EU member states. The member states must implement this supranational law and thus incorporate it into their own legal systems. They may not fall below the minimum standards of the European law, but at the same time are free to grant the buyer more rights. This is justified in particular by consumer protection, which the European law aims to strengthen. At the same time, the regulations made in Germany in addition to B2C also cover B2B contracts, for which the legislator is aiming for a uniform application of the law.

Knowledge of what is discussed in this article and the associated liability regime is essential for manufacturing companies. This knowledge ultimately determines whether the risks associated with the sale will lead to liability that the company has not priced in and consequently to an economic (pecuniary) loss the company may have to suffer.

2. Judgment of the European Court of Justice in Weber/Putz

The question of the last buyer's claim against the last seller for reimbursement of removal and installation costs was essentially answered by the European Court of Justice

(ECJ) in the Weber/Putz judgment (Judgment of the Court (First Chamber) of 16 June 2011. Gebr. Weber GmbH v Jürgen Wittmer (C-65/09) and Ingrid Putz v Medianess Electronics GmbH (C-87/09); European Court Reports 2011 I-05257; regarding the term “installation” cp. Höpfner and Fallmann, 3745 et. seq. and Hübner, 233). Based on this decision, which is outlined below, the German legislator has massively strengthened the rights of the buyer by amending the law.

In this case, the question was whether the last seller who delivers a defective item that is typically installed in another item is then liable for the necessary removal of the defective item and the installation of the defect-free item. Neither of these damage positions would have been incurred if the supplier had delivered a defect-free item, as he is obligated to do by law. Until this judgment, the existence of a claim for removal and installation costs was not explicitly provided for in European law or the German Civil Code (BGB). The paramount argument of the seller was that they cannot be obligated to do something that they do not owe and that it is the manufacturer to be held responsible (ibid marg. no. 41. Confirming: German, Belgian and Austrian Government.). Simultaneously, the seller is indisputably obliged to the delivery of a defect-free item or the removal of the defect. These claims, arising from the seller’s obligation to provide cure in the case of a defect of the delivered item (§ 437 no. 1 and § 439 para. 1 BGB), were not in dispute in either Weber or Putz case.

The Weber judgement

Mr. Wittmer and Weber concluded a contract of sale in respect of polished tiles at a price of EUR 1,382.27. After having had about two thirds of the tiles laid in his house, Mr. Wittmer noticed that there was shading on the tiles which was visible to the naked eye (ibid. Regarding the preceding judgements of the German Federal Supreme Court, cp. Wagner, 94 et seq.).

Consequently, Mr. Wittmer submitted a complaint, which Weber rejected after consulting the manufacturer of the tiles. In an independent procedure for taking evidence instituted by the claimant, the appointed expert concluded that the shadings were fine micro-brush-marks which could not be removed, so that the only remedy possible was the complete replacement of the tiles. The expert estimated the cost of this at EUR 5,830.57.

In the absence of a response to his notice addressed to Weber, Mr. Wittmer brought an action before the German Regional Court against Weber for delivery of tiles free of defect and payment of EUR 5,830.57. That court ordered Weber to pay Mr. Wittmer EUR 273.10, as a reduction of the sales price, and dismissed the action as to the remainder. On appeal against the decision the German Higher Regional Court ordered Weber to deliver a new set of tiles free from defects and to pay Mr. Wittmer EUR 2,122.37 for removing and disposing of the defective tiles and dismissed the action

as to the remainder.

Weber appealed on a point of law against the judgment of the Federal Court of Justice, which states that its judgment will depend on whether the appellate court was right to find that Mr. Wittmer could seek reimbursement of the cost of removing the defective tiles. Since Mr. Wittmer could not claim such reimbursement under German law, the answer to that question depends on the interpretation of Article 3(2) and the third subparagraph of Article 3(3) of the EU Directive, in accordance with which § 439 of the BGB should, if appropriate, be interpreted.

The Bundesgerichtshof (Federal Supreme Court is the highest court that has jurisdiction in civil matters) observes in that regard that the use of the term ‘replacement’ in Article 3(2) of the Directive may imply the existence of an obligation not just to deliver goods in conformity with the contract of sale, but also to replace the defective goods and therefore to remove them. Furthermore, the obligation to take account of the nature and the purpose of the goods, laid down in Article 3(3), combined with the obligation to bring the goods into conformity, could suggest that the obligation on the seller to replace the goods includes not only the delivery of goods in conformity, but also the removal of the defective goods to allow the use of the replacement goods in a manner consistent with their nature and purpose.

The Bundesgerichtshof notes that it would however not be necessary to answer that question if Weber were entitled to refuse to reimburse the cost of removing the tiles which were not in conformity because the cost is disproportionate. That court states that, under § 439 para. 3 of the BGB, the seller may refuse the type of subsequent performance chosen by the buyer not only where that type of performance would result in disproportionate cost in comparison to the alternative type of performance (‘relative lack of proportionality’), but also where the cost of the method chosen by the buyer, even if it is the only method possible, is inherently disproportionate (‘absolute lack of proportionality’). In the present case, the request for subsequent performance by delivery of tiles free from defects is such a case of ‘absolute lack of proportionality’, since it would oblige Weber to pay, in addition to the cost of the delivery, assessed at EUR 1,200, the cost of removing the defective tiles of EUR 2,100, a total of EUR 3,300, exceeding the threshold of 150% of the value of the goods free from defects, on the basis of which the proportionality of such a request is a priori evaluated.

The Putz judgement

In the Putz case Ms. Putz and Medianess Electronics concluded a sales contract for a new dishwasher for the price of EUR 367 plus payment-on-delivery costs of EUR 9.52. The parties agreed on delivery to the door of Ms. Putz’s house. The delivery of the dishwasher and the payment of the price took place as agreed (Judgment of the European Court of Justice, marg. no. 41). After Ms. Putz had the dishwasher

installed in her house, a defect, which was not attributable to the installation of the machine and could not be repaired, became apparent.

The parties then agreed on the replacement of the dishwasher. In this context, Ms. Putz demanded that Medianess Electronics not only deliver a new dishwasher, but also that it remove the defective machine and install the replacement machine or that it pay the costs of removal and new installation, which Medianess Electronics refused. Since Medianess Electronics failed to respond to the notice which she had addressed to it, Ms. Putz rescinded the contract of sale.

Argumentation of the ECJ

On those grounds, the European Court decided as follows (ibid):

Article 3(2) and (3) of Directive 1999/44/EC of the European Parliament and of the Council of 25 May 1999 on certain aspects of the sale of consumer goods and associated guarantees (the directive 1999/44/EC regulates in particular the concept of defect under the sales law, the rights of the buyer in the case of delivery of defective goods, with the exception of the claim for damages and recourse within the sales chain back to the manufacturer. These rights may not be waived to the detriment of the consumer-purchaser. At the same time, the directive only binds the member states in the sense of a minimum standard, which the member states may not fall below. Cp. Wagner, 88) must be interpreted as meaning that, where consumer goods not in conformity with the contract which were installed in good faith by the consumer in a manner consistent with their nature and purpose, before the defect became apparent, are restored to conformity by way of replacement, the seller is obliged either to remove the goods from where they were installed and to install the replacement goods there or else to bear the cost of that removal and installation of the replacement goods. That obligation on the seller exists regardless of whether he was obliged under the contract of sale to install the consumer goods originally purchased.

Article 3(3) of Directive 1999/44/EC must be interpreted as precluding national legislation from granting the seller the right to refuse to replace goods not in conformity, as the only remedy possible, on the ground that, because of the obligation to remove the goods from where they were installed and to install the replacement goods there, replacement imposes costs on him which are disproportionate with regard to the value that the goods would have if there were no lack of conformity and the significance of the lack of conformity. That provision does not, however, preclude the consumer's right to reimbursement of the cost of removing the defective goods and of installing the replacement goods from being limited, in such a case, to the payment by the seller of a proportionate amount.

In both cases, the buyers had bought goods (floor tiles

and a dishwasher respectively) which were delivered and installed in their homes before they turned out to be defective. In both cases, the seller merely owed the delivery of the goods, and the removal of the defective goods and the re-installation of new goods were considerably more expensive than the value of the tiles and the dishwasher themselves. As repair in both cases was not possible, neither of the sellers objected to their duty to deliver again and free of charge. However, in the cases at hand, the buyers claimed additional reimbursement of the costs of removal and installation (Weber) and the complete restitution of the contractual price after rescission (Putz) from the sellers.

In summary, the ECJ ruled that the seller is liable for the costs of the installation as well as the removal, but also that these costs can be limited to a reasonable amount (Judgment of the European Court of Justice, marg. no. 64, 74 and 78). This was justified on the basis of the objective of the European law: the underlying directive aims to protect the consumer from adverse financial consequences of a defective performance, which is why the consumer must be placed in the position he would have been in if the contract had been properly performed (Judgment of the European Court of Justice, marg. no. 42, 44 et seq.). The ECJ rejected the seller's argument that he had not promised installation and removal by considering that the seller could be obliged to do more by way of cure than he had originally promised (Judgment of the European Court of Justice, marg. no. 42. Confirming: Spain and Poland as well as the European Commission). This is based on the consideration that the seller has contractually assumed the obligation to deliver goods in conformity with the contract within the framework of the purchase agreement and must therefore bear the consequences of poor performance (Judgment of the European Court of Justice, marg. no.42 and 56).

These principles should only apply if the consumer acquired the goods in good faith, i.e. before the defect occurred, and installed them in accordance with their intended use (Judgment of the European Court of Justice, marg. no. 56, 62, 76. See also Maultzsch, ZfPW 2018, 6 et seq.; Höpfner and Fallmann, 3747 and Hübner, 243).

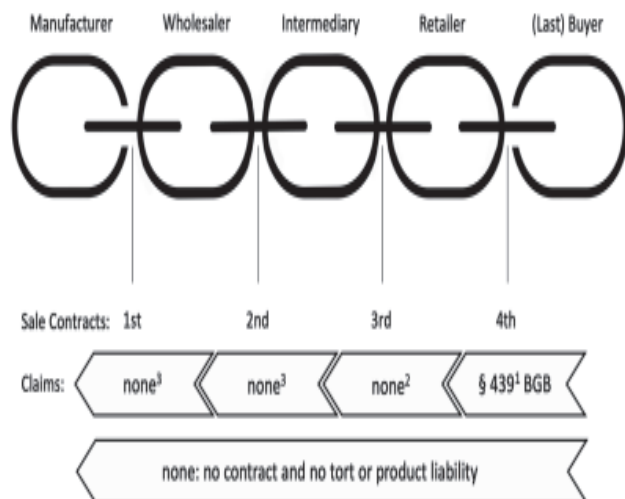
3. Externalization of costs as a consequence of the Weber/Putz judgment

It would now be factually correct to assume that the last seller of the defective items could demand compensation from his supplier (claim along the supply chain). The latter has placed defective goods on the market, which have been resold and installed, thus incurring the removal and installation costs. If one goes further in the supply chain, it can be expected that the supplier can then claim against his supplier, whereby finally the manufacturer of the defective goods has to compensate the damage suffered by the own contractual partner. This adequate outcome is based on the

fact that the manufacturer, who is obliged to deliver defect-free goods, has produced defective goods and thus they put defective goods on the market in breach of a contractual duty. However, this was not the case under the German law in force at the time of the Weber/Putz decision.

Contractual claims were excluded: The last seller suffered a pecuniary loss, i.e. damage. This corresponds to the removal and installation costs which he must reimburse to the last buyer (the case law described here refers to industrially manufactured mass-produced articles, which were also relevant in the Weber/Putz judgment). He however could only assert a corresponding claim for damages against his supplier if the latter had acted with fault, i.e. negligently or intentionally. However, the supplier, who is usually an intermediary, has neither an obligation to inspect (permanent jurisprudence, cp. BGH 25.9. 1968 – VIII ZR 108/66, NJW 1968, 2238, 2239; BGH 16.3. 1977 – VIII ZR 283/75, NJW 1977, 1055, 1056; cp. also Wagner, 103) nor can the manufacturer's fault be attributed to him (permanent jurisprudence, cp. BGH 2.4.2014 – VIII ZR 46/13, BGHZ 200, 337 Rn. 31; BGH – VIII ZR 211/07, BGHZ 177, 224 marg. no. 29. See also BGH 25.9.1968 – VIII ZR 108/66, NJW 1968, 2238, 2239; BGH 14.1.2009 – VIII ZR 70/08, NJW 2009, 1660 marg. no. 11. See also Bien, 652 and Wagner, 103 et seq. Other opinion Schroeter, 497). Consequently, there was no fault on his part and therefore no liability.

Figure 2. Structure of a sales contract and its operation



1. Claim granted for the first time based on the Weber/Putz judgment.
2. Retailer suffered a damage: Costs of the reimbursement (for removal and installation) claimed by the last buyer. He however can only claim for damage against the intermediary if the intermediary acted responsibly (negligently or intentionally) or if responsibility can be attributed. Neither of these was present.
3. No damage-claim of the intermediary and wholesaler against the own seller, as neither of them has suffered a damage.

The manufacturer, in turn, is also not held liable for the damage. His recipient did not install the goods, but merely resold them and thus did not suffer any damage (cp. also Wagner, 104). The manufacturer is also not liable to the last seller, as there is no contractual relationship between these parties (ibid). Likewise, tortious claims, i.e. claims that do not require a contractual legal relationship between the claimant and the defendant, were not relevant: Tortious or product liability will not apply because it only covers the infringement of absolute legal interests, such as property (ibid). It therefore does not cover the pure pecuniary loss that is present here (ibid).

The (old) law therefore had the effect of externalizing costs at the expense of the last seller and thus remained in favor of the manufacturer (ibid). As a result, the (last) seller who was aware of the Weber/Putz judgment priced in the potential costs of removal and installation incurred in the event of a defect and consequently passed the additional costs onto his buyer. As expected, the product intended for installation became more expensive within the last link of the chain. At the same time, the manufacturer saw little economic incentive to deliver defect-free products through a more careful production or to intensive quality controls (cp. Shavell, 48 et seq. and Wagner, 105).

4. Cost internalization as a consequence of the economic approach

Implementation of EU requirements in the German Civil Code

The German legislator has recognized the problems just presented and the consumer-friendly approach and has adapted the law accordingly. On the basis of the directive 1999/44/EC and the Weber/Putz judgment, the legislator has implemented the European guidelines in the currently applicable § 439 para. 3 of the German Civil Code as follows:

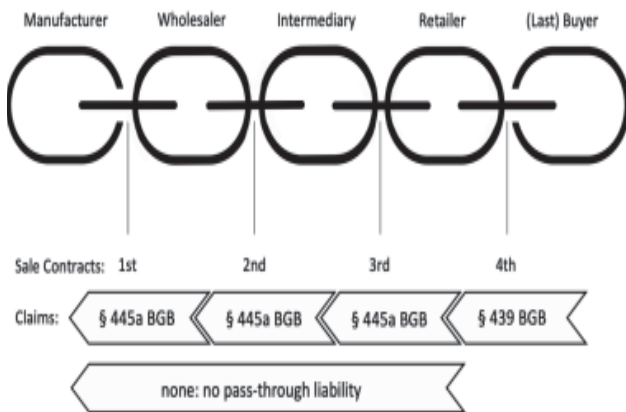
If the buyer has installed the defective item in another item or attached it to another item in accordance with its type and intended use before the defect became apparent, the seller shall be obligated within the scope of subsequent performance (cure) to reimburse the buyer for the necessary expenses for removing the defective item and installing or attaching the repaired or delivered defect-free item (on the necessity of the expenses, cf. Maultzsch, ZfPW 2018, 12 et seq. and Hübner, 242).

The German legislator could counteract the externalization of costs by creating a new provision which has been incorporated into the German Civil Code. This provision allows the costs of installation and removal to be

passed on to the next link in the supply chain. § 445a BGB regulates the following (this section is based on Article 4 of the directive 1999/44/EC which regulates the right of redress by stating: Where the final seller is liable to the consumer because of a lack of conformity resulting from an act or omission by the producer, a previous seller in the same chain of contracts or any other intermediary, the final seller shall be entitled to pursue remedies against the person or persons liable in the contractual chain. the person or persons liable against whom the final seller may pursue remedies, together with the relevant actions and conditions of exercise, shall be determined by national law. In Germany the regulation came into force on 1.1.2018 and was amended as of 1.1.2022):

- (1) In the event of the sale of a newly manufactured item, the seller may claim from the seller who sold him the item (supplier) reimbursement of the expenses which he had to bear in relation to the buyer in accordance with § 439 para. 3 (...) if the defect asserted by the buyer was already present at the time of the transfer of risk to the seller (...).
- ...
- (3) Paragraph 1 (...) shall apply mutatis mutandis to the claims of the supplier and the other buyers in the supply chain against the respective sellers if the debtors are entrepreneurs.

Figure 3. Structure of a sales contract and its operation: An example



Economic analysis of the new law

Based on the fact that the rights that a party has to grant to the other must be paid for, neither the courts nor the legislator can allocate resources in a binding way between them as long as they are free to agree on performance and consideration (cp. Wagner, 102).

With the introduction of § 445a BGB the manufacturer will instantly need to take into account in pricing the risk associated with the defect of an item and consequently will have to bear the costs of the removal and installation. The

price thus will increase by the margin reflecting the expected costs of the removal and the installation (ibid).

It can consequently be assumed that the protection of the last buyer discussed here will already be taken into account and passed on in terms of costs within the first link of the sales chain and will accordingly lead to rising prices. The rights to be granted will thus be priced in on the part of the profit-oriented manufacturer, who will take the costs of the warranty into account. As the damage avoidance costs are lowest for the manufacturer, this approach, which is now also legally anchored, proves itself in the overall view and leads to appropriate results.

According to the "cheapest cost avoider" approach, it can be assumed that the manufacturer is in a much better position to oversee and assess the risk of delivery of a defective product than his contractual partner, since he regulates the production process and is thus the only one in control of the supply chain (regarding cheapest cost avoider cp. Schäfer and Ott, 479 et seq. and Bien, 656). In particular, the manufacturer can inspect the produced and unpackaged goods at low cost and thus immediately sort out defective products by means of quality controls based on his know-how and with the help of the available technology required for this purpose (economy of scale, cp. Bien, 656 et seq.). No other link in the chain can do this more cost-effectively than he can.

From a legal point of view, the costs of removal and installation are passed on to the manufacturer, so that he bears the final costs if his product proves to be defective (Maultzsch, ZfPW 2018, 22 et seq.): Because of the damage that the last seller has to bear towards his buyer by reimbursing the removal and installation costs, the last seller will turn to his supplier, who in turn will do this to the next link in the supply chain, finally the manufacturer. Since the manufacturer now has to bear - internalize - the removal and installation costs caused by placing the defective goods on the market, he has an incentive to avoid them by taking due diligence measures (Lorenz, 2243 and Maultzsch, GPR 2011, 253, 256); provided that the costs of the due diligence measures are lower than the disadvantages caused by the defective performance for the final buyer, which are passed on to him within the supply chain (cp. Wagner, 102).

If only the expected value of the installation and removal costs is priced in, this should cause the price to increase the least due to the scaling effect (Bien, 644). In particular, the cost increase should be lower than in the case of externalization.

At first glance, this pricing may be only partially advantageous for the last buyer. However, it undoubtedly is, provided that the benefit he derives from the scheme is greater than the cost the manufacturer has to incur to satisfy the claims before passing them on.

As a result, this should lead to an increase in the quality of products, and in addition, there should be fewer warranty cases and thus lower litigation costs for the manufacturer

(ibid, 658). This development in turn has a price-reducing effect and should at least partially absorb the pricing of removal and installation costs.

The individual sellers within the chain do not experience any loss of wealth as long as the passing on of the damage in the chain is successful. In the case of insolvency of the manufacturer or of a chain link located before him, on the other hand, there will be an interruption in the settlement of claims. In this case, the passing-through of the costs will fail, and the contractual partner of the insolvent chain link will then have to finally bear the costs (the default of the contractual partner is also generally priced in). This corresponds to the general (legal) principle according to which the insolvency risk of one's own contractual partner must always be borne (for further cases of limitation of the recourse within § 445a BGB, see Maultzsch, *ZfPW* 2018, 24 et seq.). A pass-through liability, which would counteract this problem, is still unfamiliar to the German law (a different approach was taken by the French and Belgian law. Both legal systems allow a direct settlement between the buyer and the manufacturer, which is known as *action directe dans les chaînes de contracts*, cp. Bien, 646).

5. Summary

According to current law, the seller is obliged to reimburse the buyer for the removal and installation costs as necessary expenses. The underlying case law and the new regulations anchored in the German Civil Code are based on the consumer-protection objective of the European directive.

It makes common sense for the manufacturer to add the removal and installation expenses to the usual warranty costs. It can therefore be assumed that the protection of every buyer within the supply chain discussed here, will be passed on in the chain in terms of costs and will consequently lead to rising prices. The serious financial losses of passing the damage on to the manufacturer, probably more than the concern for his reputation in the event of poor performance, should be an incentive for the manufacturer to produce and inspect diligently.

From an economic point of view, the cheapest cost avoider approach has been followed. Consequently every seller of the supply chain only has to bear the costs preliminary before passing them within the chain. He himself is hence protected from economic losses.

Further protection is provided by the fact that the last seller can invoke the statutory limitation period if the buyer fails to assert his claims in due time. In addition, he can also raise the defense of disproportionality (Judgment of the

European Court of Justice, marg. no. 58; Maultzsch, *ZfPW* 2018, 14 et seq.; Höpfner and Fallmann, 3749 et seq.; Hübner, 242).

Without doubt, it is essential for all parties involved in a sales chain to know these obligations as well as rights, which are now explicitly regulated.

References

Bien, F. (2012). Haftung für reine Vermögensschäden in der Absatzkette, *Zeitschrift für Europäisches Privatrecht (ZEuP)*, 2012, 644 et seq.

Hübner, L. (2018). § 439 Abs. 3 BGB als „Nacherfüllungshilfsanspruch“, *Zeitschrift für die gesamte Privatrechtswissenschaft (ZfPW)* 2018, 227 et seq.

Höpfner, C. and Fallmann M. (2017). Die Reform des kaufrechtlichen Gewährleistungsrechts 2018, *Neue Juristische Wochenschrift (NJW)* 2017, 3745 et seq.

Lorenz, S. (2011). Ein- und Ausbauperflichtung des Verkäufers bei der kaufrechtlichen Nacherfüllung, *Neue Juristische Wochenschrift (NJW)* 2011, 2241 et seq.

Maultzsch, F. (2018). Die kaufrechtlichen Neuregelungen zum Umfang der Nacherfüllung und zum Rückgriff des Verkäufers: Berlin locuta – causa finita? *Zeitschrift für die gesamte Privatrechtswissenschaft (ZfPW)*, 2018, 1 et seq.

Maultzsch, F. (2011). Der Umfang des Nacherfüllungsanspruchs gemäß Art. 3 VerbrGK-RL, Anmerkung zum Urteil des EuGH v. 16.6.2011 – verb. Rs. C-65/09 (Gebr. Weber GmbH/Wittmer) und C-87/09 (Putz/Medianess Electronics GmbH), *Zeitschrift für das Privatrecht der Europäischen Union (GPR)* 2011, 253 et seq.

Nietsch, M. and Osmanovic, D. (2018). Die kaufrechtliche Sachmängelhaftung nach dem Gesetz zur Änderung des Bauvertragsrechts, *Neue Juristische Wochenschrift (NJW)* 2018, 1 et seq.

Schäfer, H.-B. and Ott C. (2021), *Lehrbuch der ökonomischen Analyse des Zivilrechts*, 6th ed., Springer Berlin Heidelberg.

Schroeter, U. (2010). Untersuchungspflicht und Vertretenmüssen des Händlers bei der Lieferung sachmangelhafter Ware, *JuristenZeitung (JZ)*, 2010, 495 et seq.

Shavell, S. (2007). *Economic Analysis of Accident Law*, Harvard University Press.

Wagner, G. (2016). Der Verbrauchsgüterkauf in den Händen des EuGH, Überzogener Verbraucherschutz oder ökonomische Rationalität, *Zeitschrift für Europäisches Privatrecht (ZEuP)*, 2016, 87 et seq.

The New Dimension of Green Economy Investments Green Finance: World Examples of Sustainable Innovation

Yağmur Rençber, Doğuş University, Istanbul, Turkey
Halit Targan Ünal, Doğuş University, Istanbul, Turkey

In the 21st century, the world economy has sought to find solutions for the problems of global warming and climate change that have arisen as a result of environmental destruction. This has increased the importance of the concepts of sustainable development and green economy. Sustainable development provides a perspective that protects the living opportunities of future generations for the effective and efficient use of existing natural resources. Fiscal policies have a key role in the transition to a green economy for sustainable development. Green economy and sustainable innovation are significantly related to renewable energy investments, and also their financing. This study aims to examine green finance practices in a comparative manner with a few country examples.

Keywords: Green Finance, Green Economy, Sustainable Development, Sustainable Innovation

1. Introduction

The concept of innovation has become increasingly important in recent years, appears in many places with the meaning of innovation. However, if there is no commercial benefit in the end, it is not possible to talk about innovation in an innovation. Innovation is an economic and social process. It allows the transformation of knowledge in a way that will provide economic and social benefits. As a result of innovation, a product, service or management style may occur. With innovation, a new feature can also be developed, a need can be answered or an existing problem can be resolved. Thus, it responds to expectations for a more useful and beneficial purpose. In order for innovation to be sustainable, the product produced must be environmentally friendly. Products produced with the logic of ecological production represent sustainable innovation. Because the way to be sustainable is to comply with all environmental rules. For example, the production of plastics that can be lost in nature is an example of sustainable innovation. In this sense, in this study, green banking and green banking products will be introduced, green finance applications that pave the way for sustainable innovation will be introduced, and it will be aimed to emphasize the market cycle and importance of green loans, which provide resources for green

bonds, especially renewable energy investments.

Today, as a result of various environmental problems such as the reduction of natural resources (underground and water resources) in the world, deforestation, climate change, loss of biodiversity, global warming, water pollution, ozone layer depletion, environment and air pollution, humanity is unconsciously consumed by fossil fuels (oil, coal, natural gas, etc.) has been in search of a solution. The world economy has turned to various renewable energy sources in order to restore the balances that have been disrupted due to the carbon-dependent production process, which is called the brown economy. Again, energy-efficient products have been used to protect natural resources, to produce without harming the environment, to release less greenhouse gasses to the atmosphere, and to pollute less. Here, encouraging people to this new type of energy use, which is formed with environmental awareness and environmental awareness, and financing this use is also an important issue. In this process, where new ideas are started to be produced by applying sustainable innovation;

- Soilless farming practices
- Software that regulates traffic flow using advanced algorithms and reduces the time spent in traffic
- Special window systems that change position according to sun and weather conditions to reduce energy consumption in homes
- Systems that detect leakage in irrigation channels and send a message to the farmer
- Storage solutions that collect waste food in restaurants and turn it into biogas
- Online education solutions and many other innovative ideas have been brought to those who have difficult access to education, and the production process has been tried to be sustainable, which is compatible with the green economy.

When looked at, it is accepted that the world is in a difficult period in which climate changes trigger migration waves and migration waves trigger wars and conflicts.

In this sense, from past to present, countries have set main targets such as creating employment, ensuring price stability and creating economic growth in order to keep their economies alive.

Within the scope of the target of the Paris Agreement (

2015), a global strategy should be developed to reduce the activities that will destroy the environment and to impose sanctions, to attract the attention of the private sector to green projects, and to provide incentives and tax support. The OECD Green Growth strategy is an example of this (2010:3). The Green Growth Strategy Interim Report consists of 5 main titles and basically targets greener growth.

The Relationship between Sustainable Innovation and Green Finance

It is almost impossible for businesses to be financed with only equity. In this sense, the banking market has an indispensable place in the capitalist system. Businesses with insufficient own resources have to turn to either the capital market or the banking market. The banking market is of great importance as it can provide resources faster and easier than the capital market and small enterprises have almost no chance to enter the capital market. Small businesses make loan agreements with multiple banks. In 2007, Ogawa et al. observed this situation for Japan. When looked at, businesses with high debt and liquidity problems have worked with more than one bank. In 2006, Aaboen et al. It has been observed that basic capital support for 183 SMEs with advanced technology is provided by more than one bank for Sweden. In 2003, Hooks showed that small businesses in the USA made more loan agreements with banks, just as they did in Japan. Large enterprises, on the other hand, use credit intensively if the credit information they receive from banks cannot be easily obtained from outside. While using loans from banks is a necessity for small businesses, it is perceived as a loss of reputation for large businesses. For this reason, Hooks (2003) states that state authorities have a duty to protect the reputation of businesses. On the other hand, the traditional bank-operation relationship has taken a different dimension in recent years and has begun to take shape within the framework of the concept of sustainability. Sustainability of investments has become an important prerequisite for both loan providers and loan demanders. Reasons such as legal regulations, increased operating costs, awareness of the negative ecological impacts of their activities and stakeholder pressure have caused businesses to strategically reconsider their perspectives on the natural environment (Kassinis and Soteriou 2003). Non-environmental investments of businesses have also led to loss of income in various ways. Heinkel et al. (2001) states in his research that green investors show less interest in the shares of the relevant enterprises due to the fact that the enterprises do not make ethical investments or do not renew their technologies, and therefore the value of the securities of the enterprises that pollute the environment decreases. The authors state that this situation increases the capital costs of the enterprises and for this reason, the enterprises necessarily turn to green investments. Stating that 25% of a company's stocks are

green shares, Heinkel et al. (2001) on the other hand, states that the ratio of green shares owned by enterprises is around 10%.

In this sense, the term green finance represents a nature-friendly, environmentally beneficial perspective. It is also aimed to use less harmful products and to implement projects. For this purpose, these products and projects are financed by offering appropriate opportunities by financial institutions. Here you can find low interest rates, low bank charges, donations to environmental organizations, etc. In these ways, customers are encouraged to use green financial products. Today, green finance is seen as one of the important pillars of sustainable global development (Kuloğlu and Öncel, 2015: 3). Meeting the increasing energy need with oil has increased environmental pollution, and the fluctuation of the oil market has increased the costs. In addition, the focus on global warming with the development goals in question has directed investments in the world in recent years to the green economy, which represents clean energy. In other words, investments have been converted to green financing. Governments, financial institutions and investors have started to spend their money on technologies that will cause the least damage to the environment. It offers appropriate solutions to the problems caused by rising energy demand, depleted fossil fuels and natural resources in our era of green financing. The use of renewable energy sources and other environmentally friendly technologies not only triggers socio-economic growth, but also offers attractive opportunities to investors around the world (Browne, 2011). For financial institutions that play important roles in economic development, environmental protection and social responsibility due to their financial investment and lending decisions, the concept of sustainability means managing “social and environmental risks” in the decision-making and lending stages (IFC 2007). The International Finance Corporation (IFC) (2007) defined sustainable finance as “the transfer of financial capital and risk management into projects that do not harm and promote economic wealth, environmental protection and social justice”. Why do we merge with banks? Because the institutions that are the locomotive of the economy that support production with loans are banks. It is possible that renewable energy is an expensive investment and companies can overcome this with banks. This brings up the term green banking. Because investments financed by banks may cause direct or indirect damage to the environment (Thompson 1998; Cowton and Thompson 2000). In order to eliminate or minimize these losses, it is important for banks to support investment projects aimed at protecting the natural and human environment within the scope of sustainability. In addition, considering the financial dimension of sustainability in the discussions held at international environmental conferences, financial institutions were asked to direct their resources to sustainable investments (White 1996). Countries were asked to encourage their financial banking sectors in this regard

(Aizawa and Yang 2010). Bouma et al. (2001) by sustainable banking; It is defined as “the provision of financial services and products to individuals and businesses that take into account the environmental and social impacts that may arise from their activities”. Sustainability banking activities; It has been an approach that paved the way for “green banking” activities, where environmentally friendly investments are supported by a corporate social responsibility approach and environmental reports are prepared.

One of the other factors that makes green finance companies preferable is green energy certification. This certificate is a document given on a project basis to companies & organizations that provide output through renewable energy sources during production. By including its investment in the green certificate system, the producer company in question can find the opportunity to trade international certificates and earn additional income per kWh of its current production (by reducing the cost of resources by finding cheaper loans by the certified company). It is mostly practiced in the Netherlands, Denmark and Italy.

The product should provide customers with a transparent option to mitigate indirect effects from banking activities. Negative environmental effects must be eliminated or environmental benefits must be achieved. The following includes environmentally friendly financial products and services in developed regions such as Europe, USA, Australia, Japan, as well as unique green financial regulations proposed or implemented by the International Finance Corporation (IFC). The financial services sector is divided into four sub-sectors. These are:

- Retail Banking;
- Corporate Banking and Investment Banking;
- Asset Management and
- It is in the form of insurance (UNEP FI, 2007: 15).

Considering the use of green financial products and services in the world, the Netherlands is one of the first countries in Europe to take the lead. The Netherlands offers green financial products within the scope of ABN AMRO, Dutch Bank, Rabobank, and similar companies. The UK provides green financing support with companies such as Barclays, CFS, Abbey, HBOS and Halifax. Germany Deutsche Bank and its affiliated banks, Ireland Bank of Ireland and Switzerland Credit Suisse are the countries where green financial products are seen. Also, The USA (Bank of America, Citigroup, JP Morgan, Wells Fargo, etc.), Canada (CHMC, VanCity, etc.), some Latin American countries (especially in the forest bonds area) and Australia (Bendigo Bank, etc.) are among the countries where green financial products are developed after Europe. Turkey Sustainable Energy Financing Program (TURSEFF) is accepted as one of the institutions providing the most foreign resources in the field of renewable energy in Turkey. Vakıfbank supports entrepreneurs who want to produce energy from solar energy within the scope of innovation with the agreement it has made with the European Bank for

Reconstruction and Development. On the other hand, it also offers financing to projects related to wind, geothermal and biomass energy. The Industrial Development Bank of Turkey also provides support for energy efficiency loans. Turkish Economy Bank, Denizbank and İşbank also offer green financing loans for hydroelectric power plants, wind panels, pumps and equipment required for geothermal energy production.

In 2006, Scholtens defines this banking activity, which he calls environment-friendly project finance, as the allocation of financial resources to investment projects that care about and support the protection of resources, with a priority for the protection and development of the natural and human environment. The fact that American banks were fined in large amounts by the courts in the 1980s for causing direct or indirect environmental damage can be considered as the starting point of green banking (Sahoo and Nayak 2008). With the CERCLA Act enacted by the American Congress on 11 November 1980, the owners of industries and banks that pollute public health and the environment were found guilty and banks providing funds to businesses were sentenced to pay compensation (Weber 2008). Penalties for some banks greatly exceeded the amount of financial resources they provided. Green banking can be expressed as a financial tool that encourages businesses to implement more environmentally friendly policies, supports investment projects that are based on the protection of the natural environment and reduce environmental and social problems. Depending on the intensity of environmental, social or cultural disruptions faced by countries, the separation of resources may differ. For example, Ökobank, the world's first green bank founded in Germany in 1988, directed its funds to environmental issues, social justice, education and equal opportunities, while South Shore Bank, established in the USA, directed its resources to investments that base its resources on rainforest protection and prioritize environmental and economic development (White 1996). Banks that adopt the green banking strategy create new financial resources for various industries by providing resources to projects that are supported by the society and that can also be beneficial to the environment, as well as the traditional firm and project risk control applied when funding investments (Güler ve Tufan, 2015).

Green Finance Models

Green Credits:

Green loans are loans developed by many international financial institutions such as the World Bank, European Investment Bank (EIB), Exim bank, French Development Agency (FKA), Japanese Development Bank (JKB), German Development Bank (AKB) and extended in the fields of renewable energy and energy efficiency. The risks in these loans belong to the banks that operate in the country and act

as an intermediary. The point that distinguishes it from other loans is that the institution using the loan includes projects that reduce environmental, social and economic disruptions. Green credit applications, user's energy efficiency, energy saving, etc. by evaluating its green performance, it provides customers with a decrease in interest rates. In Turkey, the World Bank provides green loans with Ziraat Bank and Vakıfbank through the SME Energy Efficiency program. The French Development Agency, on the other hand, runs Renewable Energy Loan and Energy Efficiency Loan programs with Halkbank. The European Investment Bank also carries out the European Investment Bank Loan program with İşbank. For example, the first green loan extended in Turkey was used in a foreign investment for 4 wind power plants. This green loan, amounting to 260 million dollars, was provided by 4 Turkish banks and German investment banks (KfW) and the European Bank for Reconstruction and Development (EBRD).

Stocks and Index Funds:

The fact that some investors have high environmental awareness causes them to choose companies that give importance to the environment in the production process. For this reason, it prefers to invest in the stocks of publicly traded companies that carry out activities that support clean energy, energy efficiency and low-carbon economy due to their corporate characteristics. Sometimes, based on portfolio diversity, they may not prefer to have investments in a single company. In this context, the index funds created are a preferred investment tool. These investment instruments, which are called clean index or green index in international markets, include a wide geography and technology/activity area. The first index for green securities is the Luxembourg Green Index (LGX), launched by the Luxembourg Stock Exchange in 2016.

Green Sukuk:

Renewable energy is an interest-free financing model to finance sustainable and environmentally beneficial projects. The first green sukuk in Turkey was carried out by the Industrial and Development Bank of Turkey (TSKB) on behalf of Zorlu Energy in 2020 in the field of sustainable infrastructure and clean transportation (Altunkaya and Özcan, 2021). They are asset-backed securities structured to provide financing for renewable energy and environmental projects. Southeast Asian countries such as Malaysia and Indonesia finance renewable energy projects through green sukuk. While it was used for renewable energy investments in 2018, Malaysia, which is experiencing climate crises, used it to finance the negativities caused by natural disasters. Its whole operation is the same as the green bond, and its difference from the green bond is that it is interest-free. Turkey realized 450 million TL green sukuk by TSKB in the name of challenging energy in 2020.

Green Securitization:

Securitization is the transactions in which installment receivables are converted into cash in the assets of the balance sheets. Investors' returns on assets are derived from the cash flows of the underlying low-carbon assets. The same can be applied to projects such as social housing, hospitals and social/sustainability securitizations. Market demand for Green Securitization started in 2014 and reached a volume of \$40 billion in 2017. \$25 billion of this is comprised of housing loans (CBI: 2018:1).

Green Bonds:

They are interest-bearing debt securities used to allocate capital to initiatives that are the subject of green projects such as energy efficiency, biodiversity conservation, clean transportation, renewable energy, sustainable water management, pollution prevention and water. Today, in addition to green bonds, Social Bonds and Sustainability Bonds have also been issued in recent years. Social Bonds are defined by the International Capital Markets Association (ICMA) as bonds in which the proceeds of the bonds are used to finance new or existing projects for the purpose of providing social benefits. Sustainable bonds, on the other hand, are defined in such a way that their proceeds are used wholly or partially in green and social projects. In order to create an integrated bond market, ICMA announced the transparency, disclosure and reporting standards for social and sustainable bonds in June 2018 (The Sustainability Bond Guidelines (SBG) 2018). 75% of the funds obtained in green bonds in the world are used in the field of energy efficiency and renewable energy. In 2016, it issued its first green bond in Turkey for 5 years through TSKB.

Green Insurance:

Today, risks have also been integrated into the green economy. Green insurance is defined as ecological insurance, and it finances policies arising from environmental risks, liabilities arising from soil and air pollution. Green Vehicle, Green Housing, Carbon Insurance and Green Activity Insurance are among these investment instruments.

Banks Supporting Green Finance Practices in Turkey

1. Türkiye İş Bankası: It offers environmentally friendly loans for buildings such as heat and water insulation, solar energy panels, natural gas conversion. In order to use the loan, there are various conditions such as proving that it will be used in heat and water insulation of the house of residence, switching to the central heating system in the house of residence.
2. Vakıfbank: It specializes in housing loans. It provides support to green loans within the scope of

environmentally friendly housing loans. It provides loans to customers who participate in housing projects with an Energy Performance Certificate (EKB) and environmentally friendly housing projects. According to energy performance, 90% of the appraisal value for Class A houses and up to 85% of the appraisal value for Class B houses.

3. Denizbank: Supports renewable energy and energy investments. It provides a loan of minimum 10 and maximum 40 million EUR per project with a maturity of up to 15 years with foreign resources.
4. Garanti BBVA: As of 2016, it contributed TL 835 thousand. At the same time, it achieved a significant transformation by providing Turkey's first green loan (\$10 million) to Zorlu Energy. This investment is used for Zorlu Enerji's working capital. Only 4 of 41 green loans in the world comply with Garanti BBVA and Zorlu Energy.
5. Halkbank: Offers Green Energy loan, FKA Renewable Energy Loan, FKA Energy efficiency loans. It provides financing to SMEs that are energy intensive and want to generate their energy from renewable energy sources.
6. Turkey Industrial Development Bank: As of 2020, it has become one of the leading banks in the field of green finance in Turkey by applying 290 credits. In this sense, it manages 15% of Turkey's renewable energy part.
7. FKA Renewable Energy Loan: Renewable Energy Loan is provided in cooperation with the French Development Agency and Halkbank. Conditions include being a Hydroelectric Power Plant (HEPP), Wind Power Plant (RES), Solar Power Plant, Geothermal Power Plant, Biomass company. It provides a maximum of 5,000,000 EUR.
8. FKA Energy Efficiency Loan: It focuses on reducing energy costs in enterprises. It is important to increase efficiency in capacity increase. The credit upper limit is 2,000,000 EUR, the number of employees should not exceed 500 and the conditions are required to operate in Turkey.

Result

In order for innovation to be sustainable, the product or activity in question must be environmentally friendly. When looked at, as a result of the conferences held since the 1960s, it has gained importance that production is based on the principles of green economy with the outputs of the Millennium Development Goals, Sustainable Development Goals, Paris Climate Agreement. Achieving sustainable development goals and achieving 2030 sustainability goals will only be possible with the creation and use of sustainable financing opportunities. The strategic importance of sustainable finance issuances is increasing, especially in the fight against the global climate crisis and the transition to a low-carbon economy (Şimşek ve Tunali, 2021). If we can

quickly direct the transfer of capital to a fossil fuel economy towards a low-carbon economic structure, we can avoid destructive global warming and environmental pollution (Silver, 2017:3).

With green finance, both the environment, society and the economy are environmentally friendly, using resources effectively and making investments without destroying the environment. With the green bonds, green loans, green securitization, green stock, green index and green insurance types, which are among the green banking products, both renewable energy investments were supported by the cooperation of international resources and national banks, and companies were financed. As a result, if companies have a project or want to be a part of the future, they follow the procedures and then they are selected as a suitable company to work with and they can benefit from the funds. In fact, what we need are good projects. Cost is no longer a major issue with the support of green loans. The important thing is to develop projects that are attractive, financially and ecologically sustainable. Then the necessary financing is found for this. If companies do their part with strong projects, they will see that financing is not a big problem. These projects are supported. There are international development agencies that are very interested in financing. Therefore, the priority right now is to develop the right, innovative projects.

References

- Aizawa, M. ve Yang, C. (2010). Green Credit, Green Stimulus, Green Revolution? China's Mobilization of Banks for Environmental Cleanup, *Journal of Environment and Development*, 19: 119-144.
- Altunkaya, S.M. ve Özcan, M. (2020). "Yenilenebilir Enerji Yatırımlarının Finansmanında Kullanılabilecek Yeni Nesil Finansman Mekanizmaları".
- Browne, Roland W.Chalon; (2011); "Green Financing: More Than A Trend", <http://www.environmentalleader.com>; July 2011; (Access date: 28.07.2022).
- Climate Bonds Initiative. Green Bond Policy: Highlights from 2017. Available online: https://www.climatebonds.net/files/reports/cbi-policyroundup_2017_final_3.
- Gökçınar, R. E. ve Uyuma, A., (2008) "Rüzgar Enerjisi Maliyetleri ve Teşvikleri"; 2. Ulusal Temiz Enerji Sempozyumu; 17-19 Aralık 2008; s.699-706.
- Güler, O. ve Tufan, E. (2015). "Yeşil Bankacılık ve Yeşil Krediler: Antalya'daki 4-5 Yıldızlı Otel İşletmelerinin Bakış Açıları Üzerine Bir Araştırma". *Anatolia: Turizm Araştırmaları Dergisi*, Cilt 26, Sayı 1, Bahar: 80 - 96, 2015.
- IFC (2021). "Sustainable banking network". Retrieved from https://www.ifc.org/wps/wcm/connect/98ed795e-559a-496c-b76d-b89ddb8c2716/SBN_Brief+20210511.pdf?MOD=AJPERE&S&CVID=nBpj8ZX.
- Kassinis, G. I. ve Soteriou, A. C. (2003). Greening the

Service Profit Chain. The Impact of Environmental, Management Practices, *Production and Operations Management*, 12: 386-403.

Kuloğlu, E. ve Öncel, M. (2015) “Yeşil Finans Uygulaması ve Türkiye’de Uygulanabilirliği”, *Gazi Üniversitesi Sosyal Bilimler Dergisi*. 2 (2). p. 2-19.

Sakınç, Ö. (2020). “Yeşil Bankacılık ve Türkiye Uygulaması”. 19.Uluslararası İşletmecilik Kongresi, Kayseri, Türkiye.

Silver, N. (2017). Finance, society, and sustainability: How to make the financial system work for the economy, people and planet. London: Palgrave Macmillan.

The Sustainability Bond Guidelines (SBG) 2018 https://www.icmagroup.org/green-social-and-sustainability-bonds/sustainability-bond-guidelines-sbg/TSKB_Green/

Sustainable Bond, Allocation & Impact Reporting 2017.

Şimşek, O. ve Tunalı, H. (2021). “Yeşil Finansman Uygulamalarının Sürdürülebilir Kalkınma Üzerindeki Rolü: Türkiye Projeksiyonu”. *Ekonomi ve Finansal Araştırmalar Dergisi*, 2022, 4(1): 16-45.

Turguttopbaş, N. (2020). “Sürdürülebilirlik, Yeşil Finans ve İlk Türk Yeşil Tahvil İhracı”. *Finansal Araştırmalar ve Çalışmalar Dergisi* 12 (22),ISSN: 2529-0029, ss. 267-283

UNEP FI. (2015); United Nations Environment Programme Finance Initiative, Green Financial Products and Services (Report); Canada 2007.

White, M. A. (1996). Environmental Finance: Value and Risk in an Age of Ecology, *Business Strategy and The Environment*, 5: 198-206.

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für angewandte Wissenschaften
Würzburg-Schweinfurt

