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WORKING HERE OR THERE? ASSESSING THE IMPACT OF JOB LOCATION ON SKILL MISMATCH AMONG YOUNG ENTRY-LEVEL WORKERS

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ABSTRACT

The mismatch between the skills acquired by graduates from higher learning institutions and the areas of employment they enter is an important issue and should concern policymakers. This situation reflects inefficiency in the labor market, which can be caused by various factors. Among them may be the oversupply of graduates in a particular field in the labor market, or the expertise obtained not aligning with the needs of the industry. This situation can lead to the problem of skilled workers being underutilized in the labor market. As highly skilled human capital is a crucial input to both innovative activity and economic growth, their movements after graduation can potentially affect the dynamics of local development and therefore deserve thorough investigation.

The main objective of this study is to determine the factors that influence skill mismatch with actual jobs offered among graduates from higher education institutions (HEIs) in Penang. This study adopted a survey approach with 185 university graduates from two public universities in Penang who graduated between the years 2019-2021. Descriptive analysis and logistic regression methods have been used to examine the relationship between salary, job location, and other variables such as family, friends, or hometown to the skill mismatch of these young workers. Results indicate that graduates from programs in Science,

Mathematics, and Computer Sciences, and Engineering can find regular jobs that match their field of study. Interestingly, more than three-quarters of graduates from universities in Penang successfully get jobs under the Skilled Workers category. There are only 21% employed in the semi-skilled category and only 4% in the low-skilled category. Graduates working in the sector in the skilled worker's category receive higher salaries compared to graduates working in semi-skilled and low-skilled categories.

INTRODUCTION

As per the theory of endogenous growth, economic growth is significantly influenced by the knowledge, skills, and technological innovation of the population (Romer, 1990). Furthermore, Naess (2020) acknowledged the pivotal role of human capital in development, stating that it serves as the 'engine of growth'. This effect is particularly associated with skilled labor in the output-production process. Research has shown that skilled human capital usually acquires their knowledge and skills from higher education institutions (HEIs).

According to the UNESCO National Commission Country Report Template - WHEC 2022, there were 1,207,131 students enrolled in higher education institutions (HEIs) across Malaysia in 2021. Out of that number, 590,254 students were enrolled in public universities; 517,580 in private HEIs; 84,566 in polytechnics, and 14,741 in community colleges. The increasing supply of educated and skilled workers is undoubtedly due to the fact that education has been playing a pivotal role in enhancing individuals' productivity and standard of living (Sun et al., 2020).

The role of HEIs is pivotal in providing an adequate high-skilled labor supply. At the same time, the employment demand from the industry needs to be fulfilled by channeling the right workforce needed by industry skill requirements. Having a precise match between the workforce and industry prerequisites indicates efficient labor market interaction. However, reality manifests that friction in the labor market is somewhat inevitable, particularly for the entry-level workforce, which mostly suffers from skill mismatches. This situation creates the issue of over-education, which refers to the extent to which an individual possesses an education level that exceeds the requirements of a particular job (Zakariya, 2013; Zakariya & Md. Noor, 2014). This often results in differences in the cost and benefit for university graduates when choosing their first job. It is therefore essential to explore the underlying motivations and factors that lead to skill mismatch among graduates in Malaysia. However, research on skill mismatch in Malaysia is scarce, with most studies in Malaysia focusing on university graduates' employability (Paramjit Sigh et al., 2014; Samuel & Ramayah, 2016) and soft-skills requirement (Ali et al., 2014).

Conducting a comprehensive investigation into the issue of skill mismatch among young entry-level workers in Penang is essential for several reasons. Firstly, as one of Malaysia's primary economic centers, Penang's economy plays a significant role in Malaysia's overall economic growth. In 2021, Penang recorded the highest GDP growth among all states in Malaysia, indicating a remarkable recovery of economic sectors in Penang after the pandemic crisis. Secondly, despite operating under a "full-employment" condition with unemployment rates below 3%, Penang's labor market faces a persistent shortage of skilled workers. Given the importance of Penang's economy to the performance of the national economy, any ongoing skill mismatch among young entry-level workers could affect growth and economic performance.

LITERATURE REVIEW

Studies on mismatch incidence in Malaysia have focused on graduates, with the main finding being that around 31-35% of graduates were employed in jobs that do

not correspond to their field of study (Lim, 2011). Lim (2011) noted that a large portion of mismatched graduates were from social sciences backgrounds.

Within the realm of demographic factors, gender has emerged as a salient determinant of skill mismatch. Gender has also emerged as a pivotal factor in skill mismatch. Robst (2007) adopted an innovative approach by scrutinizing why men and women accept mismatched jobs in the United States. His study found that men were observed to be more inclined to accept mismatched jobs due to considerations such as remuneration, promotional opportunities, or shifts in career interests.

The literature on over-education shows that having qualifications more than is actually required in a job implies a lower wage than working in an occupation that fits the educational level (Lim, 2011). Over-educated workers also have a lower wage growth rate than adequately educated workers (Verhaest and van der Velden 2013; Naess, 2020). Skill mismatches occur because employers do not have much information about the productivity level of applicants, whereas job seekers may misinterpret job requirements and lack knowledge about job characteristics (Zakariya, 2014). A penalty for skill mismatch is also observed in the case of non-monetary outcomes such as occupational status, such as permanent versus contract employment (Urbanski, 2022).

According to human capital theory (Becker, 2009), an employee's productivity level is directly determined by his or her individual skills. In order to increase their labor productivity, people can invest in human capital such as general education or vocational training. As employers pay their workers according to individual productivity, people's wages will rise depending on their productivity, while productivity is influenced by the level of education and skills.

METHODOLOGY

This study aims to uncover the factors that influence skill mismatch among young entry-level workers in Penang, encompassing job location, salary, and sector type. To achieve this goal, a comprehensive survey with graduates from two public universities in Penang was conducted from December 10th to December 16th, 2022. The main purpose of the survey was to determine the factors that attract graduates from public universities in Penang to stay in Penang to work after graduation. The survey also explored employment characteristics among graduates. Out of 385 responses collected, 185 respondents were used for this study. Descriptive analysis and model testing were used to study the behaviors of graduates and the prevailing labor market conditions in Penang. The study focused on graduates who have first-degree and master's degree qualifications. To design the research questionnaire, this study followed questionnaires that have been used by previous researchers such as Ma et al. (2016) and Sun et al. (2020).

The sample was further restricted due to theoretical reasoning. Graduates who became self-employed in their first significant job or started a second non-constitutive course of studies are excluded from the analyses. Skill mismatch is also based on a subjective measurement for the same reasons as indicated above. An objective assessment of skill mismatch seems to be quite arbitrary, as fields may apply to several different occupations, and one has to decide whether the field of study and a job are related or unrelated.

Based on the ISCED-97 classification (UNESCO, 1997), the field of study as a central independent variable is coded into ten categories: education, arts, humanities, social/behavioral sciences, business/economics, law, science/mathematics, engineering, agriculture, and health/welfare.

RESULTS

Hypothesis 1: The more specific the study program (field of study), the smoother graduates' transition from higher education to work.

This study assumes that graduates who work permanently are those who work based on their graduation qualifications, while those who work on a 'contract, temporary, and part-time' basis are considered graduates who work mismatched with their qualifications. This assumption arises because employers are assumed to be unsure of the suitability of the job with the qualifications of the graduates. Table 1 shows the field-specific risks of having a skill mismatch in the first significant job. Graduates from the field of study "Arts and Humanities" by far have the highest share of employees working in an occupation that does not fit their field of study: 48% of them are mismatched in their first significant job. Verhaest and van der Velden (2013) and Naess (2020) also found that credential mismatch (mismatch between formal education requirements and job requirements) was most common in the arts and humanities.

Graduates with the qualification of "Education" also face strong difficulties in finding an adequate occupation according to their acquired degree. Almost 80% of them cannot use their field-related skills. This factor may be due to the placement factor of graduate teachers, which takes more than a year after their graduation.

Interestingly, graduates from Science, Mathematics, and Computer Sciences (72% have permanent jobs), Services (71% have permanent jobs), and Engineering, Architecture, and Construction (68% have permanent jobs) are quite able to find regular jobs that match their field of study. The degree of the practicability of study contents in certain occupations in the labor market can influence job opportunities for graduates. The more specific the preparation or the narrower the occupational profile of a study program, the less additional training employers have to invest in graduates' job-specific skills. Thus, high occupational specificity should improve the match between employer and employee. Instead, students graduating in more general study programs normally lack specific occupational skills and require more cost-intensive on-the-job training. Thus, they are ranked lower in the labor queue than their peers with specific occupational skills and have more difficulties in finding a (matching) job.

Hypothesis 2: Skilled workers will get higher income compared to semi-skilled and low-skilled workers.

Skill categorization is made based on a MASCO classification, whereas Managers, Professionals, and Technicians are categorized as skilled workers; Clerical, Service, and Sales workers, Skilled agricultural and fishery, Plant and machine operators and assemblers, Craft and trade-related workers as Semi-Skilled; and Elementary occupation as Low Skilled workers. Table 2 shows more than three-quarters of graduates from universities in Penang successfully got jobs under the Skilled Workers category. There are only 21% employed in the semi-skilled category and only four percent in the low-skilled category.

Table 1 shows the field of study and status of employment

Field of Study		Status of Employment				Total
		Permanent	Contract	Temporary	Part-time	
Arts and Humanities	Count	12	7	3	1	23
	% within Field of Study	52.2%	30.4%	13.0%	4.3%	100.0%
Social Sciences and Business	Count	28	9	3	6	46
	% within Field of Study	60.9%	19.6%	6.5%	13.0%	100.0%
Science, Mathematics and Computer Sciences	Count	21	7	0	1	29
	% within Field of Study	72.4% (1)	24.1%	0.0%	3.4%	100.0%
Education	Count	4	8	4	2	18
	% within Field of Study	22.2%	44.4%	22.2%	11.1%	100.0%
Engineering, Architecture and Construction	Count	28	6	4	3	41
	% within Field of Study	68.3% (3)	14.6%	9.8%	7.3%	100.0%
Services	Count	12	5	0	0	17
	% within Field of Study	70.6% (2)	29.4%	0.0%	0.0%	100.0%
Healthcare	Count	5	3	0	0	8
	% within Field of Study	62.5%	37.5%	0.0%	0.0%	100.0%
Total	Count	110	45	14	13	182
	% within Field of Study	60.4%	24.7%	7.7%	7.1%	100.0%

Graduates working in the sector in the skilled worker's category receive higher salary remuneration than graduates working in semi-skilled and low-skilled categories. Table 3 shows the average salary rate of graduates working in the skilled workers category earning an average monthly salary of RM2,946, followed by semi-workers RM2,029, and low-workers RM1,730.

Table 2 shows the type of jobs with skill categorization based on MASCO classification

	Frequency	Percent	Valid Percent	Cumulative Percent
Managers	10	5.4	5.4	5.4
Professionals	75	40.5	40.5	45.9
Technicians	54	29.2	29.2	75.1
Clerical	9	4.9	4.9	80.0
Services (salesman)	27	14.6	14.6	94.6
Traders	1	.5	.5	95.1
Machine operators	2	1.1	1.1	96.2
Elementary occupations	7	3.8	3.8	100.0
Total	185	100.0	100.0	

Table 3 shows the mean salary by type of occupations

	N	Mean monthly salary	Std. Deviation	Mean monthly salary	Minimum	Maximum
Managers	10	2,900.00	1241.86	2,946.00	1100.00	5000.00
Professionals	75	3,063.40	1495.19		1000.00	10000.00
Technicians	54	2,790.92	861.79		1500.00	5500.00
Clerical	9	1,944.00	615.56	2,029.00	1500.00	3296.00
Services (salesman)	27	2,119.25	745.14		1000.00	3500.00
Traders	1	1,730.00	.		1730.00	1730.00
Machine operators	2	1,350.00	212.13		1200.00	1500.00
Elementary occupations	7	1,730.00	278.62	1,730.00	1500.00	2200.00
Total	185	2,706.60	1217.67		1000.00	10000.00

Hypothesis 3: Factors influencing skill mismatch among graduates in Penang.

To determine the factors influencing skill mismatches, this study conducts Logistic Regression Analysis of Skill Mismatch Among Graduates. As shown in the Logistic regression (Table 4), the impact of INCOME is prominent ($p = 0.000 < 0.05$). Graduates who work in sectors offering higher income are less likely to experience skill mismatches (negative sign). Additionally, the effect of JOB LOCATION is significant. A city with a good standard of living attracts larger inflows of university graduates and can offer them jobs suitable to their qualifications. However, the influence of the job sector and demographic factors (age and gender) is not significant.

In line with Penang's position as a state with many industries and tourist attractions, the industrial sector and tourism sector in Penang are able to offer jobs to graduates in accordance with their qualifications.

Table 4 shows the Logistic Regression Analysis of Skill Mismatch Among Young Entry-Level Workers (graduates)

N=185	B	S.E.	Wald	df	Sig.	Exp(B)
Income	-3.439	0.673	26.075	1	0.001	0.032
Job Location (1-Penang, 0-Outside Penang)	-0.749	0.416	3.236	1	0.072	0.473
Job Sector (1-Service Sector, 0-Other Sectors)	0.459	0.426	1.163	1	0.281	1.582
Age (1 - 21 until 29 years old, 0 - Others)	-0.893	0.893	1.000	1	0.317	0.409
Gender (1 - Male, 0 - Female)	-0.514	0.434	1.402	1	0.236	0.598
Constant	26.577	5.461	23.688	1	0.001	3.487E+11

CONCLUSION

The characteristics of the sample reveal that graduates from 'soft fields' such as Arts and Humanities are predominantly disadvantaged at labor market entry. In comparison to 'hard fields' programs such as Science, Mathematics, Computer Science, and Engineering, they take longer to find their first significant job, are more often over-educated, and have a higher risk of being mismatched in this first occupation.

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WILL HIGHER WAGES BENEFIT THE ECONOMY? THE EFFECTS OF LABOR INCOME SHARE ON MACROECONOMIC VARIABLES IN MALAYSIA

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ABSTRACT

In Malaysia, household expenditure drives about 60% of the economy. This suggests that increasing aggregate demand is crucial for economic growth. As demand is a function of labor income, raising the latter puts more money into the pockets of consumers, which eventually facilitates feedback effects on the goods and factor markets and potentially triggers macroeconomic structural changes. Having these effects in hand raises a concern on the extent to which the increase in labor income could influence selected macroeconomic variables, such as shadow economy, female labor force participation rate, technology, labor productivity, foreign workers, and skilled-related underemployment. These are some structural issues pointed out in the Twelfth Malaysia Plan (2021-2025). In the pursuit of achieving targets to increase labor income to GDP from 37.1% in 2020 to 40% by 2025, this paper attempts to examine the impact of labor income on the selected macroeconomic variables using annual data from 2005 to 2021 and employing the Ordinary Least Square (OLS) with robust standard error due to Newey-West procedure. Our results indicate that the labor income could boost female labor force participation rate, labor productivity, and technological innovation. Meanwhile, it is also found that increase in the labor income could dampen the prevalence of shadow economy, skilled-related underemployment, and dependency on foreign workers at various skill levels. Therefore, a policy

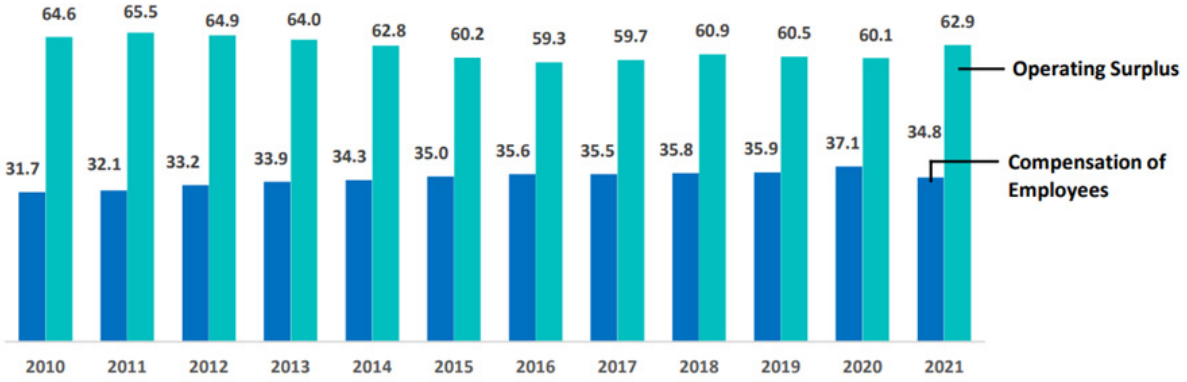
that targets improving labor income could have greater potential to solve various structural issues inflicted on the nation for decades. Whilst the present study provides empirical evidence on the macroeconomic perspective, it is of great importance for the policy makers to gauge a deeper understanding on such effects at the microeconomic side.

INTRODUCTION

The national account identity reveals the equality of national income or Gross Domestic Product (GDP) with respect to production, expenditure, and income approaches. The latter approach is seldom given research attention due to limited information. It is perceived that the total income of the nation is essentially shared by labour and capital owners (employers). Income received by labour is measured by compensation of employees (CE), also known as labour compensation. Whereas, income for capital owners is represented by profits, rents, and other forms of income generated by enterprises, which are also known as operating surplus (OS).

In Malaysia, the share of compensation of employees (CE) to GDP is considerably low, despite an increase from 31.7% in 2010 to 35.9% in 2019, as shown in Figure 1. The federal government aims to increase this share to 40% by 2025, as targeted in the Twelfth Malaysia Plan (12th MP). Though it may seem like a far-reaching goal, when compared to other countries such as Germany (53.4%), the United Kingdom (48.7%), Australia (47.2%), the Republic of Korea (47.5%), and Singapore (39.9%) in 2019, Malaysia's share of labour compensation is relatively low.

Figure 1: Share of compensation employees and operating surplus to gross domestic product, 2010 - 2021 (%)



Source: Department of Statistic Malaysia (2022)

The low share of compensation of employees (CE) in Malaysia is related to the structural issues faced by the country. As stated in the 12th Malaysian Plan (RMKe-12) document, untapped female participation, a high dependency on low-skilled foreign workers, and skill mismatches are some of the structural issues that can contribute to low wage distribution among local workers in Malaysia. Since 60% of total household incomes come from employee wages, the low share of CE could lead to increased income inequality between workers and employers. This situation is exacerbated when the world is hit by events like COVID-19, leading to more workers becoming unemployed and businesses ceasing operations. Therefore, interventions are needed to ensure that workers receive an equitable share of the distribution based on their productivity, thereby boosting overall company production.

This study attempts to assess the impact of labour income on selected macroeconomic variables, particularly pertaining to the core structural issues in Malaysia. It is important

to empirically assess the impact because understanding the relationship between labour income and these variables can provide further insights into potential policy measures that can address the challenges posed by the aforementioned structural issues and promote economic stability and equity in the country.

LITERATURE REVIEW

Cross-country studies (Lupu et.al, 2022) shows that increment in wage will generate more income to businesses. Study made by Lupu et. al, 2022 shows that there is a positive correlation between GDP growth and wage growth in Eastern European countries. As GDP increases, wages also tend to increase, suggesting that economic growth drives wage share. However, these impacts are mostly short-term and only supported in some European countries to catch up with the Western states. Meanwhile, other studies such as Growiec, et. al, 2018, Ibarra and Ros 2019, Abreu and Lopes, 2021 had also made a study on the relationship between wages share and economic growth with positive correlation. This is because, the higher the wages obtained by workers, the more they will spend, thus increasing the profit of the firm and its output.

In Malaysia, there are not many studies that have been made on understanding the increment in wage on the economy. The Department of Statistic had published the trend of the Malaysian salary and wage data from 2011 to 2019, which shows that Malaysia compensation of employees (CE) had remained positive but has a very low percentage share to GDP. This is caused by the low value-added and labour-intensive industries in Malaysia. Moreover, a study from Bank Negara Malaysia (BNM) on the outlook and policy in 2021 states that prevalence of the low-cost production model and high dependence on low-skilled foreign workers discourages productivity enhancements, and depresses wages from the observing the trend of wages, productivity through value-added per worker and size of non-citizen by sectors. The discourse on wages has been a persistent subject among private sector employees, featuring prominently in government initiatives such as the 12th Malaysia Plan, as well as in discussions within various ministries.

However, from an empirical analysis point of view there are a limited number of studies made to investigate the relationship between macroeconomic indicators and labour share. A study from Growiec J., 2012 used panel data to identify the determinants of labour share. The empirical findings shows that sector-specific factors, ownership structure, human capital, labour market characteristics, and firm demographics contribute to the growth of labour share. Furthermore, empirical studies on wage share and economic growth had also been made by Karabarbounis and Neiman, 2014, and Charpe, Bridji, and McAdam, 2019 that focuses in developed countries. Hence, this study aims to bridge the empirical analysis gap by evaluating the influence of labour share on macroeconomic indicators in Malaysia, this study will also provide valuable insights for policy development aimed at enhancing wage distribution in Malaysia.

METHODOLOGY

In a stochastic econometric model, the macroeconomic variables are determined randomly based on the study of Kindler. A, Golo. N, and Solomon. S on the Stochastic Agent-Based Simulation of the Role of Labor in the Economy, where the macroeconomic variables are chosen based on the discussion from academic and economics practitioners as stated in the RMKe-12. The model is as follow;

$$\mathrm{Macro}_{jt} = \alpha_0 + \alpha_1 \mathrm{CoE}_t + \varepsilon_t$$

where Macro_{jt} is the dependent variable represented by six macroeconomic indicators, which are woman labour force participation rate, labour productivity, technology adoption, shadow economy, skill mismatch and the low-skill foreign workers. COE_t is the compensation of employees. The error term, e_t, is assumed

to has zero mean and constant variance. The parameters are elasticities that suggest the response of $Macro_{jt}$ with changes in COE_t. All variables are transformed into logarithm.

Technology adoption is measured by component of total patent applications by both non-residents and residents (pattot), research and development expenditure to GDP (rndy), number of researchers in R & D (rndpc), number of scientific and technical journal articles (journal), number of technicians in R & D (techy), and total trademark applications by both non-residents and residents (tmtot). Technology Index is computed as log((0.145694*pattot) + (0.172612*rndy) + (0.175956*rndpc) + (0.163893*tmtot) + (0.176246*journal) + (0.165598*techpc)).

Whereas, skill-mismatch is computed by calculating the skilled workers working in semi- and low-skilled jobs. The skilled workers are categorized by education level, where workers who have a diploma, degree and above are categorized as skilled workers. While semi and low-skilled jobs are categorized by 1 digit MASCO, where occupations from digit 4 to 8 are categorized as semi-skilled workers and digit 9-elementary occupations are categorized as low-skill workers. The presence of skill mismatches indicates instances where skilled workers are not fully utilizing their capabilities, leading to a situation of underemployment.

Data for woman labour force participation rate, labour productivity, low-skilled foreign workers, employed person by education level and occupations by 1 digit MASCO were compiled from the Department of Statistics Malaysia; while data on total patent applications by both non-residents and residents, research and development expenditure to GDP, number of researchers in R & D, number of scientific and technical journal articles, number of technicians in R & D, and total trademark applications by both non-residents and residents were collected from the World Development Indicators available at the World Bank database. Shadow economy measures were estimated using the Modified Currency Demand Deposit Ratio (MCDR) approach and the estimates by World Bank using Computable General Equilibrium (CGE) and Multiple Indicator and Multiple Causes (MIMIC) approaches.

To estimate the above model, we employ the Ordinary Least Square (OLS) with robust standard error. To do this we estimate using the Newey-West approach that is correct for both autocorrelation and heteroscedasticity.

FINDINGS

Study from Growiec J. (2012) stated that labour market condition, market structures and firm demographics plays an important role in determining the labour share, which in other words is the share of compensation of employees to GDP. These factors are similarly observed in this study, where the labour market condition refers to the woman labour force participation, shadow economy, skilled mismatch and low-skilled foreign workers. While the market structure and firm demographic can be referred to the labour productivity and technology adoption in the firm level of the country. Our study findings are aligned with the findings by Growiec J (2012), corroborating the trends identified in prior research.

From the analysis, it is found that all of the macroeconomic variables significantly correlate with the CoE as seen in Table 1 at 1% level of significance. Women labour force participation rate, labour productivity, and technology are positively correlated with the changes of labour share at 1.1%, 2.2% and 3.7% respectively for every 1% in CoE. Therefore, the higher the share of labour compensation to GDP, the higher the participation of women in the labour force, labour productivity and adoption of technology in the industry. In addition, each of these variables exhibits a robust correlation with the labour share, exceeding 50%.

Whilst, the shadow economy, skill mismatch, and the presence of low-skilled foreign workers exhibit an inverse association with the Compensation of Employees (CoE) with elasticities of -0.5, -2.7, and -2.3, respectively. This implies that a 1% increase in the labour share will decrease the size of the shadow economy at 0.5%, indicating a positive transformation of the industry from non-taxable to taxable. Moreover, increasing in the CoE will also decrease skill mismatch by 2.7% and the use of low-skilled foreign workers by 2.3%, thereby enhancing the overall economic output of the country.

Table 1: Results of impact of COE on Macroeconomic variables

Models	Constant	Macroeconomic indicators	Adjusted R-square
1. Woman labour force participation rate	-0.1082***	1.1495***	0.9075
	(-0.3943)	(14.8215)	
2. Labour productivity	-3.4973***	2.2416***	0.6716
	(-2.1454)	(4.8638)	
3. Technology	-13.0702***	3.7385***	0.7331
	(-5.1816)	(5.2423)	
4. Shadow economy	5.2653***	-0.5473***	0.8091
	(14.7515)	(-5.3375)	
5. Skill mismatch	23.1186***	-2.7453***	0.4878
	(9.8216)	(-4.3793)	
6. Low-skilled foreign workers	21.2295***	-2.3234***	0.3091
	(7.1548)	(-2.9404)	

Notes: Asterisks ***, ** and * denote statistically significant at 1%, 5% and 10% level, respectively. denotes adjusted R-squared. All variables are in logarithm. Dependent variables are women labour force participation rates (lfpr); technology indices (innovation), labour productivity, measures of shadow economy (shadow), skilled mismatch and low-skilled foreign workers. All models have been estimated using OLS with robust standard error due to Newey and West (1987) that correct for both autocorrelation and heteroscedasticity. Variable CoE denotes compensation of employees and woman labour force participation rate denotes female labour participation rate estimated by DOSM. Labour productivity is computed by deflating real GDP with total employment in Malaysia. Technology index is computed as log((0.145694*pattot) +(0.172612*rndy)+(0.175956*rndpc)+(0.163893*tmtot)+(0.176246*journal)+(0.165598*techpc)). Shadow economy measures were estimated using Modified Currency Deposit Ratio (MCDR) approach and estimates by World Bank (using Computable General Equilibrium (CGE) and Multiple Indicator and Multiple Causes (MIMIC) approaches. Skilled mismatch is estimated through identifying the skill worker (worker with tertiary education) working in semi- and low skill jobs (based on MASCO classification). Low-skilled foreign workers are obtained from DOSM.

Therefore, these findings highlight the need to increase the wage for workers. As higher labour compensation is found to be the answer for some of the structural issues in Malaysia. Among the structural issues are low labour force participation rate (LFPR), inequality in income distribution as well as slow rate of technological innovation and adoption. The implication of this study can be used for some policy intervention. From the data analyzed in Table 1, the conclusion for each variable is explain as follows;

Higher wages attract more woman in the labour force

Firstly, higher wages attract more women in the labour force. When labour shortages arise, offering higher wages tends to attract more women to join the workforce, as indicated by empirical data. These findings emphasize the importance of a wage-focused policy approach in achieving the targeted women's labour force participation rate of 57.0% by 2025 under the Twelfth Malaysia Plan.

Higher wages promote technological adoption

Adopting technology in the production process is a way to increase output by optimizing the use of production inputs such as labour and energy (Maneejuk and Yamaka, 2020). Technological adoption is found to complement the demand for skilled workers that help to increase wages. The empirical assessment as shown in Table 1 indicates that adoption to technology leads to higher labour compensation and higher skilled workers. Thus, firms must be willing to share their wealth by increasing wages that commensurate with higher skills.

Higher wages improve economic efficiency by reducing the size of shadow economy

Shadow economy includes all market-based legal production of goods and services that are deliberately concealed from public authorities to avoid payment of taxes and social security contributions as well as to avoid complying with labour market standards and administrative obligations (Schneider, 2011). The size of the shadow economy in Malaysia for the period of 2010-2019 is estimated at approximately 21.2% of GDP. Shadow economy creates economic inefficiencies as it could potentially reduce government tax revenue, cause a fragmented labour market and lower economic growth. Increasing wages will possibly decrease the size of shadow economy.

Higher wages promote labour productivity growth

Productivity growth is the primary determinant of an economy's long-term growth and higher wages. If an employer is willing to share the wealth by raising wages, employees will consistently exert extra efforts in response to higher wages, in line with the so-called "efficiency wage" theory (Riley and Bondibene, 2017; Georgiadis, 2013). Workers, therefore, may be more motivated to work with higher pay that subsequently contributes to higher productivity. The analysis in Table 1 confirms this expectation, showing that productivity tends to expand by 2.2% for every percentage increase in wage.

Higher wages reduce the dependency on low-skilled foreign labour

According to the Department of Statistic Malaysia (DOSM), low-skilled foreign workers in Malaysia in 2021 made up about 8.0% or 1.2 million persons of the total employments, of which almost 91% of them occupied the low-skilled and semi-skilled employments. The economic costs of extensively relying on low-skilled foreign workers in Malaysia are well documented in the literature, which highlighted the high reliance of low-skilled foreign workers would suppress the domestic wage growth and adversely affect productivity growth (Bank Negara Malaysia, 2018). The empirical analysis as explained in Table 1 indicates that the size of low-skilled foreign workers can be reduced by 2.3% for every percentage increase in labour compensation. The results suggest that wage adjustment is the most effective market-based price mechanism to be used as a policy tool to reduce the dependency on low-skilled foreign workers.

Higher wages reduce the size of skill mismatch

Skills-related underemployment is a condition where workers hold skills or qualifications higher than that required to perform their jobs. Indirectly the skill-related underemployment

can be portrayed as the indicator for the skill underutilization which measures those workers with tertiary education and working in the semi- and low-skilled occupations. In 2021, the skill-related underemployment increased by 6.3% to record 1.9 million workers compared to 1.8 million in 2020 (DOSM, 2022b). Persistent instances of skills-related underemployment in Malaysia, akin to unemployment, signify a structural issue (Zakariya, 2014). Addressing this challenge is crucial, as sustained underemployment hinders the full realization of workers' potential, particularly for those with higher skills engaged in lower-skilled jobs, where increased labour compensation, as indicated in Table 1, could potentially reduce skills-related underemployment by 2.7% for every percentage point increase. This finding underscores the potential of wage-focused policy interventions to stimulate automation, technological upgrading, and heightened demand for skilled occupations, ultimately mitigating skills-related underemployment (Lee and Wie, 2015).

CONCLUSION

In conclusion, there is a need to increase the wages of workers, especially after COVID-19 pandemic as price increases and job loss is higher. From the workers' perspective, an increase in wage is necessary to compensate for the higher prices of goods and services. Generally, employers claimed that wage increases could inflate prices, leading to market distortions that could pose a threat to the economy. Nevertheless, cross-national investigations, exemplified by Lupu et al. (2022), indicate that an increase in wages correlates with a subsequent augmentation in business income—a trend substantiated by our empirical discoveries.

As two-thirds of household income is generated from the labour market, changes in wages can have a positive impact on the economy as well. This is because households provide labour input to the economic sector and receive wages in return. The more wages earned, the higher consumption of goods and services, hence generating additional profits for the business sector.

Therefore, this study has provided some insights to the possible scenario when wages are adjusted higher than the current rate. The empirical analyses clearly show the role of higher wages in addressing pertinent structural issues such as women participation in the labour market, technological adoption, shadow economy and skills-related underemployment. However, it is still crucial to have a thorough comprehension of the various aspects that come with higher income, for example social mobility, income inequality, and sustainable development. Thus, more dedicated studies on the possible impact from the multidimensional aspects of wages are needed, as Malaysia aspires to become a high-income economy.

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MATCHING SKILLS TO CAREERS: THE IMPACT OF HUMAN CAPITAL ON JOB ALIGNMENT IN MALAYSIA

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ABSTRACT

This study examines the impact of human capital factors on job-matching outcomes among Malaysian employees, emphasizing the roles of work experience and educational attainment. Utilizing a logistic regression model, the analysis reveals that both work experience and tertiary education significantly reduce the likelihood of job mismatches. The findings highlight the importance of employers offering adequate rewards, recognition, promotion opportunities, and work-life balance to enhance job satisfaction and retain employees. Additionally, the study underscores the critical role of tertiary education in preparing employees for the evolving demands of the Fourth Industrial Revolution (IR4.0). Despite its contributions, the study acknowledges a limitation in not capturing the specific educational programs studied by employees, suggesting this as a direction for future research.

INTRODUCTION

The Malaysian economy has successfully transformed from an agriculture-based to an industry and service-based economy over the past several decades. This shift in economic structure and diversification of industrial activity has led to changes in the composition of trade and investment. Historically, Malaysia was one of the world's main producers and exporters of commodities such as rubber and palm oil. However, with the onset of its

industrialization strategy, the manufacturing sector has emerged as a critical driver of the country's growth, development, and export earnings. The manufacturing activities include rubber and oil palm processing, electronics, smelting, logging, and timber processing. Today, Malaysia is one of the world's leading producers and exporters of electrical appliances, electronic parts, and components.

With initiatives under the Sustainable Development Goals (SDGs) and the "Environmental, Social and Governance" (ESG) framework, the world is moving towards a greener economy, a more equal society, and better governance (Har, Kee, Lee, & Low, 2022). Regarding sustainable development, income inequality remains a persistent challenge for policymakers and academics, but it has only recently been connected to the green economy. Income inequality is often a consequence of job mismatches. Har et al. (2022) found that achieving the three goals of low inequality, a green economy, and excellent governance is very challenging, especially for middle-income countries. Among these countries, the transition to a green economy has a statistically insignificant effect on income disparity between the highest and middle quantiles, but it is detrimental among the lowest quantiles.

This study focuses on the labor market and employees' perspectives. Recent labor market statistics indicate an expansion, with the labor force increasing by 28.4% from 2010 to 2021. In 2021, Malaysia's labor force stood at 15.7 million. The number of employed persons followed a similar trend, increasing by 26.6%. Despite the increase in employment, the unemployment rate in Malaysia was at its highest at 4.6% in 2021, compared to 2.9% in 2014. Another important issue is underemployment. Skill-related underemployment increased from 32.2% in 2015 to 37.4% in the fourth quarter of 2022, while time-related underemployment rose from 1.9% in 2015 to 2.4% in the fourth quarter of 2020 (Department of Statistics Malaysia, 2022).

The expansion in the education sector is evident with the significantly larger number of graduates entering the labor market (5.61 million persons in 2021 compared to 4.28 million in 2016) (Ministry of Higher Education, 2022). Employers now face difficulties in matching the right talents with their vacancies (Lee, 2022). Various organizations and agencies, such as Talent Corporation Malaysia Berhad (TalentCorp) and the Human Resource Development Corporation (HRDC), have been established by the Malaysian Ministry of Human Resources (MOHR). Through their efforts in reskilling and upskilling programs, Malaysia has shown an ability to address unemployment (Azalea Azuar, 2022). However, the biggest issue now is not unemployment but the mismatch of talents.

RESEARCH OBJECTIVE

The objectives of this study are as follows:-

i) To investigate the extend of job mismatch among Malaysian employees, and

ii) To examine the impact of human capital factors on the probability of job-matching outcomes.

METHODOLOGY

Research has primarily focused on the impact of job mismatches on factors such as wage equilibrium (Kim & Choi, 2018; Mateos-Romero & Salinas-Jiménez, 2018; Veselinovic, Mangafic, & Turulja, 2020; Zhu, 2014) and job satisfaction (Kim & Choi, 2018; Mateos-Romero & Salinas-Jiménez, 2018). Our study provides a unique context to examine how human capital factors are linked to the occurrence of job mismatches. This study involves 347 Malaysian employees in a questionnaire survey. Guided by the Human Capital Theory by Becker (1961) and Sweetland (1996), this study includes human capital variables such as work experience, educational attainment, and rewards. Gender is employed as a control variable.

Work experience is measured in years. Educational attainment is classified as either "with tertiary education" or "without tertiary education." Rewards refer to the number of rewards provided by employers. Gender is categorized as either "male" or "female." This study employs a logistic regression model to examine the impact of human capital factors on the probability of job-matching outcomes.

FINDINGS

Table 1 shows the summary statistics in this study. Among the Malaysian employees (n=347) involved in this study, 42.4% (n=147) were considered mismatched in their jobs. In the qualification mismatch category, 61.9% (n=91) were male, while 38.1% (n=56) were female. Regarding marital status, the percentage of respondents who had not yet married (53.1%) was slightly higher compared to respondents who were married (46.9% or n=69). Examining educational attainment, about 70% (n=240) of the respondents had tertiary education. Among the same group, 93% (n=186) were not experiencing job mismatches. The Chi-square test analysis shows that gender (p-value = 0.022) and educational attainment (p-value = 0.000) were associated with job matching.

Table 1 Summary Statistics

		Mismatched	Matched
Gender	Female	56 (38.1)	101 (50.5)
	Male	91 (61.9)	99 (49.5)
Ethnicity	Chinese	48 (32.7)	66 (33.0)
	Malay	77 (52.4)	114 (57.0)
	Indian	20 (13.6)	19 (9.5)
	Others	2 (1.4)	1 (0.5)
Educational Attainment	Without Tertiary Education	93 (63.3)	14 (7.0)
	With Tertiary Education	54 (36.7)	186 (93.0)
Looking for Job Switching	Not Looking for Other Jobs	100 (68.0)	131 (65.5)
	Looking for Other Jobs	47 (32.0)	69 (34.5)
Marital status	Not Yet Married	78 (53.1)	107 (53.5)
	Married	69 (46.9)	93 (46.5)

Source: Authors own estimates

Note: *Figures are frequencies; percentages and p-values are in parentheses; n=347*

Our regression analysis focuses on the impact of human capital factors on job-matching outcomes. Table 2 presents the logistic regression results. The findings show that work experience and educational attainment are negatively associated with job mismatch and can significantly influence job-matching outcomes. For every year's increase in work experience, the odds ratio is 0.964. This indicates that with every year's increase in work experience, Malaysian employees are 1.03 times less likely to have a job mismatch (1/0.964). Employees with more experience may have higher self-awareness and a deeper understanding of job demands, such as skills, knowledge, and qualifications. Over time, they become more familiar with their job roles and career paths, accumulating a wide range of skills and expertise. Hence, their knowledge and ability to learn from past experiences can reduce the likelihood of a job mismatch.

Additionally, for Malaysian employees with tertiary education, the odds ratio is 0.260. This shows that Malaysian employees with tertiary education are 3.85 times less likely to experience a job mismatch (1/0.26). Tertiary education provides specialized knowledge and skills relevant to their field of study. With this relevant knowledge and these skills, Malaysian

employees are more likely to secure jobs that align with their educational background. Another key point is that employers may prefer hiring individuals with higher education qualifications, assuming that these qualifications provide individuals with greater competitiveness and a higher ability to perform their tasks.

Table 2 Logistic Regression Results

	Coefficient	Standard Error	Wald	Exp(B)
Gender (Male)	.267	.258	1.079	1.307
Working experience (in years)	-.037	.016	5.457	.964**
Education Attainment (With tertiary education)	-1.348	.258	27.318	.260*
Number of benefits	-.038	.084	.211	.962
Constant	1.945	.690	7.951	6.992

Source: Authors own estimates

*Note: Male as the reference group for gender; "with tertiary education" as the reference group for education attainment; n = 347; * significant at 1% level; ** significant at 5% level*

CONCLUSION

The current study provides essential practical implications. The findings reveal that human capital factors, including work experience and educational attainment, are crucial for individuals to remain relevant in the job market. These results underscore the importance of employers protecting the well-being of their employees by offering rewards and benefits, recognition, promotion opportunities, and work-life balance to enhance job satisfaction and, consequently, retain them in the organization. Otherwise, employees may consider switching organizations and experience job mismatches due to irrelevant work experience in their new jobs.

Additionally, the findings of this study highlight the importance of tertiary education. As Malaysia enters the era of the Fourth Industrial Revolution (IR4.0), many ways of work are changing. Job applicants are encouraged to enhance their skills and acquire relevant competencies before joining the job market. Higher education institutions need to offer programs and curricula that prepare future-ready talent.

Despite these important implications, the main limitation of this study is the data collection, which did not capture the specific programs studied by Malaysian employees. Future research should consider including this information to provide a more comprehensive analysis of the human capital factor from an educational perspective.

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THE EVOLUTION OF INTELLECTUAL PROPERTY TRADE RESEARCH

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ABSTRACT

As an important growth point of the world economy, intellectual property trade is closely related to the division of labor and benefit distribution in the global value chain, and has become an important tool for countries to seek international competitive advantages. However, no systematic literature review has been made on intellectual property trade research. Taking the related research on patents as the object of trade as the research object, this study makes a literature review of the current situation and evolution of intellectual property trade, and its influencing factors. It can be concluded that since the 1980s, the global intellectual property market has expanded with increased transaction scale and international patent technology transactions. Developed countries dominate the market, while China and other emerging countries have risen. The influencing factors include intellectual property protection, economic scale, and geopolitics, amongst others. International protection is essential, and the degree of protection is related to the level of national development. The study found that the current literature on intellectual property trade is far from extensive and in-depth, and there needs to be a scientific framework and system for the research on the theoretical basis and influencing factors.

INTRODUCTION

The intellectual property regime is the product of modern science and technology development and the commodity economy. Intellectual property has become the core element of international competitiveness and a significant global trade resource in economic globalization. It is also an essential part of international service trade. In the era of economic globalization, international cooperation and knowledge sharing are the general trend (Analysis Group on International Balance of Payment of SAFE 2021, 47). Intellectual property trade is the transnational exchange of knowledge and technology. Unlike the global trade in goods, the trade in intellectual property rights has emerged with the development of international technology trade. The World Intellectual Property Organization (WIPO) has issued a report every two years since 2011, focusing on the global innovation pattern and intellectual property trade.

From the content, international intellectual property trade can be traced back to the end of the 19th century and the beginning of the 20th century, when transnational licensing trade was more widespread (Xie 1994, 25). However, the intellectual property trade on a particular scale only developed in the 1960s. The research on intellectual property trade began in the 1970s. The first concern is the transfer of military technology, such as the United States with Japan (Hall, 1970), and the United States with the former Soviet Union (Sandberg 1991). Then, scholars focused on the strategy and mechanism of technology transfer from developed countries to developing countries through transnational corporations (Egea 1975).

At present, the first known document using the term "intellectual property trade" was found in Chen Changbai's book *International Intellectual Property Trade* in 1994 (Cheng 1994). Subsequently, in 1996, He Qiongjun published *The Resource Allocation Mechanism of Intellectual Property Trade* in the South China Journal of Economics (He 1996), but none of them defined intellectual property trade. In 2000, Xue Hong published *Conflict and Regulation: Legal Conflict of Intellectual Property Trade in the Network Environment* in Intertrade, which defined intellectual property trade for the first time:

> *International Trade in intellectual property is mainly manifested in the cross-border circulation of copyright products such as films, audio recordings, and computer programs, as well as the transfer or licensing of patents and trademarks related to technology introduction and capital introduction.*(Xue 2000, 52)

Five years later, Li Hao published *On Our Country's Intellectual Property Rights Trade: Problems and Countermeasures* in the Journal of International Trade (Li 2005), in which intellectual property trade is divided into a narrow and broad sense according to the definition of intellectual property rights in the Agreement on Trade-Related Intellectual Property Rights of the World Trade Organization (WTO):

> ***In a narrow sense**, intellectual property trade refers to the trade with intellectual property as the subject matter, mainly including intellectual property licensing, intellectual property transfer, and other contents, that is, a kind of trade behavior between enterprises, economic organizations, or individuals that sell or purchase the right to use intellectual property from each other according to general business conditions. **In a broad sense**, it also includes the trade of intellectual property products, which refers to the trade of products containing intellectual property rights (intellectual property products, intellectual products), especially high-tech products with high added value and high-tech technology, such as integrated circuits, computer software, multimedia products, video products, audio-visual products, literary works, etc.* (Li 2005, 118).

LITERATURE REVIEW

Evolution Trend of Intellectual Property Trade

Since the 1980s, one of the results of the in-depth development of the knowledge economy has been the vigorous development of the intellectual property market (Ashby 2009, 470) . The number of countries participating in global technology creation and technology transactions through the intellectual property market is growing (Suma and John 2007, 210), the transaction scale is expanding rapidly, and the proportion in the service industry is steadily increasing. WIPO statistics show that the volume of international technology trade among countries around the world, mainly in the form of licensing trade of patented technology, was US$2 billion in 1965, US$11 billion in 1975, US$50 billion in 1985, increased to US$250 billion in 1995, exceeded US$650 billion in 2000, and doubled in less than five years on average (Ye and Zhao 2008, 53). From 1980 to 1990, the growth rate of global intellectual property expenditure was 8.7%, and the revenue growth rate was 7%. From 1990 to 2003, the expenditure growth rate was 9.8%, and the revenue growth rate was 5.6%, higher than the global GDP growth rate of 3% in the same period (Ashish and Alfonso 2010,778). According to UNCTAD data, the world service trade in royalties and licensing fees increased from US$114.4 billion in 2003 to US $ 268 billion in 2012, with an average annual growth rate of 14.5% and 91% (Liu and Li 2016, 135). In 2015, the global trade revenue of intellectual property rights reached US$323.3 billion, making an increasingly obvious contribution to the development of the world economy (Wang and Gao 2021, 13). In addition, the proportion of start-ups making profits through intellectual property licensing and transfer has increased, and the number of companies and institutions specializing in intellectual property market intermediaries has also increased (Zhao and Du 2013, 154).

The distribution of international intellectual property trade is extremely unbalanced. Developed countries account for 80% of the world's intellectual property trade. The United States, Britain, Germany, France, and Japan account for more than 90% of developed countries' intellectual property trade volume. 85% of the global intellectual property trade is conducted among developed countries (Ye and Zhao 2008, 54). The proportion of developing countries and emerging economies in world intellectual property trade has increased rapidly, with some countries from Asia playing the most prominent role. The proportion of China, South Korea, ASEAN (Singapore, Thailand, Indonesia, and the Philippines), and India in international intellectual property trade has steadily increased from 5% in the mid-1990s to 12.4% in 2010, with Singapore accounting for 4.1%, China (including Hong Kong and Macao) 3.8%, and Korea 2.8% (Zhao and Du 2013, 154).

a. International Competitiveness of Intellectual Property Trade

The existing research on the competitiveness of intellectual property trade is mainly based on Trade Competitiveness Index (TC Index), Revealed Comparative Advantage Index (RCA Index), International Market Share (IMS) and other indicators, focusing on the development of intellectual property trade in the United States of America (US) and China.

Compared with the trade in goods, there has always been a surplus in the international trade of intellectual property rights in the US. With the rise of emerging economies and the increase of innovation sources, the dominant position of the US in the international trade of intellectual property rights weakened, and its competitiveness has declined, with the Trade Competitiveness Index decreasing from 0.68 in 1990 to 0.51 in 2012 (Zhao and Du 2013, 155). The relative decline of the US intellectual property trade competitiveness index stems from the profound changes in

the pattern of world intellectual property trade. Since the global economic crisis, the prominent feature of the international trade of intellectual property rights in the US is that the Asia Pacific region has become the most intensive region in using American intellectual property rights. In addition, the proportion of emerging economies in the American intellectual property market has increased significantly. In 2011, the Asia Pacific region's intellectual property exports in the US reached 48%, surpassing Europe for two consecutive years and becoming the largest intellectual property market in the United States (Zhao and Du 2013, 157).

From the perspective of the product structure in the international intellectual property market, the intellectual property categories with the largest proportion in the US intellectual property exports are industrial technology, general software, and film and television. The changing trend of the proportion of the three is that the proportion of industrial technology is stable at 1/4, the proportion of general software continues to increase from 1/4, and the proportion of film and television continues to decline. The change in the structure of intellectual property trade reflects the characteristics of the change in the economic structure of the United States to some extent. On the one hand, the US has maintained the core competitiveness of the industrial economy era and is still the source of industrial technology output. On the other hand, the economy has gradually turned to the information economy characterized by the Internet and software and has become the center of the global information economy (Zhao and Du 2013, 156). The IMS index value of soft technology trade in the US is about 22%, and the Export Sophistication (ES index) value of telecommunications, computer and information services, and intellectual property royalties reached 332.0 International Dollars and 3803.7 International Dollars in 2016, respectively (Shi and Tao 2019,119-122). The export technology complexity is high. The specialization of royalty and license fee services in the US is also very high, and it has a monopoly advantage in the world, which leads to the lack of competitiveness of other countries' services in the US. Hence, its degree of intra-industry trade is low. Japan's lafay index is also very high, indicating that Japan's royalty and license fee services are also highly specialized (Liu and Li 2016, 138).

The IMS index of China's soft technology trade grew from 0.68% to 3.30% (Shi and Tao 2019,119). However, few core technologies, low international patent levels, limited intellectual property development, and weak independent research and development characterize the situation. Although the ES index of China's telecommunications, computer and information services, and intellectual property royalties showed an upward trend, it was still low. By 2016, it was only 114.2 International Dollars and 17.6 International Dollars (Shi and Tao 2019,122). The development level of core technology lagged far behind that of the US, and intellectual property development remained low. Whether from the perspective of international market share, trade deficit, or various competitiveness evaluation indicators, China's global competitiveness of royalty and license fee services has been relatively weak in the past 10 years. Its international competitiveness is weak, far behind developed countries such as the US, Japan, and Britain, and only surpassing emerging countries such as Brazil, Russia, and India (Liu and Li 2016, 138). It also shows a downward trend, and the export volume fluctuates greatly, reflecting the lack of the ability of China's royalty and license fee service exports to continue to grow.

As the vast number of developing countries are still in the process of industrialization for a long time, and the demand for industrial technology will exist for a long time, the trade of intellectual property rights of industrial technology may only decline steadily. With the transition from an industrial society to an information society

and the development of the cultural industry, the proportion of general software intellectual property trade will continue to increase, and the proportion of cultural intellectual property trade will also increase. However, due to the higher complexity and integration of general software intellectual property technology and closer relationship with production and life, the proportion of its international trade will rise faster. Emerging developing countries have obvious competitive disadvantages in intellectual property services trade, and the BRICs countries do not have professional advantages. The degree of specialization of Russia is close to that of China, which is very low, far behind developed countries such as the US and Japan.

b. *Geographical Pattern and Network Evolution of Intellectual Property Trade*

With the application of social network analysis in international trade, scholars began to build intellectual property trade networks to reveal the geographical pattern and network evolution of global or regional intellectual property trade.

From the global scale, the international intellectual property trade network mainly shows the following characteristics: 1) The trade ties and intensity have significantly increased, indicating the broadening and deepening of international intellectual property trade activities.; 2) The polarization is significant, characterized by a significant "core-edge" structure (Feng, Zhang and Liu 2022, 47); 3) The double arch pattern of "United States-Western Europe" and "United States-Japan" evolved into a cross-regional fireworks pattern centered on the United States, forming a typical small-world network, indicating increased activity and efficiency in intellectual property trade activities(Duan, Du and Chen 2019, 2119); 4) It has developed a pyramid structure with the United States at the top, showing a clear hierarchy. However, in recent years, there has also been a trend of decentralization (Duan, Du and Chen 2019, 2123; Wang and Meng 2023, 84); 5) From the perspectives of international intellectual property import and export patterns, imports show a development trend from concentration to dispersion. The intellectual property import volume of some emerging economies is proliferating, while the export pattern remains unchanged, locked in the "three pillars" pattern of the United States, Japan, and Western Europe (Duan, Du and Chen 2019, 2119).

Feng, Zhang and Liu (2022，44-45) also analyzed the geographical gravity center transfer of intellectual property trade and found that the import center had undergone four shifts in the order of Germany → Japan → the United States → the Netherlands → Ireland, and the transfer was frequent and accounted for a relatively low proportion, indicating that the import activities of intellectual property trade were affected by a country's policies related to technology import, intellectual property rights and economic development, and had been widely valued by many countries; While the export center has always been the United States, which has not been transferred, but its share continues to decline. The strong scientific and technological strength and innovation ability of the United States have kept it the most potent export country for a long time. Still, the increasing technology export ability of several major innovative countries/regions has diluted the share of the United States.

From the regional scale, the "Belt and Road" is characterized by marginalization and regionalization in the global intellectual property trade network, and its internal technology trade volume is far lower than that of external technology trade. At present, the "Belt and Road" technology trade is mainly controlled by Russia and the United States, which are the most significant technology sources of 19 and 21 " Belt and Road" countries (regions), respectively. At the same time, China is not the largest technology trading country

of any "Belt and Road" countries (regions) (Duan, Chen and Du 2019, 1006).

From the perspective of the nodes in the network, the United States is the core of the global geo-technological pattern, and its core position has been continuously consolidated and strengthened. However, Central Asia, West Asia, and Africa are areas where the United States currently lacks scientific and technological power, which are the core areas of China's "Belt and Road" construction (Duan, Du and Chen 2019, 2126). China's position in the network has gradually improved, becoming a vital network hub (Wang and Meng 2023, 70), but the technology trade export capacity needs to be further improved.

METHODOLOGY

The concepts of intellectual property trade, technology trade, and technology transfer are cross-cutting, to avoid confusion and omission, the research object of this study is the related research with patents as the trade object. Using Web of Science (WOS), Scopus, and CNKI as retrieval platforms and using international intellectual property trade, international licensing of technology, and international technology trade as keywords, 26 articles of WOS, 7 articles of Scopus, and 120 articles of CNKI were found. Eliminating duplicate literature, a total of 149 articles were included. According to the main research topics, this study reviews the intellectual property trade's current situation, evolution, and influencing factors.

FINDINGS

Research on the Influencing Factors of Intellectual Property Trade

Robert W. (1977) was an earlier scholar who studied international technology licensing. He put forward the idea of expansion constraint and oligopoly view, believing that overseas expansion's financial and organizational constraints are more extraordinary than domestic expansion and that companies choose to license international technology to maintain their segmented geographical market (Robert 1977, 116-117). Subsequently, scholars studied the influencing factors of intellectual property trade from multiple dimensions.

a. Intellectual Property Protection

Intellectual property protection, such as patents, trademarks, service marks, and copyrights, is at the forefront of the globalization of markets in ideas, technology and economics. As intellectual property rights play an increasingly important role in promoting the development of the international economy and trade, protecting intellectual property rights has become the consensus of all countries (Wang, Tao and Zu 2018, 154). The relationship between intellectual property rights and international trade has also become the focus of scholars (Maskus and Penubarti 1995; Primo Braga and Fink 1999; Branstetter, Fisman and Foley 2006). The trade of intellectual property rights itself is based on intellectual property rights, and the protection of intellectual property rights is bound to have a far-reaching impact.

The host country's degree of intellectual property protection is an important concern for scholars. The willingness of developed countries to exchange technology with developing countries mainly depends on whether the country has a legal framework of intellectual property rights that can protect the local interests of technology owners. Suppose the goal is to encourage the technology licensing of parent companies and subsidiaries abroad. In such a scenario, a strong and effective intellectual property law is essential, with successful implementation being of utmost importance. Strengthening the protection of intellectual property rights in a country is conducive to promoting the development of its technology import trade and its acquisition

of advanced foreign technology, especially for developing countries (Weng, Ma and Dai 2018, 57). The patent system reform can increase the cost of imitators, reduce the risk of imitation (Ivus, Park and Saggi 2016,2-3) and the cost of technology licensing, and stimulate information transfer and technological innovation (Yang and Maskus 2001,170). The resulting introduction of a raft of IP laws has clearly given rise to a rapid increase in the flows of patent, trademark and design activity to the PRC by Western countries(Bosworth and Yang 2000, 454). Branstetter, Fisman and Foley (2006) investigated the impact of intellectual property reform in 16 countries on the technology transfer of U.S. transnational corporations from 1982 to 1999 and found that U.S. multinational corporations significantly increased the technology transfer to the reformed countries. Ivus (2010) discovered that substantial intellectual property rights in developing countries can increase the trade volume of developing economies in U.S. intellectual property-sensitive industries, resulting in a 13% annual growth in the import volume of high-tech goods.

Chinese scholars have reached similar conclusions and found that intellectual property protection can promote technology transfer through technology licensing (Lv 2007; Yu and Wang 2009). Ma Lingyuan (2014) empirically analyzed the impact of strengthening intellectual property protection on service trade imports from 2000 to 2011. The results showed that when the market expansion effect of intellectual property protection was pronounced, the impact on service trade imports was more significant. Dai, Liang and Sun (2015) analyzed that with the development of a knowledge-intensive service industry, strengthening the protection of intellectual property rights will promote the improvement of the technical complexity of service trade exports. However, some scholars have found that the impact of intellectual property protection on outward technology transfer is negative (Wang and Tan 2012, 20 ; Gu and Shi 2014, 100). In addition, some scholars believe that only the strong intellectual property protection of exporting countries can bring about the intensive export of goods, primarily intellectual property-intensive products (Paweł and Kuźnar 2013, 10-12).

In addition, the impact of intellectual property protection on intellectual property export revenue in developed and developing economies is significantly different. In developed economies, improving intellectual property protection forms a monopoly on knowledge innovation (Maskus and Penubarti 1995, 228; Chin and Grossman 1988, 3), which is not conducive to introducing innovative technologies. Furthermore, countries with technological advantages can leverage intellectual property protection to secure a favorable position in international competition and seek greater influence in other domains (Duan, Du and Chen 2019, 2117), greatly increasing the economic growth of the home country and expanding the income sources of the parent companies of transnational corporations (Park and Ginarte 1997, 57; Sattar and Mahmood 2011, 174-179). In developing economies, strengthening intellectual property protection can deter imitation, suppress imitation-based production, and boost the demand to adopt new technologies (Maskus and Penubarti 1995, 243).

Weng, Ma and Dai (2018) used the cross-border panel data of 71 countries from 2006 to 2015 to study the impact of intellectual property protection on technology import trade. The results indicate an inverted U-shaped relationship between intellectual property protection and technology import trade in the global sample. That is, with low levels of intellectual property protection, technology imports increase as intellectual property protection improves. When the level of intellectual property protection reaches a critical point, technology imports decrease as intellectual property protection improves. For developing countries, intellectual property

protection has a linear relationship with their technology import trade volume, resulting in a significant positive impact. However, it has no significant impact on developed countries. One possible reason is that intellectual property protection in developed countries has already been strong, and no imitation enterprises are operating. Therefore, further strengthening intellectual property protection will not reduce the number of imitation enterprises and, as a result, will not increase the volume of technology import trade. Simultaneously, developed countries possess advanced technology levels and primarily require high-end core technology, which is typically not easily transferable. Therefore, intellectual property protection may have a relatively minor impact on the technology trade of developed countries.

Wang and Meng (2023) also discovered that as the gap in intellectual property protection levels between two countries widens, the volume of intellectual property exports from nations with stronger protection to those with weaker protection increases. There is a "U"-shaped relationship between the overall level of intellectual property protection and the export volume of intellectual property between these countries. The higher a nation's level of development and innovation, the more influential intellectual property protection becomes in promoting intellectual property trade. Enhancing state-level intellectual property rights protection is beneficial for facilitating the signing of trade agreements, thereby stimulating the growth of intellectual property trade relations.

b. Innovation and Technology Absorption Capacity

The host country's innovation and technology absorption capacity will also affect the intellectual property trade relations. The greater the technological gap between local and multinational companies, the smaller the possibility and proportion of the advanced technology of international companies transferred to local companies. In the case of a large technology gap, developing countries cannot meet the capital and production scale requirements for the effective use of TNCs' advanced technology, so the technology employed by TNCs' subsidiaries and their affiliates may not disseminate to local enterprises in developing countries (Lun 2007, 67). In the high-tech sector, excessive technological gap will hinder the transfer and dissemination of technology.

Blind and Jungmittag (2005) studied the impact of innovation and technical standards on trade between developed countries and found that British standards have a more substantial positive impact on imports and exports than international standards. Germany's export performance can be explained mainly by its innovation ability, and only a small part is related to the strength of technical measures. China's high-tech industry has steadily enhanced its independent innovation capabilities, and the scale of technology transactions has consistently grown thanks to technology transfer policies. This technological innovation has driven the growth of China's intellectual property trade, resulting in a rising proportion of intellectual property trade activities (Gu and Liu 2014, 50). While the number of patents granted in Beijing is increasing, there remains a significant gap when compared to developed countries. Additionally, the quality of some patents may be low, hindering the promotion of intellectual property export trade (Wang, Tao and Zu 2018, 154). Moreover, notable variations exist in the inverse relationship between a company's capacity to assimilate innovation and the exportation of U.S. intellectual property rights in countries at various stages of economic development. In developing economies, this negative impact is statistically significant at the 1% significance level, whereas it lacks significance in developed economies. This suggests that the absorptive capabilities of developing economies have reached a certain

threshold, thereby fostering enhancements in their innovation prowess. The progression of indigenous innovation endeavors spurs the emergence of novel technologies, diminishing reliance on U.S. intellectual property rights. This phenomenon is less pronounced in developed economies (Wang and Gao 2021, 17).

However, some scholars believe that the impact of productivity level on technology import is not significant. On the one hand, the higher the productivity, the stronger the imitation ability, thus inhibiting the transfer of advanced technology to it. On the other hand, improving productivity has created conditions for the application and popularization of technology (Weng, Ma and Dai 2018, 54). The two effects may offset each other in general.

The intensity and scale of a country's R&D activities are essential indicators to reflect its innovation ability. To secure and sustain a competitive edge, attention must be devoted to R&D with a corresponding boost in investment. Pawel and Kuźnar (2013) found that the export of more intensive intellectual property-intensive industries was accompanied by higher total expenditure on R&D of exporting and importing countries (but the coefficient related to the cost of exporting countries was much higher than that of importing countries). Therefore, overall, the total R&D expenditure seems to have a greater impact on the export of intellectual property-intensive industries. In comparison, it has a smaller impact on the export of all commodities. Beijing's investment in R&D remains notably insufficient and has yet to contribute significantly to advancing its intellectual property trade (Wang, Tao and Zu 2018, 154). There are also differences between developed and developing economies in this regard. The company's R&D investment significantly negatively impacts the intellectual property import of developing economies, mirroring the overall sample. In contrast, it positively impacts developed economies, although the effect is not obvious (Wang and Gao 2021, 17). In developing economies with weak innovation capabilities among enterprises, increasing R&D investment is highly effective in improving R&D capabilities, enhancing independent innovation capacity, promoting technological innovation, reducing reliance on foreign technology, and minimizing the introduction of intellectual property rights. The interaction between R&D investment and enterprise absorptive capacity increases the absorption of imported intellectual property rights, which contributes to the formation of internal innovation ability. In developed economies, where R&D capabilities have already reached a certain level, increased R&D investment may not lead to developing a high-level innovation capacity. Instead, it may need to be introduced to some extent, but the effect is not particularly significant.

c. Political and Economic-Related Factors

Trade is closely related to political and economic policies. The relevant research on intellectual property rights mainly involves geopolitics, economic scale, economic policy, foreign direct investment, etc.

From a geopolitical perspective, countries or regions can promote trade, investment, and economic ties among Member States to achieve shared economic growth and development goals by reducing trade barriers, enhancing economic cooperation, and coordinating policies to form a close economic alliance or cooperation system. Baldwin (1997) believed that the regional trade integration arrangements between the European Union and North America positively impacted the living conditions of their members. Regional trade integration arrangements promote the growth of trade among members, which is faster than the growth of trade among nonmembers (Bhagwati 1992, 543-544). Luo, Luo and Liu (2014) made empirical research showing that the free trade area positively impacts member trade, but the statistical effect is insignificant.

Secondly, the economic scale also significantly impacts the amount of technology imports. Generally speaking, the larger the economic scale, the greater the technology imports. Weng, Ma and Dai (2018) discovered that a 1% increase in economic scale led to a significant 0.4046% average increase in technology imports, which was significant at 5%. Import trade also has a significant positive impact on technology imports. Specifically, a 1% increase in the import volume of goods and services resulted in a significant 0.6381% average increase in the import volume of technology, which was significant at 1%.

Thirdly, economic policy also exerts an influence. Riker (2014) demonstrated a negative correlation between enterprises' total tax rate and intellectual property rights export revenue. However, the negative correlation between the total tax rate of the host country and the export revenue of U.S. intellectual property trade varies for economies with different levels. In developed economies, an increase in the host country's corporate tax reduces the import of intellectual property from developed economies to the United States, and this effect is significant at the 1% level. However, this negative correlation effect in developing economies is not significant (Wang and Gao 2021, 17).

In addition, the relationship between foreign direct investment and intellectual property trade is also very close. Generally speaking, there is a substitution relationship between foreign direct investment and technology transfer. An enterprise either invests directly in the host country or transfers technology to the host country. According to U.S. Bureau of Economic Analysis (BEA) data, over 60% of U.S. intellectual property exports are directed towards institutions affiliated with the United States. U.S. Outward Foreign Direct Investment (OFDI) is closely interconnected with intellectual property exports. Intellectual property plays a role in reducing the cost of technology transfer (Maskus 2004, 20), and multinational corporations enhance technology dissemination through Foreign Direct Investment (FDI) and licensing agreements (Smith 2001, 416;Branstetter *et al.* 2011, 30-32). Developing economies with robust intellectual property rights can leverage technology licensing via the FDI channel, thereby altering the operational dynamics of transnational corporations (Ivus, Park and Saggi 2016, 1075). Wang and Gao (2021), based on panel data encompassing U.S. intellectual property exports to 32 economies between 2006 and 2015, examined the influence of the host country's FDI inflow stock on the exporting country's intellectual property exports. The export of intellectual property is FDI-driven, with this driving effect being particularly pronounced in developing economies as host countries. However, Weng, Ma and Dai (2018) found that the impact of FDI on technology import is insignificant. One possible explanation is that, when considering the overall volume of technology trade, the substitutive relationship between the two countries' direct investment and technology transfer becomes less apparent. Import trade also plays a crucial role in international technology spillover. In the case of developing countries, there is no substitutive relationship between imports and technology trade.

d. Human-Related Factors

Intellectual property is the crystallization of human wisdom. The development of intellectual property trade must also be closely related to human factors.

Scholars generally believe that human capital can promote economic growth, and many studies have proved that human capital plays a more significant role in promoting economic development than material capital. The current era is an era of knowledge economy. As the main body of knowledge and technological innovation, human capital is a critical factor of production in intellectual property-related industries, which plays

a vital role in improving the international competitiveness of intellectual property trade (Wang, Tao and Zu 2018, 154). Paweł and Kuźnar (2013) found that more students in higher education are accompanied by more intensive export of intellectual property-intensive goods and all goods in exporting countries. However, the statistical results of the number of students in importing countries are insignificant.

In addition, the importance of the global diasporas to contemporary economic development is a new research field that has not been paid enough attention. Global diasporas refer to a common nation, ethnic group, country, or cultural group distributed worldwide. These diaspora groups usually leave their motherland or place of origin for historical, economic, political, and other reasons and settle in other countries or regions. These groups maintain their own cultural, linguistic, religious, and other characteristics overseas and often keep in touch with the original country or culture. Nurse (2016) discussed the impact of the economy of the diaspora on trade, enterprises, and investment in the Commonwealth countries and found that it could deliver and receive the needs of the Diaspora and supply goods, services, and intellectual property rights, and promote financing, investment, and knowledge transfer. Akinori (2019) used Japan's bilateral trade data and Japan's bilateral trade data with OECD countries (Akinori 2023) and found that immigration networks can reduce the information cost of transactions and promote intellectual property trade. Still, intellectual property revenue negatively correlates with the number of Japanese immigrants in developing countries.

CONCLUSION

From the perspective of the current situation and evolution of intellectual property trade, since the 1980s, the global intellectual property market has developed rapidly, and the volume of transactions has expanded. Intellectual property trade has a significant impact on the economy. The volume of international patent technology transactions continued to grow, with developed countries taking the leading position and developing countries taking up an increasing proportion of intellectual property trade. The competitiveness index of intellectual property trade reflects the international competition pattern. The United States continues dominating, but emerging countries like China are growing. The global intellectual property trade presents a network structure with the United States as the core. Central Asia, West Asia, Africa, and others lack scientific and technological power, while China gradually improved its status by constructing the "Belt and Road."

The United States attaches great importance to strategic research and information monitoring of intellectual property trade. The "Patent Scoreboard' system of CHI Research Company of the United States, which uses the bibliometric analysis method to carry out annual analysis of scientific papers and patent indicators, has been cited by many countries. The Bureau of Economic Analysis of the United States has established a cross-border service, including intellectual property services and a service trade statistics database of affiliated institutions, to conduct statistical monitoring and analysis of the trade in intellectual property services between the United States and countries worldwide. The Global Intellectual Property Center (GIPC) of the American Chamber of Commerce regularly publishes the international Intellectual Property Index report every year, which evaluates the development of intellectual property in 50 economies worldwide by 40 indicators from 8 aspects, including patents, copyrights, trademarks, trade secrets, commercialization of intellectual property, law enforcement, system efficiency, accession to and ratification of international treaties (Cui 2019, 75).

Chinese scholars have proposed various opinions and suggestions for developing China's intellectual property trade. To fully leverage the government's role, there should be a promotion of an innovation-driven strategy and the establishment of a policy system oriented towards the quality of intellectual property trade. Various platforms should be established to enhance intellectual property protection and enforce compliance reviews. Industrial policies conforming to international practices and not violating WTO framework agreements should be formulated. Attention should be given to introducing and training technical trade talents (Liu 2016, 31;Song and Zhang 2018, 64).

Regarding the influencing factors of intellectual property trade, Robert (1977) focused on international technology licensing, emphasizing expansion constraints and oligopoly. The subsequent research analyzes the impact of intellectual property protection, economic scale, geopolitics, and foreign investment on intellectual property trade from the perspectives of institution protection, innovation ability, political economy, and manpower. Among them, the international trade protection of intellectual property rights has become the focus of global attention and is crucial to international economic development. Countries have strengthened the protection of intellectual property rights to promote technology transfer and innovation. However, the degree of protection is closely related to the level of national development, and the impact of intellectual property protection on technology import trade shows an inverted U-shaped relationship. Technology trade in developed countries may be less affected by protection, while the difference in the degree of intellectual property protection can affect intellectual property trade.

The current literature on intellectual property trade is far from extensive and in-depth compared with its importance, and there is no scientific framework and system for the research on the theoretical basis, influencing factors, and economic consequences. As intellectual property trade involves many fields, including political, economic, legal, trade, management, and other related knowledge, it is bound to be comprehensive interdisciplinary research in the future.

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NEXUS BETWEEN FOREIGN CAPITAL INFLOW, POVERTY AND ECONOMIC GROWTH AMONG SELECTED WEST AFRICA COUNTRIES: A SECTORAL APPROACH

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ABSTRACT

In the selected West African nations, issues concerning foreign capital inflows, poverty, and economic growth are complex and multifaceted. These issues encompass reliance on commodity exports, fluctuations in foreign capital inflows, debt burdens, corruption, poor governance, and lack of diversification. Therefore, understanding the nature of these challenges is both relevant and imperative. Consequently, this paper investigates the relationship between foreign capital inflow, poverty, and economic growth in the chosen West African countries. To estimate the model, the study employs a Random Panel model. The findings reveal, among other things, that foreign capital inflows have a beneficial impact on the agricultural, health, and educational sectors in the selected West African nations. It is recommended that in order to support sustainable development and reduce reliance on external expertise, foreign investors should be encouraged to engage in technology sharing, skills transfer, and local capacity building, particularly in the agricultural and industrial sectors. Additionally, incentives should be tailored to attract foreign investment in sectors where these nations excel. This may include measures such as land access, tax breaks, and other sector-specific advantages.

INTRODUCTION

In some West African nations, the relationship between foreign capital inflows, economic growth, and poverty can be complex. Economic growth is significantly influenced by foreign capital inflows, such as Official Development Assistance (ODA), Foreign Portfolio Investment (FPI), and Foreign Direct Investment (FDI) (Oshikoya, 2003). The infusion of capital could result in increased investments in technology, infrastructure, and job creation, all of which would support overall economic growth (Asiedu, 2002). However, the impact of foreign capital inflows on poverty varies depending on several factors, such as how resources are distributed, the inclusiveness of economic growth, and the effectiveness of governance (Gupta, 2010).

Foreign capital inflows may exacerbate income inequality and have no effect on reducing poverty when economic growth is not inclusive (World Bank, 2001). Thus, evaluating the relationship among foreign capital inflows, economic growth, and poverty requires a deep understanding of the unique conditions of each nation in West Africa (Easterly, 2001). To maximize the potential benefits of foreign capital inflows for regional economic growth and poverty reduction, effective policies and strategies are necessary. Foreign capital enters West Africa through various channels.

Foreign direct investment (FDI) is often sought after due to its potential to stimulate economic growth through investments in infrastructure, technology transfer, and job creation. On the other hand, poverty reduction and socioeconomic development are the primary objectives of ODA. FPI could have a more unpredictable impact and come with a higher risk profile in exchange for the potential for rapid profits. The relationship between these inflows and local economies varies and is complex across different countries. Economic expansion is a key component of development and the fight against poverty in any given region.

The economies of the sixteen West African countries have grown at varying rates; some have experienced rapid growth, while others have struggled to keep up with population expansion. It is essential to investigate whether foreign capital inflows have a lasting and direct effect on the development and expansion of the chosen nations' economies.

The economies and development environments of the sixteen West African countries differ significantly from one another. While a few nations in the region have experienced impressive economic growth and a decline in poverty, others still face significant poverty rates and underdeveloped economies.

The region boasts a wealth of natural resources, is experiencing an increase in foreign capital inflows, and is gaining popularity among youth. It is imperative that international development organizations, investors, and policymakers understand the connection between these migration waves and economic expansion. West Africa is grappling with poverty despite its economic potential.

Persistent problems in many nations include high rates of poverty, income inequality, and limited access to essential services. Given the complex relationship between foreign capital inflows and poverty reduction, it is crucial to determine whether these inflows promote inclusive growth or exacerbate regional inequality.

While numerous studies have delved into the relationship between foreign capital inflows, poverty, and economic growth in various contexts, few comprehensive studies focus exclusively on West African nations. A focused investigation is needed to fully grasp the dynamics at work due to the unique political and socioeconomic circumstances in this region.

LITERATURE REVIEW

Theoretical literature

The Dual Economy Model offers a framework for understanding the connection between foreign capital inflows, economic growth, and poverty. It was initially developed with developing economies in mind by Sir Arthur Lewis. According to this model, an economy can be divided into two distinct sectors: a modern, capital-intensive, high-productivity sector and a traditional, labor-intensive, low-productivity sector. The following explanation elaborates on the connection between the Dual Economy Model and foreign capital inflows, economic growth, and poverty:

Impact on economic growth

According to the Dual Economy Model, the expansion of the modern sector is the primary way that foreign capital inflows can stimulate economic growth. For instance, technology transfer, the construction of new factories, and the adoption of contemporary production methods are all potential outcomes of foreign direct investment (FDI). The growth of the modern sector is fueled by foreign capital, which also contributes to the overall economic growth of the nation. Increased production in contemporary industry may lead to gains in GDP and productivity.

Impact on poverty

The Dual Economy Model also has implications for poverty. The traditional sector is mainly comprised of low-income subsistence farming and informal employment. Foreign capital inflows that support the modern sector have the potential to reduce poverty within that industry by raising wages and creating employment opportunities, but these benefits are not always distributed equally. If workers in the traditional sector do not directly benefit from the growth of the modern sector, then income disparities may persist or even worsen. In this scenario, the traditional sector may not experience as much of the economic growth as the modern sector, which could widen the wealth gap.

Ensuring a more equitable distribution of the benefits of economic growth fueled by foreign capital inflows is crucial to reducing poverty, as is taking steps to improve the living conditions of those employed in the traditional sector. This may include programs for rural development, availability of credit, and skill development.

Thus, the Dual Economy Model helps us comprehend the relationships between inflows of foreign capital, economic expansion, and poverty in developing nations. Even though foreign investment can support the growth of the modern sector and increase incomes for some, it also draws attention to the possibility of persistent poverty and income inequality in the traditional sector. To guarantee that foreign capital inflows support inclusive growth and the reduction of poverty, effective policies and strategies are needed.

Empirical literature review

Numerous studies have been conducted globally, especially in developing countries, to ascertain the actual correlation between foreign capital inflows and economic growth.

Huong (2022) examined the connection between foreign direct investment (FDI) and Vietnam's economic growth between 1990 and 2020 using the VAR model. She discovered that foreign direct investment negatively impacted growth in the short and long terms. FDI capital has grown over time and has a lot of potential, but its effectiveness has remained relatively low.

Additionally, in 2022, Iwegbu and Dauda studied the connection between foreign aid's ability to reduce poverty in Africa and fiscal policy. This 1980–2017 study employs the panel dynamic ordinary least squares (DOLS) estimation method. The findings demonstrate that effective education-related fiscal policies combined with foreign aid raise income levels considerably in all regions—except Central Africa—and increase consumption in the Western and Central regions. Therefore,

governments' allocation to the health and education sectors needs to be improved to maintain the effectiveness of foreign aid in Africa and raise household income.

Examining the relationship between growth, the reduction of poverty, and the remittances from Nigerian migrants between 1981 and 2019, Lawal, Adegun, Aderemi, and Dauda (2022) employed the Granger causality techniques and the ARDL Bounds test to analyze the study's goal. They found a strong positive correlation between GDP per capita and migrant remittances. Moreover, the country's economic growth drives efforts to combat poverty. Thus, it makes sense to conclude that the primary causes of Nigeria's declining poverty are economic growth and migrant remittances.

Between 1996 and 2018, Arogundade, Mduduzi, and Eita (2022) looked into the connection between host absorptive capacity and poverty in countries in sub-Saharan Africa. By using the fixed-effect panel threshold model, fixed-effect instrumental regression, and heterogeneous Granger-causality test, the study discovered that although foreign direct investment (FDI) affects the host country's absorptive capacity, it has no direct impact on the frequency and severity of poverty. It also shows how foreign direct investment (FDI) can lessen poverty to some extent when paired with human capital and elite institutions. Lastly, there is a causal relationship that runs both ways between foreign direct investment and poverty.

Similarly, Musakwa, Odhiambo, and Nyasha (2021) examined the impact of foreign capital inflows on the decline in poverty in Vietnam using secondary data from 1990 to 2018. The study's autoregressive distributed lag (ARDL) method showed that foreign direct investment lowers poverty both short- and long-term using household consumption expenditure as a proxy for poverty. Nevertheless, the study found that FDI exacerbated poverty in the short term when the infant mortality rate and HDI were substituted for poverty.

The study conducted by Sikandar, Erokhin, Wang, Rehman, and Ivolga (2021) examined the impact of foreign capital inflows on agricultural development and poverty reduction in developing countries. Using the panel unit root test and pool mean group estimation techniques, the short- and long-term relationships between dependent and explanatory variables were observed across fourteen developing economies in Latin America, Asia, and Eastern Europe. As a result, the results suggest that increasing the value of agricultural exports, foreign direct investment, foreign development assistance, and remittances from migrant workers may help to reduce poverty.

Dada and Akilo (2021) investigate whether environmental degradation has an effect on foreign direct investment and the fight against poverty in sub-Saharan Africa between 1986 and 2018. The results of threshold regression show that FDI significantly lowers poverty at higher levels of environmental degradation when household final consumption is used as a proxy for poverty. Furthermore, FDI is not very effective at decreasing poverty when methane and nitrous oxide emissions are higher.

Using FMOLS to estimate the model, Awad (2021) examined foreign capital inflows and economic growth in low-income Sub-Saharan African nations from 1990 to 2018. The results showed that trade and aid eventually had a positive impact on these countries' per capita income growth rates. On the other hand, it appeared that external debt was detrimental to this type of growth.

Olowookere, Oluwole, Mabinuori, and Aderemi (2020) conducted a significant study that examined the relationship between foreign capital inflow and the decline in poverty in Nigeria using time series data spanning the years 1990 to 2019. The

study concluded that there is a long-term equilibrium between foreign capital inflows and the decline of poverty in Nigeria. The model was estimated using FMOLS and the Granger causality technique. Moreover, there is a unidirectional causal relationship between foreign direct investment and the decrease in poverty. Granger's efforts to combat poverty are reflected in his investments in foreign portfolios.

In a study published in 2020, Adebayo and Oluwaseun investigated the relationship between foreign capital inflow and the economy of Sub-Saharan Africa from 1990 to 2018. The study used variance decomposition, impulse response, and structural vector autoregression (SVAR) to demonstrate a positive correlation between growth and foreign capital inflow in Sub-Saharan Africa. Additionally, it discovered a negative relationship between economic growth and foreign capital inflow into Sub-Saharan Africa and macroeconomic instability.

Between 1980 and 2017, Fagbemi and Olufolahan (2019) looked at Nigeria's financial development, capital inflow, and initiatives to reduce poverty. VECM was used in the study to estimate the model. The findings thus highlight the critical indirect role that capital inflows and financial deepening play in the mechanism that reduces poverty. Furthermore, they show how the interaction term between financial development and capital inflows points to a significant decrease in the population living in poverty over the long and short terms.

Adekunle and Sulaimon (2018) used secondary data from 1986 to 2015 along with the autoregressive distributed lag (ARDL) methodology to evaluate the relationship between capital flows and economic growth in Nigeria. They found that portfolio inflows and foreign remittances had a statistically significant negative short-term impact on growth, while net foreign investment increased growth. According to their findings, the Nigerian government ought to foster an atmosphere that would attract both foreign and domestic capital inflows for the good of the nation. The findings of Adekunle and Sulaimon (2018) are consistent with the findings of Onyekachi and Okparaka (2017), who noted that foreign capital inflow positively and directly impacted growth.

Padhan, Behera, and Sahu (2023) looked into whether corruption hinders India's economic growth despite the nation's rising capital inflows and remittances. Data from 1995–1996 to 2016–2017 were analyzed using Bayer-Hank (B-H) and Autoregressive distributed lag (ARDL) in this study. The conclusion is that trade balance, government consumption spending, foreign capital inflow, and corruption are all related to economic growth in the long run.

Using generalized methods of moments, Githaiga and Kilongi (2023) examined the effects of institutional quality on the relationship between foreign capital flow and human capital development in sub-Saharan Africa from 2009 to 2019. The study shows that the influence of FDI and remittances on the development of human capital is moderated by the institution's quality. Nonetheless, the impact of ODA on the development of human capital is independent of institutional quality. The study's conclusions can provide policymakers with important new information. The importance of FDI and remittances in fostering the growth of human capital in sub-Saharan Africa is highlighted by this study.

Using OLS estimation techniques, Juwaid and Saleem (2017) ascertain the impact of capital inflows on growth in Pakistan from 1976 to 2015. The findings showed that while remittances and external debt had a positive effect on GDP, direct investment had a negative one. The study found that policymakers needed to guarantee that foreign direct investment (FDI) growth would continue in order to reduce reliance on external debt. Furthermore, Waweru and Ochieng (2017) used secondary data from 1984 to 2014 that was acquired via the use of ARDL to study the

effect of capital inflows on economic growth in Kenya. The outcome proved that capital inflows have a direct effect on growth.

Sothan (2017) examined the relationship between direct investment and growth in Cambodia between 1980 and 2014 using VECM and discovered a positive correlation. Thus, it is imperative that the government enact prudent macroeconomic policies, encourage financial development, construct infrastructure, eliminate obstacles to foreign direct investment, and advance trade and investment.

Although foreign direct investment and other capital flows also contribute to economic growth, Adeola (2017) used VECM to study economic growth and foreign capital flows in a few Sub-Saharan African countries. Results show that remittances, an increasingly important source of foreign capital flows, account for most of economic growth in two of the four sub-Saharan African countries examined. This suggests that increasing foreign direct investment and remittances ought to be the top policy goals for fostering economic growth in sub-Saharan Africa.

Nguyen (2017) used ARDL and ECM estimation techniques on secondary data from 1986 to 2015 to study the relationship between exports, direct investment, and growth in Vietnam. The study concludes that exports have a negative effect on growth while direct investment has a positive effect. Thus, the study concluded that major adjustments to export policy are required if the government hopes to achieve sustainability in future growth. Furthermore, Abdullahi, Garba, and Magaji (2017) used secondary data covering the years 2010 to 2015 to examine the impact of capital inflows on growth in Sub-Saharan Africa and discovered a negative correlation between the two using the GMM technique. Thus, governments in sub-Saharan Africa should ensure that people and property are adequately protected in order to promote an environment that is conducive to business. They should also give technologically advanced countries the incentives they need, like tax holidays, since they are ultimately responsible for maintaining foreign direct investment.

Oluwaseyi, Abdullahi, and Mahmood (2017) used secondary data sets spanning the years 1980–2015 and the Granger causality test to examine the effects of capital inflow on growth in West African nations. The outcome demonstrated that there is no correlation between capital inflow and growth in those regions. Therefore, policies that promote political stability, create a favourable environment, and liberalise domestic economies are required to encourage capital inflows.

The synopsis above shows that empirical research is inconclusive when it comes to the nature and extent of foreign capital inflows' effects on economic growth and the eradication of poverty in various Nations and cross-national studies. Therefore, our research adds to the body of knowledge in this field, particularly in West African Nations.

METHODOLOGY

Empirical Model Estimation Technique

Before investigating the correlation among sectoral growth, poverty, and foreign capital inflow, the unit-root test needs to be employed to assess the time-series properties of the variables. To establish a long-term relationship, variables need to be integrated at level I (1). To estimate a long-run relationship, it is first necessary to show that the variables are integrated of mixed order I (0) and I (1). A cointegration test is the next action to take. The Pedroni (2004) panel cointegration test, which uses seven test statistics to assess cointegration among variables, was used in the study to test for cointegration.

After Pedroni (2004) found that the variables are not cointegrating, the long-term relationship is estimated. The study's approach for estimating the long-term relationship was the Random Effect Model. The method is preferred for estimating long-term relationships among variables because it can account for unobserved heterogeneity and has advantages in efficient estimation, balancing model, statistical efficiency, and mixed effects modelling. The definition of the random effect model is as follows:

$$Y_{it} = \alpha + \sum_{k=1}^{N} \beta_k X_{k,it} + \mu_{it}; \qquad k = 1,\ldots,N$$

1

Where:

= the explained variable for the it$h$ country at time t,

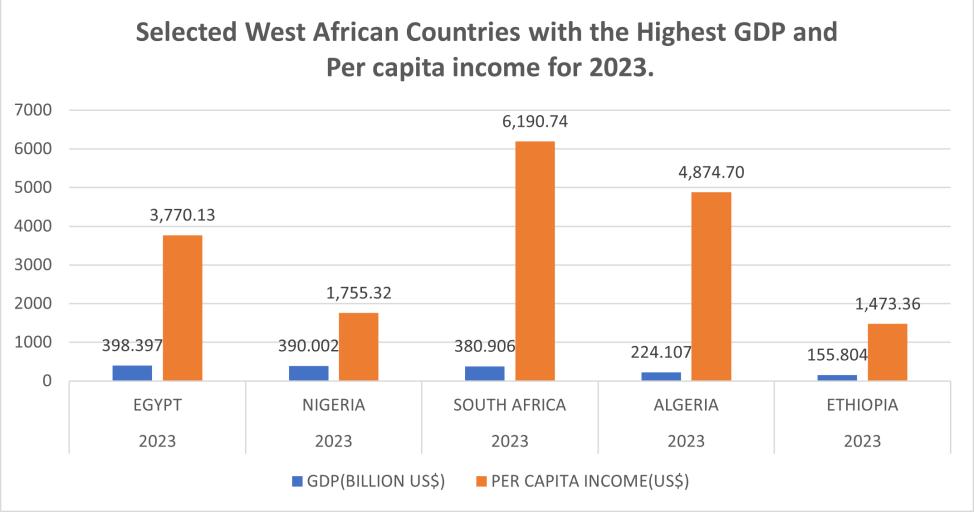
x = vector of the independent variables to be estimated,

μ = is the composite error term which can be decomposed further into specific effects and remainder disturbance term. However, the specific effects have been further categorized into individual specific effects and time specific effects.

Therefore, estimation of Static panel models is as follows:

Where is the sectoral growth and the superscript "j" corresponds to service, Agriculture and Industrial sectors. Sectoral growth is measured as a percentage of GDP. *fci* is foreign capital inflows, *pov* is poverty level and *gdpgro* is the GDP growth rate and is the composite error term. The above panel model will be estimated via the fixed effect and random effects regressions whereby the best model will later be chosen through the Hausman test. The parameters to be estimated are: , and . Data on Poverty, GDP, foreign capital inflows and GDP per capita growth was taken from world development indicator (WDI). The five West African countries (Nigeria, Egypt, South Africa, Algeria and Ethiopia) selected were chosen depending on two criteria as suggested in figure 1: highest GDP and Per capita income. For FDI, poverty and GDP growth rate, the period for the analysis is 1980–2022.

Figure 1: The five West African countries with highest GDP and per capita income in 2023



FINDINGS

Descriptive statistics and correlation matrix

According to Table 1's descriptive statistics, the service sector in the selected West African countries makes up the largest portion of GDP, with agriculture having the lowest average value over the sample period at 6%. According to the measures of volatility, services are the most volatile sector, while foreign capital inflows are the least volatile. The relatively low mean growth rate of 2.87 observed in the selected West African countries is indicative of the underdeveloped state of these sectors. The poverty mean value indicates that poverty, which is still a significant factor, may either encourage or hinder these countries' continued economic development. Remittances of foreign capital, on the other hand, have a lower mean value, which suggests that less foreign capital is flowing into these economies.

Table 1: Descriptive Statistics

Variable	Obs	Mean	Std.Dev.	Min	Max
Foreign Capital	215	1.52	2.25	-7.39	9.89
Poverty	215	2.88	5.00	-15.45	13.86
Agric	215	6.56	3.36	6.35	1.11
Service	215	39.02	23.72	0.20	97.80
Industry	215	8.25	6.92	2.06	2.49
Gdp Growth rate	215	2.87	3.30	3.71	1.19

Source: Authors finding.

In order to determine the direction and strength of the correlation between the variables, the study also generated a correlation matrix. Serial collinearity is less of an issue in the first scenario since Table 2's findings show that there is little correlation between the explanatory variables. Additionally, the matrix demonstrates a positive correlation between sector growth, poverty, foreign capital inflows, and GDP growth rate.

Table 2: Correlation Matrix

Variable	Foreign capital	GDP growth rate	Industry	Poverty	Services	Agriculture
Foreign capital	1.000000					
GDP growth	0.003183	1.000000				
Industry	0.382082	-0.260119	1.000000			
Poverty	0.088222	0.134695	-0.203285	1.000000		
Services	0.735010	-0.098896	0.744986	0.067534	1.000000	
Agriculture	0.581543	-0.049547	0.495661	0.219647	0.785071	1.000000

Source: Authors finding

Unit root test

Table 3 displays the outcomes of the panel unit-root test. Both the intercept and the trend were included in the unit root test. All other variables were non-stationary at level I (0) but became stationary after the first difference I (1), except poverty, GDP growth rate, and industry.

Table 3: Panel Unit Root Test using Fisher-ADF

Variable	Level	First difference	Decision
Foreign capital	9.7168	62.1889**	I(1)
Poverty	44.0263	-	I(0)
GDP growth rate	40.4758**	-	I(0)
Agriculture	0.2862	56.1311**	I(1)
Industry	23.9287	-	I(0)
Service	4.7224	44.7695**	I(1)

Source: Authors finding

Panel Co-integration test

The variables are not cointegrated, which suggests that there is no long-term relationship between them and does not refute the null hypothesis that there is no cointegration, according to the cointegration test results shown in Table 4.

Table 4: Test for Cointegration

	Agriculture	Industry	Service
Panel v-Statistic	-1.377922 (0.8827)	-0.122409(0.6267)	-1.101794(0.8559)
Panel rho-Statistic	-1.178917 (0.2502)	-1.183848(0.3171)	-0.498252(0.3727)
Panel PP-Statistic	-1.632646(0.1290)	-1.683314(0.1751)	-0.452820(0.3918)
Panel ADF-Statistic	1.584841(0.8592)	0.541090(0.7906)	2.008541(0.9642)
Group rho-Statistic	0.360998(0.6409)	-0.215289(0.4148)	0.376961(0.6469)
Group PP-Statistic	-0.507629(0.3059)	-1.196727(0.1157)	-0.123710(0.4508)
Group ADF-Statistic	1.938039(0.9737)	0.715965(0.7630)	2.326492(0.9900)

Note: P-values are in parentheses

The Fixed effect model and the Random effect model are selected using the Hausman test. Consequently, the Hausman test result is shown in table 6. To confirm that the specific effects estimated are, uncorrelated and in fact, random effects, the Hausman test is widely used. The PV of the test summary, which is shown below, indicates that since the effects are not correlated, the random effects regression might offer a better fit than the fixed effects model. As a result, the Random Effect Model assumed way.

Selection between Fixed effect model and Random effect model

Table 6: Hausman Test

Test Summary	Chi-sq statistic	Chi-sq d.f	Prob.
Cross section random	143.318	3	0.0000

Source: Authors computation.

The data presented in Table 7 demonstrate that every variable is statistically significant, with the exception of the GDP growth rate for each of the chosen West African nations. The foreign capital inflow coefficient is positive and statistically significant at the 5% significant level for each of the three sectors. This means that as the output of the industrial, agricultural, and service sectors grows, so too should the amount of foreign capital inflows into these countries. This demonstrates even more how an increase of a thousand foreign capital inflows will, on average, lead to an increase in output in the

three chosen economic sectors of more than a million. On the other hand, this is consistent with the results of Juwaid and Saleem (2017) and Oluwaseyi, Abdullahi, and Mahmood (2017). Similarly, poverty benefits all three of these sectors in these countries. This suggests that the anticipated degree of development in the agricultural, service, and industrial sectors of these economies is positively correlated with the degree of poverty in the chosen West African nations. Thus, a decrease in the percentage of the population living in poverty in these nations will undoubtedly lead to increased output from the industrial, service, and agricultural sectors. In actuality, this outcome agrees with Adekunle and Sulaimon's findings (201). That, however, runs counter to Juwaid and Saleem's (2017); and Guo and Luo's (2017). findings.

It makes sense that the economic effects of a foreign capital inflow can vary significantly, depending on the specifics and how the capital is used. Nevertheless, in countries like Algeria, South Africa, Nigeria, Egypt, and Ethiopia, foreign capital inflow usually has some positive effects on the industrial, agricultural, and service sectors. Higher tax receipts, more infrastructure and technology spending, support for agriculture, industrial growth, knowledge and skill transfer, export promotion, and the development of jobs and infrastructure are a few potential financial outcomes.

It's crucial to remember that the benefits of foreign capital inflow are not always guaranteed and rely on a number of variables, such as the investment's nature, the host nation's policies, and the state of the world economy. The influx of foreign capital may also carry certain risks, such as an excessive dependence on foreign investors and possible capital flight. These nations should enact laws and policies that support ethical foreign investment, guarantee that the influx of funds supports their development objectives, and encourage openness and sound governance in the handling of foreign exchange in order to optimize the gains and reduce the risks. They should also focus on developing the nation's technological prowess and ability to reduce its long-term dependency on foreign investors. The industrial, agricultural, and service sectors in the chosen African nations (Ethiopia, South Africa, Nigeria, Egypt, and Algeria) may benefit economically from decreasing poverty. Reducing poverty can lead to several potential benefits for these sectors: increased consumer demand; agricultural productivity; industrial growth; service sector expansion, human capital development; reduction in income inequality; enhanced agricultural and industrial supply chain However, it's important to note that the relationship between poverty reduction and economic development is complex and multifaceted. Reducing poverty is a long-term process that requires a comprehensive strategy, including social safety nets, education, healthcare, and job creation. Additionally, the specific impacts can vary by country, depending on their unique circumstances, policies, and the pace of poverty reduction. Governments and policymakers in these nations should concentrate on putting poverty reduction programs into action, encouraging inclusive economic growth, and making sure that the advantages of development are widely distributed among the populace in order to achieve these favourable effects on the service, agricultural, and industrial sectors. Policies that support corporate expansion and investment in vital industries should be implemented in addition to these initiatives.

Table 5: Panel Random effect Model

Variables	Dependent variable: Agriculture		Dependent variable: Industry		Dependent Variable: Service	
	Coefficient	Prob.	Coefficient	Prob.	Coefficient	Prob.
Foreign capital	7.61	0.0000**	4.240735	0.0000**	22.60806	0.0000**
Poverty	1.64	0.0023**	60. 159631	0.0323**	48836993	0.0000**
GDP growth rate	2.36	0.3449	-1.24E+08	0.3397	-1.43E+09	0.6446
c	1.01	0.0004**	6.18E+10	0.0000**	5.04E+10	0.0045

Source: Authors finding
Note: ***, ** and * implies stationary at 1%, 5% and 10% respectively.

CONCLUSION

In these African nations, foreign capital inflows have the potential to be extremely important for promoting sectoral development, job creation, and economic growth. These investments can expand the industrial, agricultural, and service sectors as well as improve infrastructure and productivity when managed well. It is crucial to clarify that poverty itself does not benefit the industrial, service, or agricultural sectors. Poor consumer demand, a lack of resources, and limited access to healthcare and education are all associated with poverty and can impede economic growth.

On the other hand, as the preceding response indicated, there may be advantages for these industries if poverty is successfully reduced. Consequently, the recommendations and conclusions in the chosen African countries (Ethiopia, South Africa, Nigeria, Egypt, and Algeria) centered on poverty reduction and its possible benefits for these sectors. As a result, the industrial, agricultural, and service sectors may benefit from the decrease in poverty in these selected African nations. People become more engaged members of the economy when they are able to escape poverty and have access to vital services and higher incomes. Enhanced economic involvement can consequently result in amplified consumer demand, investment, and productivity within these industries.

The main takeaways from this research include the necessity of implementing comprehensive strategies for reducing poverty that prioritize giving the poor better access to jobs, healthcare, and basic social services. To create a favorable business environment, governance should be strengthened, corruption reduced, and the rule of law promoted. Moreover, boosting the general investment climate in these nations by cutting back on bureaucratic red tape, expediting the business registration process, and enhancing transparency and legal protections for foreign investors is essential. In a similar spirit, encouraging foreign investors to participate in technology sharing, local capacity building, and skills transfer—particularly in the agricultural and industrial sectors—will help advance sustainable development and lessen dependency on outside knowledge. Finally, incentives should be designed to attract foreign investment in fields where these nations excel. These might consist of land access, tax breaks, and other sector-specific advantages.

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THE RELATIONSHIP BETWEEN GEOPOLITICAL TENSIONS AND GLOBAL TRADE: AN ANALYSIS OF THE EFFECT OF RUSSIA-UKRAINE CONFLICT ON THE BANGLADESHI BRAND CASIO METAL

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ABSTRACT

Md. Badsha Mia founded Casio Metal, a local faucet-manufacturing business, in 1986 with a small capital of 25,000 BDT. Currently, Casio Metal is facing severe disruptions in its business operations, and its survival is threatened by the ongoing Ukraine-Russia war. This is due to the increase in the dollar's value against the local currency, which has resulted in a dollar crisis in local banks, leading most private banks not to grant permission to open LCs. Additionally, the crisis has prevented Md. Badsha from importing necessary machinery and equipment from other countries, including China, from which he usually imports parts and equipment. As a result, the company has been unable to fulfill its orders, significantly impacting its regular operations. This case focuses on the challenges faced by a raw-materials import-based manufacturer during a global crisis and the uncertainty surrounding whether Casio Metal will survive. It is a single case study. The data collection method was based on in-depth interviews with the owner. The interview was audio-recorded with the interviewee's permission. The type of case is an applied decisional case. The protagonist was present. The theoretical framework of this case study is based on the negative impacts of globalization, including its associated costs.

INTRODUCTION

The faucet industry in Bangladesh has seen significant growth in recent years owing to the increasing demand for modern and sophisticated home fixtures. According to a report by the Bangladesh Sanitary Ware Manufacturers and Exporters Association (BSWMEA), the faucet industry in Bangladesh is worth around 1.2 billion takas (USD 14 million). It has been growing at a rate of 15% per annum in recent years. The availability of raw materials and cheap labour in Bangladesh have also contributed to the growth of the faucet industry. Most of the raw materials required for manufacturing faucets, including brass, stainless steel, and zinc, are available locally at competitive prices.

Additionally, the country has a large pool of skilled and unskilled labour, which allows manufacturers to keep their production costs low. Another key factor contributing to the growth of the faucet industry is the emergence of many local manufacturers. Over the past decade, several local companies have entered the faucet industry and competed with established global brands. The growth of these local manufacturers has provided consumers with a broader range of options, created employment opportunities, and contributed to the growth of the country's economy.

Despite the growth of the faucet industry in Bangladesh, this sector continues to face several challenges. The COVID-19 pandemic has had a significant impact on the economy of Bangladesh, including its industrial sector. The country experienced a sharp slowdown in economic growth in 2020 owing to the pandemic. According to the Bangladesh Bureau of Statistics (BBS), the country's gross domestic product (GDP) growth rate fell to 5.24% in the fiscal year 2019-2020, decreasing from 8.15% in the previous fiscal year. This slowdown was due to a decline in domestic and external demand, and disruptions to supply chains caused by the pandemic. However, despite the initial slowdown, the country has seen a rebound in economic activity, with the BBS reporting a GDP growth rate of 6.1% in the first quarter of the fiscal year 2021-2022. Bangladesh's economy has yet to make sizable investments in recent years. UNCTAD (2021) reports that FDI inflow decreased to $2.9 billion in 2019 from $3.6 billion in 2018 and continued to decrease constantly by 11% to $2.6 billion in 2020 from 2019. This drop results from the Covid-19 pandemic's widespread economic catastrophe, and it will take a while for FDI inflows to recover because investment pledges are still weak. The latest conflict between Russia and Ukraine may have significantly weakened investment inflows (Mamun & Kabir, 2022).

The conflict between Russia and Ukraine has brought further devastation; global inflation has been at its worst since the financial crisis of 1998 (Pitigala, 2022). The Ukraine-Russia war started to question the overdependence of the countries on each other. Moreover, global businesses and small and medium-sized enterprises (SMEs) in emerging markets face various challenges and uncertainties due to the ongoing Russia-Ukraine conflict and COVID-19 pandemic. These complexities have introduced several risks and difficulties for companies to navigate to maintain operations and sustain growth (Karmaker et al., 2023).

The war between Russia and Ukraine did not directly affect Bangladeshi's faucet market. However, global supply chains and commodity prices could be affected by this conflict, which could indirectly impact Bangladesh's faucet industry. For example, disruptions in the global supply of raw materials or finished products due to the conflict could cause prices to rise, which could in turn impact the faucet industry in Bangladesh.

The primary objective of this case study is to demonstrate the significant influence of the Russia-Ukraine War on a thriving local faucet manufacturing company named Casio

Metal, which has been operating for 36 years. Founder of the company, Md. Badsha Mia, established it in 1986 to provide for his family. The company has survived and thrived despite various challenges including the pandemic. However, ongoing conflict on a distant continent exerts significant pressure on its survival.

Background of the Case:

Since its founding in 1986, the Md. Badsha Mia, "Casio Metal" has produced many metal faucets, particularly water taps. The eldest son of a big, eight-person family, Mr. Mia, joined a metal tap manufacturing factory as a day labourer to support his family when his father passed away. In addition, because of poverty, he was unable to complete school. While employed, he had a recurring dream of setting up a similar manufacturing plant. He initiated his envisioned project with modest personal savings, establishing a metal faucet manufacturing facility in Jatrabari, situated near the capital city of Dhaka, with three employees. Within two years, during the catastrophic flood that occurred in 1988 and caused widespread damage across Bangladesh, he faced his first obstacle, as it disrupted his national supply chain.

In 1990, Md. Badsha wanted to reestablish his dream factory. However, he required more capital to commence his business. As a result, he formed a partnership with a business associate who provided the necessary funds while contributing his expertise and diligent efforts. Due to Md. Badsha Mia's limited education and his partner took charge of oversee the financial aspects of the business. To keep costs low and maximise return on investment, he opted to purchase used equipment from a neighbouring factory. With these resources, they launched their business and established a new factory in Jatrabari, Dhaka, for the second time. Despite their partnership, Md. Badsha became aware that his business associate had been deceiving him by presenting inaccurate financial calculations and receipts. Consequently, he decided to establish severe ties with his partner by returning invested capital. Once again, he independently commenced his business venture.

During the initial stages of his start-up, Md. Badsha faced considerable hardships. To keep the business afloat, he resorted to taking advance payments from his dealers, who were willing to do so because of the high-quality and well-designed products he provided. Beginning with a modest capital of 25,000 BDT, he has since managed to grow his business, and it now boasts capital of nearly 70 million BDT. Having begun with just three employees, the factory has expanded and currently employs a staff of fifty-three individuals. Moreover, it produces a remarkable seven thousand pieces of products monthly. The business generates a monthly turnover of 60 00,000 BDT and an annual turnover of 7, 20, 00,000 BDT.

Case Dilemma:

The enterprise known as "Casio Metal" specialises in manufacturing a range of metal faucet products, including water taps, showerheads, and various other faucet items designed for use in washrooms, kitchens, sinks, tubs, and other related settings. 'Casio Metal' follows a B2B (business-to-business) model for its operations, which involves selling its products to wholesalers, distributors, contractors, or directly to large-scale building projects.

In 2019, Casio Metal was confronted with the coronavirus pandemic. As per the government's mandate, factory operations had to be temporarily ceased owing to the declared lockdown measures and social distancing requirements. Following the lifting of the lockdown measures, Casio Metal experienced an increase in its local sales orders. This was largely because the import of metal taps from China was restricted owing to concerns about COVID-19 contamination, thus boosting the demand for locally manufactured products.

However, at present, the business operations of Casio Metal have been severely disrupted, and its existence has been threatened by the Ukraine-Russia war. This was because the dollar's value increased against the local currency, and banks faced a severe dollar crisis. Consequently, most private banks did not grant permission to open the LC. In addition, Md. Badsha was unable to import the necessary machinery and equipment from other countries because of the crisis. Although he typically imported parts and equipment from China, he could no longer do so. This crisis has significantly affected the company's regular operations, and it has been unable to deliver ordered pieces. As Bangladesh is heavily dependent on imported goods, this price hike has negatively affected the country's foreign reserves as import payments have now increased. In addition, the ongoing war also raises the demand for dollars worldwide, as U.S. assets are seen as safe havens. There is a common perception that war will have a comparatively less negative impact on the U.S. economy (Klein, 2022). Due to this situation, the value of most of the major currencies has devalued against U.S. dollars.

Over 80% of ships that reach their End of Life (EoL) are dismantled in South Asian countries, including Bangladesh, India, and Pakistan (Rahman et al., 2021). In Bangladesh, brass is the primary raw material for manufacturing faucet items, such as water taps, and is typically obtained through shipbreaking. Shipbreaking is the practice of dismantling or scrapping the parts of an old or unusable ship to reuse them. Shipbreaking yards in Bangladesh are located outside the major port city of Chittagong, and brass obtained from ships is highly corrosion-resistant to salt water, making it ideal for use by ship propellers. In addition, brass combines copper and zinc, making it resistant to corrosion under wet conditions.

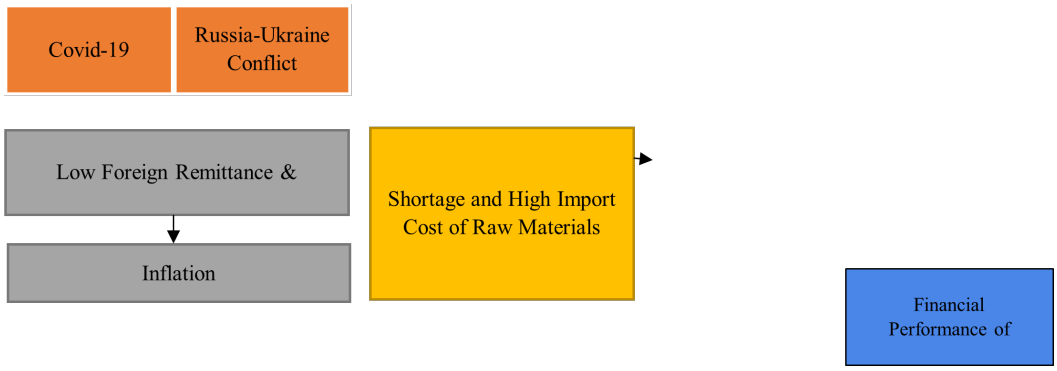
Furthermore, they can withstand very high temperatures, making them suitable for piping or condensers in marine environments. Owing to Bangladesh's significant ship-breaking industry, brass is readily available as a primary raw material for manufacturing water taps. However, According to Rahman et al. (2021), owing to efforts to reduce the spread of COVID-19, the international supply chain has experienced a significant decrease, except for certain urgent medical-related items.

The ongoing global conflict between Russia and Ukraine has also contributed to the devaluation of local currencies on the Indian subcontinent, resulting in a substantial decrease in ship recycling prices. For example, according to Intermodal, recycling yards in Bangladesh require tonnage, although they offer lower prices for such vessels. This is due to the limited availability of ships in their inventories and also a report by Global Marketing Systems (GMS), a Dubai-based company notes that steel prices have been affected by the ongoing Russia-Ukraine conflict and the depreciation of local currencies (Maritime Gateway, 2022). As a result, the company, "Casio Metal is currently experiencing a shortage of the necessary raw materials for their manufacturing processes.

The end of the pandemic restrictions has led to increased competition in the faucet manufacturing industry, as companies in Italy, Germany, Korea, India, Thailand, China, Taiwan, and other countries are now exporting their products using aggressive business tactics. This has created an additional challenge for local companies like "Casio Metal." In addition, large corporate entities such as Akij, Pran RFL, and others have expanded their businesses in this industry, making the market even more competitive for small and medium-sized enterprises (SMEs) in the sector.

The current situation is highly challenging for "Casio Metal" due to the economic issues caused by the COVID-19 pandemic and the Russia-Ukraine conflict. As a result, the company faces the dilemma of whether to maintain its existing strategies or adopt new ones to regain its growth trajectory.

Figure 1: Conceptual Framework (Constructed by the Researchers).



LITERATURE REVIEW

The concept of business success is multifaceted and different criteria are used in various contexts to define it. Financial success, company longevity, and size expansion are potential indicators of business success (Key 2022). Due to this complexity, there is no single definition of what it means to be successful in business (Rogoff et al., 2004). According to Rodriguez and Santos (2009), assessing successful business operations in emerging countries is rare. Profitability is a crucial indicator of corporate success in accounting, while "business success" and "firm performance" are often used interchangeably in management studies (Tehseen et al., 2019).

B2B businesses are an essential component of the global economy. Research shows that financial success is critical for these companies. Rahman et al. (2018) find that profitability or return on investment, market share, and sales growth are three of the most commonly used criteria for evaluating a B2B company's financial performance. Moreover, financial stability and economic growth are essential to ensuring the commercial viability of these companies.

Another study by Langerak & Hultink (2018) found that effective marketing and strategic management are crucial for B2B business success. The authors suggest that successful B2B companies prioritise customer centricity, innovation, and value creation.

The faucet industry in Bangladesh is a significant contributor to the country's economy, generating employment and revenue. Haque et al. (2019) highlight the significance of the faucet industry in the Bangladeshi economy. This study reports that the faucet industry has experienced substantial growth in recent years, registering a 15% annual growth rate over the past decade. The faucet industry is one of the fastest-growing manufacturing sectors in Bangladesh, contributing to the country's export earnings.

Growth in the faucet industry has been attributed to several factors, including the availability of skilled labour, low production costs, and a favourable business environment. Bangladesh has a vast pool of skilled labourers, and its low-cost production capabilities have made it a hub for manufacturing. The government has also implemented policies to promote the growth of the manufacturing sector, including that of the faucet industry. For example, Bangladesh Bank has extended various credit facilities to support the growth of its faucet industry (Haque et al., 2019).

However, Bangladesh's faucet industry faces challenges including competition from foreign companies, limited access to financing, and an inadequate supply of raw materials. Competition from foreign companies, especially China and India, has made it difficult for local companies to compete. The aggressive export policies of these countries have also posed a challenge to Bangladesh's

faucet industry (Islam et al., 2020). According to Ahmed (2017), the industry has been growing steadily in recent years, with a yearly growth rate of 15% and an estimated market value of TK 1,500 crore. However, foreign brands predominantly dominate the market, with only a few local brands, such as the RFL Group, manufacturing these items (Khan, 2019). The limited number of local brands has resulted in the entry of substandard products into the market, which has taken away market share (Ahmed, 2017). According to traders, approximately 50 companies in Bangladesh produce faucets and showerheads made of plastic, steel, or metal. These companies manufacture various products such as bib cock water taps, showers, water closet commodes, basin taps, and squat toilet taps. In modern apartments, high-end hotels, and luxury resorts, sanitary products are often imported from countries such as Italy, Germany, Korea, India, Thailand, China, and Taiwan. However, cheaper and lower quality products are imported from China. Generally, over 50% of all sanitary fittings sold in a country are of foreign origin (Business Standard, 2021).

The conflict between Russia and Ukraine disrupted the global supply chain and caused many countries, including Bangladesh, to face challenges in importing raw materials. According to a report by The Business Standard, Bangladesh's faucet industry has been hit hard by this conflict, leading to a shortage of brass, a key raw material for faucet manufacturing (The Business Standard Report, 2021). The shortage of brass has resulted in higher prices and delays in production schedules for faucet manufacturers. According to an article by The Daily Star, the shortage of brass has forced manufacturers to reduce their production capacity, thereby impacting the country's overall faucet supply (Noyon, 2022). Furthermore, the conflict has affected transportation and logistics, causing further disruptions in the supply chain. Shipment delays have increased transportation costs and delivery schedules for raw materials (Alam, 2021). This conflict has caused a significant increase in the US dollar price, which has created challenges for the faucet industry in Bangladesh. According to a report by Business Standard (2021)., the increase in the price of the US dollar led to an increase in the cost of imported raw materials and a subsequent increase in the price of locally manufactured faucets. The increase in the price of faucets has resulted in a decline in demand as consumers are hesitant to pay higher prices. This decline in demand has created challenges for faucet manufacturers in Bangladesh because they struggle to maintain profitability and remain competitive in the market (Hossain, 2021). The faucet industry in Bangladesh has been hit hard by the US dollar price increase, with manufacturers struggling to cope with the rise in production costs (Noyon, 2022). According to the report by The Daily Star, the increase in the price of the US dollar has made it difficult for faucet manufacturers to import the necessary raw materials, leading to a shortage of supply and higher prices. The increase in the US dollar price caused by the Russia-Ukraine conflict has created challenges for the faucet industry in Bangladesh. The increase in production costs and the subsequent increase in the price of faucets have led to a decline in demand, making it difficult for manufacturers to remain profitable and competitive in the market.

The foreign reserve crisis caused by the Russia-Ukraine War has also created challenges for the business industry in Bangladesh. According to a report by The Daily Star, the foreign reserve crisis has made it difficult for businesses to open Letters of Credit (LCs) and import the necessary raw materials (Noyon, 2022). The report highlights that businesses need more foreign exchange, making importing the necessary raw materials and paying for other essential imports difficult. According to a report by The Business Standard, the government of Bangladesh has taken measures to address the foreign reserve crisis and to support the business industry. These measures include increasing the limit for opening LCs, allowing businesses to borrow money from the central bank at a reduced

interest rate, and providing financial incentives for exporters (Business Standard Report, 2022). Despite these measures, the foreign reserve crisis and LC opening challenges continue to create difficulties for Bangladesh's business industry. According to a report by The Daily Star, the crisis has led to delays in importing the necessary raw materials and equipment, impacting the production and operations of businesses (Noyon, 2022).

The industry in Bangladesh has witnessed the entry of large corporate companies, which has created challenges for SMEs. According to a report by The Daily Star, SMEs need help to compete with large corporations because of their limited resources, lack of technology, and access to financing (Khan, 2019). The report highlights that large corporations have better access to technology, raw materials, and financing, enabling them to produce high-quality products at lower costs, making it difficult for SMEs to compete. The government of Bangladesh has acknowledged the challenges that SMEs face in the faucet industry. According to a report by The Daily Star, the government has announced several initiatives to support SMEs, including providing access to finance, improving technology, and offering training and education (Islam 2019). Despite these initiatives, SMEs in the faucet industry continue to face challenges in terms of competing with large corporations. According to a report by Financial Express, SMEs are calling for more government support to address their challenges (Ahmed, 2018).

Despite these challenges, Bangladesh has many opportunities for the faucet industry. The increasing demand for faucets owing to the rise in construction and building activities presents opportunities for growth in the sector. Furthermore, the government's efforts to promote the manufacturing sector, including the faucet industry, can support growth and development (Haque et al., 2019). The faucet industry in Bangladesh is a vital contributor to the country's economy by generating employment and revenue. Although the sector has experienced substantial growth in recent years, it faces several challenges, including competition from foreign companies, limited access to financing, and an inadequate supply of raw materials. Nevertheless, growth opportunities exist and the government's efforts to support the manufacturing sector could promote the growth of the faucet industry in Bangladesh.

Theoretical Anchoring:

The ongoing one-year conflict between Russia and Ukraine has caused significant repercussions on the global economy, with many countries being affected. Due to the interdependence brought about by globalisation, nations are reliant on one another. Bangladesh is currently experiencing high inflation and a US dollar crisis. As a result of the shortage of dollars, many banks are now declining to open LCs (letters of credit) which negatively impacts imports. Casio Metal, a company that imports machinery, equipment, and raw materials from abroad, faces significant challenges in sustaining its production and business operations.

This case study focuses on and adds value to a small manufacturing company and highlights the negative impact of the global crisis on its operations. It also illustrates the challenges posed by macro-environmental factors, particularly the unpredictable nature of global politics.

RESEARCH QUESTIONS

1. In the era of globalisation, how are local businesses affected by the ongoing global crisis?
2. How is the raw-material import-based manufacturer in Bangladesh affected by the global economic crisis resulting from the conflict between Russia and Ukraine?

METHODOLOGY

This case study aims to comprehensively comprehend a specific event that occurs at a particular time. To gather information for this case study, an in-depth interview method was utilised, which is especially suitable for investigating unique subject matter, particularly those involving sensitive or private issues. Unstructured interviews are often called in-depth interviews, as they allow researchers to engage with units of analysis to obtain critical information about personal experiences and viewpoints. This method offers greater flexibility to respondents, enabling context-specific information to flow more freely, resulting in richer data. Individual face-to-face and group interviews were conducted as part of the enquiry process for this study (Bihu, 2020). According to Nick (2009), individual interviews are suitable for providing participants with in-depth information regarding the significance of an event, circumstance, or social context in a controlled setting. Although significant effort is required, in-person interviews may be the most effective approach for obtaining high-quality data. On the other hand, group interviews are best suited for qualitative techniques (Morgan, 1999). Nevertheless, this approach may be helpful in certain situations, such as conducting appropriate in-depth, one-on-one interviews and promoting interactivity among participants to obtain relevant context-specific information.

Prior to the interview, the respondent of this case study (the owner of 'Casio Metal') was informed of the study's objectives. The interview consisted of three steps. In the initial step, the interviewer sought a backdrop for the interviewee's experience relevant to the subject matter. The interviewee's experience with the subject was then highlighted to encourage experience reconstruction regarding how the respondent was engaging in that experience. In the last step, the interviewees were asked to reflect on the significance of their experiences, particularly how the respondents related their feelings and thoughts to the study subject (Bihu, 2020). Following these three stages, the interview may transition from an early, more unstructured phase to a more focused one, in which the interviewer can combine prior materials to develop important meanings derived from their experiences (Nick, 2009).

In 1986, Md. Badsha Mia founded "Casio Metal" with modest personal savings. Despite facing natural and human-made challenges, his intense dedication and hard work allowed the sole proprietorship business to achieve financial success, longevity, and expansion. This case study provides an overview of the company and highlights the obstacles or dilemmas it is currently facing.

FINDINGS AND DISCUSSION

"Casio Metal", an SME in the faucet manufacturing industry founded in 1986, has had a lengthy 36-year journey marked by significant ups and downs. However, it overcame several obstacles and finally reached a breakeven, demonstrating its success with the help of careful preparation and the owner's commitment.

Due to restrictions on the import of faucets from other countries due to concerns over COVID–19 contamination, the performance of "Casio Metal" increased in the local market during the pandemic period of 2019–2010, when the entire business world faced its most significant challenges to remain in operation. Nevertheless, the current Russia-Ukraine war seriously hampered Casio Metal's economic activities and jeopardised its survival. This was mostly because the dollar's value had risen relative to the local money, and local financial institutions, such as banks, dealt with a severe dollar issue. Therefore, most private banks no longer permit the opening of LCs. In addition, due to the crisis, "Casio Metal", a manufacturing company that relies on importing raw materials, has trouble obtaining the necessary machinery and

equipment from other countries. This issue has substantially influenced routine business operations, preventing them from supplying the necessary components. Furthermore, obtaining the primary raw material for faucet production has become challenging, as ship recyclers also experience difficulties in collecting the necessary materials owing to the same issues.

In Bangladesh, approximately 50 domestic companies manufacture plastic, steel, and metal faucets and showerheads. Competition in this sector has intensified with the entry of prominent corporate players, and the situation has become more complicated owing to the lifting of pandemic restrictions. Additionally, companies from countries such as Italy, Germany, Korea, India, Thailand, China, and Taiwan have started exporting their faucet products to Bangladesh using aggressive business tactics. The industry in Bangladesh has experienced steady growth over the past few years, with an annual growth rate of 15%. The market value was estimated at 15 billion BDT. Despite this growth, foreign brands dominate the market. More than 50% of all sanitary fittings sold in the country are of foreign origin.

Despite being a BDT-7.2 crore business, "Casio Metal' has faced numerous challenges since its inception. These challenges include environmental factors, competition, dominant market platforms and standards and customer knowledge and beliefs. Consequently, the company experienced ups and downs due to the obstacles created by these challenges. These barriers have had a significant adverse impact on the growth and development of the business, causing "Casio Metal" to encounter substantial difficulties.

The firm's success was not due to a formal planning procedure but rather due to its founder's tenacity, fortitude, intuition, and quick reactions. However, the current business environment is more challenging due to global economic issues related to the pandemic and the Russia and Ukraine War, posing new problems for the company.

CONCLUSION

As we live in an era of globalisation, all nations are connected and interdependent. Owing to this growing integration, businesses are now easily affected by any global incident, either positively or negatively. In the case of Casio Metal, the aftermath of the pandemic and the ongoing war are creating serious challenges for businesses. To survive in the long run and overcome these challenges, Casio Metal should search for local or alternative sources of raw materials. Casio Metal can be used to diversify its business. Another approach the business may take is to 'wait and watch'. They can observe the situation and wait for the right time to take action.

As this study is based on a single case of a faucet-industry SME, the information presented relies on the owner's perspective. Further research is required to clarify the role of entrepreneurial marketing in the business sector. It would be interesting to conduct additional research using multiple case studies to understand how business owners employed entrepreneurial marketing strategies to initiate comeback efforts in a competitive climate following the global economic collapse resulting from the pandemic and recent war-related events.

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THE RELATIONSHIP OF E-TRAINING, WORK MOTIVATION, AND WORK-LIFE BALANCE ON MALAYSIAN TEACHERS' PERFORMANCE DURING COVID-19 PANDEMIC

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ABSTRACT

E-training, work motivation and work-life balance are three crucial factors that could affect employee performance. However, literature review indicates a lack of consistency in the study of the relationship among these elements, particularly in the context of the COVID-19 pandemic. This research delves into how e-training, work motivation, and work-life balance influence teachers' performance during the COVID-19 crisis. Previous studies highlight the detrimental impact of the pandemic on 90 per cent of employees in Malaysia, with 53 per cent of teachers experiencing a decline in performance attributed to elevated stress and mental health issues. A total of 152 teachers from both primary and secondary schools in Malaysia participated in a comprehensive 47-item online survey. The results reveal a positive correlation between e-training, work motivation, and work-life balance with teachers' performance. Teachers equipped with adequate e-training, high work motivation and good work-life balance would translate into increased performance amid the challenges posed by the COVID-19 pandemic. The insights gained from this study can inform government initiatives to design and implement more effective e-training programmes, fostering work motivation and work-life balance for high-performance employees.

INTRODUCTION

Background of the Study

The global impact of the COVID-19 crisis has been significant, affecting 84 per cent of industries worldwide (Gilchrist, 2020). The crisis has taken a toll on employee performance in Malaysia, negatively impacting 90 per cent of workers (Ram, 2021). Notably, teachers have faced challenges, with 53 per cent reporting a decline in performance due to heightened stress and mental health issues, as they had to adapt rapidly to distance learning and virtual student engagement (Kraft et al., 2020). The demands for teacher resilience and tolerance for anxiety were high, contributing to performance issues (Anderson et al., 2020). The adoption of 'emergency remote teaching' to address the pandemic's impact on education further complicated the situation (Assuncao Flores & Gago, 2020). Despite integrating e-training in education, it poses challenges for teachers, such as a lack of social interaction and human contact with students, potentially impacting their ability to lead and guide effectively (Tamm, 2020). The COVID-19 pandemic, coupled with the rise of "work from home" (WFH) practices, has brought discussions about e-training, work motivation, and work-life balance to the forefront (Kaushik & Guleria, 2020). WFH practices, for example, have shown positive outcomes for employees, leading to higher performance and a healthy work-life balance (Wolor et al., 2020). The interconnection between work motivation, work-life balance, and employee performance becomes evident as maintaining a favourable work-life balance increases motivation and performance levels (Thamrin & Riyanto, 2020). This study aims to revisit these four variables to understand their relationship within the context of the COVID-19 pandemic.

RESEARCH OBJECTIVES

This study aims to determine the relationship of e-training, work motivation, and work-life balance on Malaysian teachers' performance during the COVID-19 pandemic. Specifically, this study seeks:

a) To determine the relationship between e-training and teachers' performance during the COVID-19 pandemic.
b) To determine the relationship between e-training and work motivation during the COVID-19 pandemic.
c) To determine the relationship between work motivation and teachers' performance during the COVID-19 pandemic.
d) To determine the relationship between e-training and work-life balance during the COVID-19 pandemic.
e) To determine the relationship between work-life balance and teachers' performance during the COVID-19 pandemic.
f) To determine the relationship between work-life balance and work motivation during the COVID-19 pandemic.

LITERATURE REVIEW

This study is based on Human Capital Theory (HCT), a key theory in human resource development, which became influential in modern economics in the early 1960s and gained further significance with the advent of the "knowledge economy" in recent decades (Baptiste, 2001; Gillies, 2017). HCT is relevant to this study in multiple ways. Firstly, e-training is viewed as imparting valuable knowledge and skills to employees, thereby enhancing their performance, productivity, and income (Fugar et al., 2013). Aliaga (2001) suggested that such training contributes to human capital development, allowing individuals to enhance their expertise. Wang and Holton (2005) emphasized that training is crucial in establishing human expertise, providing a theoretical framework widely accepted by human resource development professionals. HCT also helps employers understand individuals' motivation at work through rational egoism, a consistent motivational factor (Fredman, 2014). Furthermore, HCT posits that work-life balance is largely influenced by employees' attitudes towards their organization and their personal lives

(Kumar, 2012). Rincy and Panchanatham (2016) noted that employees are willing to allocate resources to work, family, and leisure activities within time and energy constraints. This perspective aligns with the study's objectives, which aim to explore the relationship between e-training, work motivation, and work-life balance on employees' performance during the COVID-19 pandemic.

E-Training and Employees' Performance

The literature confirms that the primary purpose of e-training is to improve employees' performance by enhancing their knowledge, skills, and abilities (Zainab et al., 2015). Numerous studies show significant positive associations between e-training and employee performance. For example, Kamal et al. (2016) found a positive correlation between e-training and employees' performance, especially among those at the Ministry of Education. Previous research also indicated a positive relationship between e-training and the performance of academic professionals in public universities (Umar et al., 2020). Hence, the first hypothesis is:

H1: There is a significant positive relationship between e-training and teachers' performance during the COVID-19 pandemic.

E-Training and Work Motivation

E-training is seen as a practical professional development tool that enhances cost-effectiveness, flexibility, comfort, and work motivation (Ramayah et al., 2012). Past studies suggest that e-training helps employees understand how their work fits into the company's structure and goals, leading to increased work motivation (Tanner, 2017). Studies report a positive correlation between e-training and work motivation among employees in childhood education programs (Siswanto et al., 2018). Thus, the second hypothesis is:

H2: There is a significant positive relationship between e-training and work motivation during the COVID-19 pandemic.

Work Motivation and Employees' Performance
Motivation reflects employees' orientation towards work within the organizational setting (Pancasila et al., 2020). Employees with a positive disposition towards their work are likely to exhibit higher work motivation and, consequently, better performance. Hamdani et al. (2018) highlighted the close association between work motivation and teachers' performance. Andriani et al. (2018) also found that increased work motivation correlates with elevated teachers' performance. Martini and Sarmawa (2019) discovered a positive correlation between work motivation and the performance of employees in 25 non-star hotels in Denpasar-Bali. Therefore, the third hypothesis is:

H3: There is a significant positive relationship between work motivation and teachers' performance during the COVID-19 pandemic.

E-Training and Work-Life Balance

To gain a competitive edge and meet global job market demands, employees need essential knowledge, skills, and abilities (Alkali & Mansor, 2017). E-training has surged as a substitute for traditional training due to advancements in information technologies (Al-Amri et al., 2020). The literature consistently shows positive associations between e-training and work-life balance. For example, Bulinska-Stangrecka et al. (2021) identified a positive correlation between e-training and work-life balance, demonstrating that e-training helps maintain employees' work-life balance. Hence, the fourth hypothesis is:

H4: There is a significant positive relationship between e-training and work-life balance during the COVID-19 pandemic.

Work-Life Balance and Employees' Performance

Previous research has shown a positive connection between work-life balance and the performance of teaching faculty members (Soomro et al., 2018). Work-life balance boosts employee productivity, positively impacting both employees and organizations (Semlali & Hassi, 2016). For teachers, a favorable work-life balance leads to increased job satisfaction and performance (Baluyos et al., 2019). Mendis and Weerakkody (2017) found similar results in the telecommunications industry. Thus, the fifth hypothesis is:

H5: There is a significant positive relationship between work-life balance and teachers' performance during the COVID-19 pandemic.

Work-Life Balance and Work Motivation

In the competitive business landscape, work-life balance is essential (Kanwar et al., 2009). Implementing work-life balance practices mitigates work-life conflicts, enhancing employee efficiency and effectiveness (Lazar et al., 2010). Strong work-life balance is linked to increased work motivation and effectiveness (Abdirahman et al., 2018). Literature consistently supports a positive correlation between work-life balance and work motivation (Wolor et al., 2020). Hence, the sixth hypothesis is:

H6: There is a significant positive relationship between work-life balance and work motivation during the COVID-19 pandemic.

Figure 1 The conceptual framework of this study

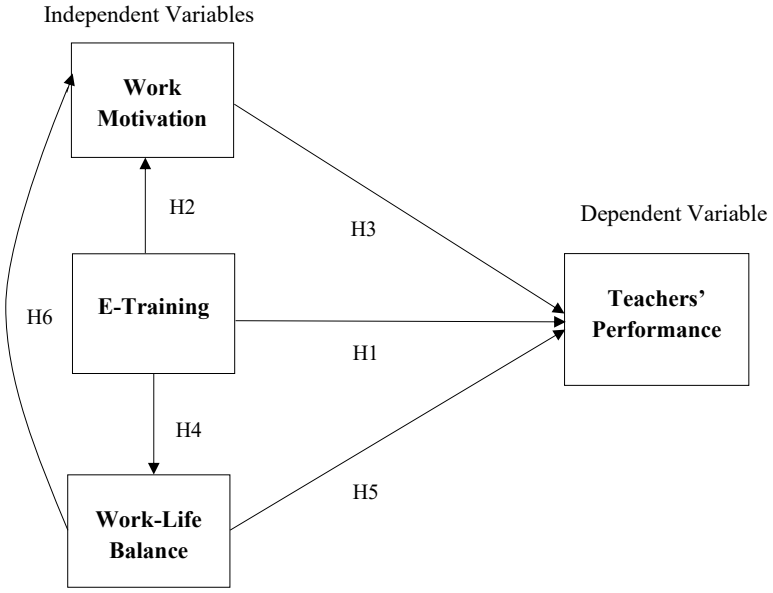

Figure 1 represents the framework used in this study with e-training, work motivation, and work-life balance as independent variables, and teachers' performance as the dependent variable

METHODOLOGY

Research Design

This study employed a correlational and quantitative research design. This study focused on Malaysian teachers situated in various states. According to Malaysian Educational Statistics (2020), there were a total of 32.4 million teachers in 2018, with an increase of 0.2 million, bringing the total to 32.6 million

in 2019. The sample for this study comprised 152 teachers from both primary and secondary schools in Malaysia, who participated through an online survey form. In this study, the snowballing sampling technique involved sharing the survey link with personal contacts, who then circulated it to other teachers. A total of 152 responses were obtained from the survey, and all 152 responses were complete, constituting the final dataset. Consequently, the response rate for this study was 100.00%. The sample size of cases in the current study surpasses 138 cases, as determined by power analysis using G*Power version 3.1.9.4 for conducting Pearson Correlation analysis to test the hypotheses.

Research instrument

An online questionnaire was used as the research instrument to gather data. The questionnaire comprised sections A and B. Section A focused on gathering demographic information, including gender, age, highest educational attainment, city of origin, years of working experience, and the school where teachers are currently employed. Section B addressed the variables of interest: e-training, work motivation, work-life balance, and teachers' performance. To assess e-training dimensions (infrastructure, efficiencies, and methods), a 25-item scaled questionnaire developed by Baldwin and Ford in 1988 and later adopted by Kamal et al. (2016) was utilized. Work motivation was measured using a 6-item scaled questionnaire from the McKinsey Quarterly adopted by Rizwan et al. (2014). A 4-item scaled questionnaire adopted from Shukla and Srivastava (2016) was employed to evaluate work-life balance. Finally, teachers' performance was gauged using a 12-item scaled questionnaire developed by Thomson in 2008 and adopted by Kamal et al. (2016). Respondents were required to rate each item on a five-point Likert scale, ranging from strongly disagree=1, disagree=2, neutral=3, agree=4, to strongly agree=5.

Data Analysis

Before conducting descriptive statistics and Pearson correlation using SPSS, data screening was carried out to identify missing data and assess the presence of extreme values based on skewness and kurtosis. Following data screening, the validity and reliability of the instrument were determined to assess if the data was adequate for subsequent analyses. Additionally, the collected data were utilized to ascertain respondents' demographic profiles during the descriptive analysis phase. This involved analyzing the mean and standard deviation for both the independent variables (e-training, work motivation, and work-life balance) and the dependent variable (teachers' performance) to ensure the acceptability of the mean values. Finally, Pearson correlation tests were employed for hypothesis testing. A total of 152 completed surveys were analysed in the study, resulting in a 100% response rate.

Following the normality tests, no significant outliers were identified, as all values fell within an acceptable range. The normality of the sample was inferred from the Skewness and Kurtosis test results. According to Orcan (2020), as long as Skewness and Kurtosis values remain within ±1, it indicates a normal distribution for the study.

Validity of the instrument

According to Table 1, the questionnaire proved reliable instruments for this research. As per Ursachi et al. (2015), the widely accepted guideline suggests that a Cronbach's Alpha value between 0.6 and 0.7 indicates an acceptable level of reliability, while a value of 0.8 or higher indicates an excellent level of reliability. It is worth noting that values exceeding 0.95 may indicate redundancy and are not necessarily favourable. Nonetheless, the results demonstrated that all variables were both valid and reliable for the study.

Table 1 Reliability Test

Construct	Cronbach's Alpha (Past Literature)	Cronbach's Alpha (Current Study)	No. of Items
Teachers' Performance	0.780	0.825	12
E-Training	0.810	0.950	25
Work Motivation	0.759	0.824	6
Work-Life Balance	0.730 to 0.850	0.639	4

RESULTS

Characteristics of the respondents

The initial phase of the data analysis involved evaluating the participants' demographic profiles. This assessment encompassed factors such as gender, age, highest educational attainment, city of origin, years of professional experience, and the type of educational institution where the teachers are currently employed. Female participants surpassed their male counterparts, constituting 77.0% compared to 23.0%. The predominant age range among the respondents was 41-50 years (36.2%). Those aged 21-30 accounted for 27.6%, followed by 19.1% in the 51 years and above category. Respondents aged 31-40 constituted 15.8%, and a minor proportion of 1.3% fell within the age group of 20 years and below. Regarding the highest educational achievement among the teachers, most of the participants, constituting 67.1%, hold a Bachelor's Degree or equivalent. This is followed by respondents with a Master's Degree, accounting for 14.5%, and those with a Diploma/Technical school certificate, making up 13.8%. In contrast, a minority of participants, specifically 3.9%, have educational qualifications of Malaysian Certificate of Education (SPM) and below, while 0.7% have attended college as their highest academic attainment. Additionally, in terms of the city of origin, a significant portion of the respondents, totalling 73.0%, hails from East Malaysia, whereas 27.0% of the participants originated from West Malaysia. Based on the results, most participants, accounting for 32.9%, had work experience falling within the 21-30 years range. Respondents with 11-20 years and less than one year of working experience constituted 26.3% and 18.4%, respectively. A further 14.5% of participants reported working for 1-10 years, while a minority, comprising 7.9%, had accumulated more than 30 years of working experience. Regarding the current type of school where the teachers are employed, 63.8% of the respondents were engaged in teaching at the primary school level, while 36.2% were involved in secondary school education. A comprehensive breakdown of the demographic profiles of the respondents can be found in Table 2.

Table 2 The demographic profiles of the respondents

Variables		Frequency (N)	Percentage (%)
Gender	Male	35	23.0%
	Female	117	77.0%
Age	20 years and below	2	1.3%
	21-30 years	42	27.6%
	31-40 years	24	15.8%
	41-50 years	55	36.2%
	51 years and above	29	19.1%
Highest academic attainment	SPM and below	6	3.9%
	Diploma / Technical school certificate	21	13.8%
	College	1	0.7%
	Bachelor's Degree or equivalent	102	67.1%
	Master's Degree	22	14.5%
City of origin	East Malaysia	111	73.0%
	West Malaysia	41	27.0%
Years of working experience	Less than 1 year	28	18.4%
	1-10 years	22	14.5%
	11-20 years	40	26.3%
	21-30 years	50	32.9%
	More than 30 years	12	7.9%
Type of school teachers currently serving	Primary school	97	63.8%
	Secondary school	55	36.2%

Descriptive data analysis

The participants were required to evaluate e-training, work motivation, work-life balance, and employee performance. As indicated in Table 3, the analysis reveals that work motivation received the highest mean score (Mean = 3.93, Standard Deviation = 0.692), followed by employee performance (Mean = 3.67, Standard Deviation = 0.607) and work-life balance (Mean = 3.64, Standard Deviation = 0.704). Conversely, e-training obtained the lowest mean score among the assessed factors (Mean = 3.53, Standard Deviation = 0.651).

Table 3 Descriptive Statistics

Variables	Mean	Standard Deviation
E-Training	3.53	0.651
Work Motivation	3.93	0.692
Work-Life Balance	3.64	0.704
Teachers' Performance	3.67	0.607

Hypotheses testing

This section used the Pearson Correlation to assess the relationship between the independent and dependent variables. As Schober et al. (2018) outlined, correlation coefficients were employed to elucidate the strength and direction of the association between variables. The Pearson correlation coefficients (r) range from -1 to +1, signifying positive or negative correlations, while a correlation coefficient of 0 indicates no correlation, implying zero relationships (Obilor & Amadi, 2018).

Correlation of E-Training and Teachers' Performance

Table 4 Pearson correlation findings between e-training and teachers' performance

		E-Training	Teachers' Performance
E-Training	Pearson Correlation	1	0.458**
	Sig. (2-tailed)		0.000
	N	152	152
Teachers' Performance	Pearson Correlation	0.458**	1
	Sig. (2-tailed)	0.000	
	N	152	152

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

The results in Table 4 showed that there is a significant positive relationship between e-training and employees' performance (r = 0.458, p = 0.000). Hence, hypothesis 1 is supported because the p-value is ≤ 0.01. In other words, it also indicates that there is a moderate positive relationship between e-training and teachers' performance which is based on a 99% confidence interval.

Correlation of E-Training and Work Motivation

Table 5 Pearson Correlation Findings between E-Training and Work Motivation

		E-Training	Work Motivation
E-Training	Pearson Correlation	1	0.409**
	Sig. (2-tailed)		0.000
	N	152	152
Work Motivation	Pearson Correlation	0.409**	1
	Sig. (2-tailed)	0.000	
	N	152	152

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

The results in Table 5 showed that there is a significant positive relationship between e-training and work motivation (r = 0.409, p = 0.000). Hence, hypothesis 2 is supported

because the p-value is ≤ 0.01. In other words, it also indicates that there is a moderate positive relationship between e-training and work motivation which is based on a 99% confidence interval.

Correlation of Work Motivation and Teachers' Performance

Table 6 Pearson correlation findings between work motivation and teachers' performance

		Work Motivation	Teachers' Performance
Work Motivation	Pearson Correlation	1	0.622**
	Sig. (2-tailed)		0.000
	N	152	152
Teachers' Performance	Pearson Correlation	0.622**	1
	Sig. (2-tailed)	0.000	
	N	152	152

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

The results in Table 6 showed that there is a significant positive relationship between work motivation and employees' performance (r = 0.622, p = 0.000). Hence, hypothesis 3 is supported because the p-value is ≤ 0.01. In other words, it also indicates that there is a moderate positive relationship between work motivation and teachers' performance which is based on a 99% confidence interval.

Correlation of E-Training and Work-Life Balance

Table 7 Pearson correlation findings between e-training and work-life balance

		E-Training	Work-Life Balance
E-Training	Pearson Correlation	1	0.266**
	Sig. (2-tailed)		0.001
	N	152	152
Work-Life Balance	Pearson Correlation	0.266**	1
	Sig. (2-tailed)	0.001	
	N	152	152

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

The results in Table 7 showed that there is a significant positive relationship between e-training and work-life balance (r = 0.266, p = 0.001). Hence, hypothesis 4 is supported because the p-value is ≤ 0.01. In other words, it also indicates that there is a weak positive relationship between e-training and work-life balance, which is based on a 99% confidence interval.

Correlation of Work-Life Balance and Teachers Performance

Table 8 Pearson correlation findings between work-life balance and teachers' performance

		Work-Life Balance	Teachers' Performance
Work-Life Balance	Pearson Correlation	1	0.407**
	Sig. (2-tailed)		0.000
	N	152	152
Teachers' Performance	Pearson Correlation	0.407**	1
	Sig. (2-tailed)	0.000	
	N	152	152

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

The results in Table 8 showed that there is a significant positive relationship between work-life balance and employees' performance (r = 0.407, p = 0.000). Hence, hypothesis 5 is supported because the p-value is ≤ 0.01. In other words, it also indicates that there is a moderate positive relationship between work-life balance and teachers' performance which is based on a 99% confidence interval.

Correlation of Work-Life Balance and Work Motivation

Table 9 Pearson correlation findings between work-life balance and work motivation

		Work-Life Balance	Work Motivation
Work-Life Balance	Pearson Correlation	1	0.450**
	Sig. (2-tailed)		0.000
	N	152	152
Work Motivation	Pearson Correlation	0.450**	1
	Sig. (2-tailed)	0.000	
	N	152	152
** Correlation is significant at the 0.01 level (2-tailed).			

The results in Table 9 showed that there is a significant positive relationship between work-life balance and work motivation ($r = 0.450$, $p = 0.000$). Hence, hypothesis 6 is supported because the p-value is ≤ 0.01. In other words, it also indicates that there is a moderate positive relationship between work-life balance and work motivation which is based on a 99% confidence interval.

DISCUSSION

This research demonstrates a significant positive correlation between e-training and Malaysian teachers' performance amid the COVID-19 pandemic. This result aligns with earlier studies indicating a positive correlation between e-training and employee performance (Kamal et al., 2016; Alhooti & Anto, 2020; Hassan et al., 2020). It suggests that e-training plays a crucial role in determining employee performance, consistent with the training literature's emphasis on enhancing performance by developing knowledge, skills, and abilities (Zainab et al., 2015). Furthermore, the study argues that employees are more likely to engage in e-training if these systems create committed and satisfied job performers. This finding resonates with Umar et al.'s (2020) conclusions, emphasizing that effective e-training significantly influences and enhances employees' performance. Despite the pandemic reshaping work patterns and pushing many employees to work online, e-training remains essential to enable employees to fulfill specific job requirements and ensure job satisfaction. To achieve this, each e-training program must cater to individual employee needs to enhance performance (Halawi & Haydar, 2018). Syahmaidi et al.'s (2021) study, like the current one, suggests that employees' performance depends on the training output, whether in academic or non-academic achievements. Despite teachers' initial lack of preparation for online teaching due to their traditional face-to-face training, e-training proves beneficial. It allows teachers to stay current with teaching methodologies and consistently acquire new technological skills to meet the challenges of the digital age (Delgado, 2020). Consequently, e-training, a vital component of professional development, can enhance teachers' performance by acquiring relevant skills.

The study reveals a significant positive correlation between e-training and work motivation among Malaysian teachers during the COVID-19 pandemic. This outcome aligns with earlier research demonstrating a positive correlation between e-training and work motivation, as seen in the study by Siswanto et al. (2018). Their study, conducted in a similar field involving 183 respondents in the educational industry, supports the current findings and suggests that the effectiveness of e-training can influence work motivation positively (Sutarto et al., 2019). E-training helps employees comprehend how their work aligns with the company's structure and goals, contributing to increased work motivation when individuals understand the significance of their contributions (Tanner, 2017). Additionally, this study posits that e-training influences cost-effectiveness, flexibility, comfort, and work motivation (Ramayah et al., 2012). Therefore, increasing e-training provision is perceived to enhance employees' work motivation. The current global situation, notably the pandemic, underscores the imperative of e-training as a crucial tool for

upgrading employees' knowledge, skills, and proactive behavior (Mohamad et al., 2020). This finding is consistent with the study by Mohamad et al. (2020), emphasizing the influential role of e-training content in impacting employees' work motivation, leading to improved competencies, reduced errors, and the application of new problem-solving skills. Despite potential tension or stress experienced by teachers in adapting to online teaching, the study suggests that teachers can autonomously enhance their work motivation when the training conditions actively contribute to fulfilling their intrinsic psychological needs for autonomy, efficacy, and efficiency in their professional endeavors (Gorozidis et al., 2020).

The study indicates a significant positive correlation between work motivation and the performance of Malaysian teachers during the COVID-19 pandemic. This finding aligns with previous research where work motivation was positively correlated with employee performance (Riyanto et al., 2017; Martini & Sarmawa, 2019; Efendi et al., 2020). Employees exhibiting a positive attitude toward their work will likely have higher work motivation, contributing to excellent performance (Pancasila et al., 2020). Despite the pandemic causing anxiety among employees, those who demonstrate positive work motivation and experience a focus on safety measures, such as implementing work-from-home arrangements, still exhibit commendable performance (Susilo, 2020). Teachers' heightened concern about work-related activities during the pandemic is linked to their understanding that work motivation is closely tied to performance (Hamdani et al., 2018). This perspective is supported by Andriani et al. (2018), emphasizing that a higher application of work motivation leads to enhanced teacher performance. Teachers with high work motivation strive for continuous improvement as educators, aiming for optimal results and performance.

The study reveals a significant positive correlation between e-training and work-life balance among Malaysian teachers during the COVID-19 pandemic. This finding aligns with previous research where e-training was found to have a positive correlation with work-life balance (Bulinska-Stangrecka et al., 2021). This suggests that e-training plays a crucial role in shaping work-life balance, given its proven ability to balance professional and personal lives for employees. The pandemic has shifted the role of teachers from knowledge importers to expeditors of knowledge (Yao et al., 2020). Consequently, teachers are under mental strain and stress as they undergo e-training to enhance their technological proficiency and adapt to online teaching quickly (Marek et al., 2021). This transition has likely impacted their work-life balance, as teachers must navigate new family schedules and adjust to a transformed work situation and online teaching environment. Such substantial lifestyle changes may contribute to increased stress, depression, and anxiety among teachers (Konig et al., 2020). Additionally, despite the positive impact of e-training on enhancing teachers' skills and knowledge, continuous exposure to computer screens may strain their eyes, affecting their overall work-life balance due to an unhealthy lifestyle (Eman, 2021). In summary, the prolonged and intense nature of e-training can become monotonous and stressful, ultimately influencing teachers' work-life balance.

The study demonstrates a significant positive correlation between work-life balance and the performance of Malaysian teachers during the COVID-19 pandemic. This finding aligns with prior research where work-life balance was positively correlated with employee performance (Soomro et al., 2018; Mendis & Weerakkody, 2017). This implies that work-life balance plays a pivotal role in enhancing employees' productivity, positively influencing both individual and organizational performance (Semlali & Hassi, 2016). Therefore, organizations are encouraged to implement

effective work-life balance policies to ensure that employees remain socially connected with society while concurrently improving performance and productivity. Undeniably, the pandemic has heightened the significance of work-life balance, as it has significantly contributed to positive employee performance (Bataineh, 2019). Despite the rapid transition to online teaching, resulting in increased workloads for teachers during the pandemic, maintaining work-life balance remains crucial. Past research has substantiated that a favorable work-life balance leads to higher job satisfaction and teacher performance (Baluyos et al., 2019).

The study reveals a significant positive correlation between work-life balance and work motivation among Malaysian teachers during the COVID-19 pandemic. This result aligns with previous research where work-life balance was found to be positively correlated with work motivation (Wolor et al., 2020). This implies that practices promoting work-life balance are a remedy to reduce work-life conflict, enabling employees to be more efficient and effective in both their professional and personal roles (Lazar et al., 2010). In essence, it reflects the degree to which employees' needs are met in both their work and non-work aspects (Popoola & Fagbola, 2020). Furthermore, according to Abdirahman et al. (2018), work-life balance is considered the most critical aspect of the workplace. Therefore, employees who maintain an excellent work-life balance are more likely to exhibit higher work motivation, putting in more significant effort and dedication. Consequently, it suggests a positive influence of employees' work-life balance on their work motivation. With its shift to remote work, the pandemic has made it challenging for employees to maintain a healthy work-life balance and effective coping strategies for work-related stress, impacting their motivation to work (Rudnicka et al., 2020). Additionally, adopting online teaching during the pandemic has affected teachers' mental health due to the abrupt transition, suggesting disruptions in work-life balance and work motivation for employees during this period.

CONCLUSION

The study's findings indicate that the performance of Malaysian teachers is influenced by the provided e-training, aligning with the training literature's primary aim of enhancing employees' performance by developing knowledge, skills, and abilities. Additionally, the results underscore the role of e-training in determining work motivation. According to the study, e-training can influence work motivation, with increased training effectiveness leading to heightened motivation. Furthermore, the research highlights the equal importance of work motivation in determining employees' performance. The study suggests that teachers who exhibit a positive attitude towards their work demonstrate higher work motivation, ultimately contributing to outstanding performance. Moreover, the study indicates that e-training plays a role in determining work-life balance, as it has been proven to help maintain teachers' work-life balance. Subsequently, the outcomes emphasize that employees' performance is also influenced by work-life balance. The study proposes that work-life balance significantly enhances teachers' productivity, positively impacting individual and organizational performance. Additionally, the study stresses the equal significance of work-life balance in determining work motivation. According to the findings, work-life balance is considered the most crucial aspect of the workplace. Therefore, when school teachers maintain an excellent work-life balance, they are more likely to be motivated to work harder and invest more effort. In summary, the study underscores the interconnected roles of e-training, work motivation, and work-life balance in shaping and enhancing the performance of Malaysian teachers.

However, this study exclusively focused on Malaysia as its study population, and this narrow scope restricts the generalizability of the findings to a broader population. Additionally, the research was conducted with 152 complete respondents, which is considered the minimum sample size. Therefore, caution must be exercised when attempting to extrapolate the results of this study. Furthermore, a limitation of the present study is that data were collected exclusively from teachers in both primary and secondary schools. Consequently, the extent to which the findings can be generalized to other sectors or industries may vary due to differences in operational models, government policies and implementation, and cultural distinctions.

Despite the acknowledged limitations, it is imperative for future research to undertake a nationwide study that delves into understanding how the interplay of e-training, work motivation, and work-life balance can impact and shape employees' performance on a more expansive scale. This approach would enable the derivation of cross-border findings, allowing for a more comprehensive comparison of the research model across various states in Malaysia. Additionally, future research endeavours should broaden the coverage of the population by including samples from neighbouring countries such as Brunei, Indonesia, and Thailand, encompassing employees from diverse industries or sectors. This expanded approach aims to achieve a larger and more diverse sample size, thereby mitigating the potential for sample bias in the current study and facilitating meaningful comparisons between countries.

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EXPLORING THE MEDIATING EFFECT OF PERCEIVED EASE OF USE AND PERCEIVED USEFULNESS ON ACTUAL ADOPTION OF MOBILE WALLETS IN MALAYSIA

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ABSTRACT

Our study examines the actual adoption of mobile wallets (m-wallets) in Malaysia, with a particular emphasis on addressing the factors influencing the selection and efficient utilization of this payment method. We concentrate on the globally recognized Alipay and the locally established GrabPay. Based on the Technology Acceptance Model (TAM), the study investigates consumer-centric and technology-related factors and explores the role of Perceived Ease of Use (PEOU) and Perceived Usefulness (PU) as mediators in influencing the actual adoption of m-wallets. To compare Alipay and GrabPay, the data collection is through a survey of 632 responses and utilizing PLS-SEM and Welch's t-test for analysis. Our findings highlight the significant impact of compatibility on actual adoption, mediated by both PEOU and PU. However, personal innovativeness, mobile payment knowledge, and self-efficacy are found to have a relatively minor effect on actual adoption. GrabPay exhibits higher convenience and compatibility compared to Alipay, while personal innovativeness shows similar patterns for both platforms. Self-efficacy consistently influences adoption for both m-wallets. As compatibility is identified as the most crucial factor leading to m-wallet adoption, it is advisable for m-wallet service providers to offer a variety of services tailored to accommodate the diverse lifestyles of consumers.

INTRODUCTION

Historically, consumers utilized physical currency in the form of notes and coins to complete their commercial transactions with merchants. A novel payment system cantered around consumer preferences has been introduced recently to the market. The prevailing inclination among consumers is now to use mobile devices for conducting payments, commonly known as mobile payment (Shin, 2010). Mobile payment denotes a method of financial transaction wherein monetary transfers are facilitated through a portable device (Kenton, 2021). Mobile Wallet (m-wallet) equally refers to a virtual wallet that affords users a more user-friendly avenue for executing payments by securely storing payment card details on a mobile device (Kenton, 2021). The m-wallet market is home to a variety of payment innovations, including Quick Response (QR) codes and Near Field Communication (Kazan et al., 2018).

According to the Mastercard Impact Study in 2020, Malaysia has contributed to 40% of m-wallet adoption in Southeast Asia. This percentage is followed by 36% in the Philippines, 27% in Thailand, and 26% in Singapore. In fact, the Central Bank of Malaysia has implemented a systematic reform strategy stated in the Financial Sector Blueprint 2011-2020 (FSBP) to support Malaysia's move towards electronic payment (e-payment) (Lee & Daniel, 2018). The Ministry of Finance in Malaysia has actively promoted the use of m-wallets such as a one-time incentive for qualified Malaysians who register with specified m-wallet providers as part of the Annual Budget 2020 (Aziz, 2019). Additionally, approximately 35 % of Malaysian fintech companies were involved in deploying m-wallets and digital payment solutions during the COVID-19 outbreak (The Edge Markets, 2021). This brought attention to the possibility that Malaysians use m-wallets mostly for various transactions involving food and drink, groceries, and convenience stores.

The current Malaysian market is witnessing a proliferation of m-wallets (Gomes, 2022). This abundance of m-wallet options in Malaysia creates a challenge for user adoption and utilization of these platforms to purchase goods and services (DeMers, 2016). The extensive variety of choices tends to confuse consumers, making it difficult for them to select the most suitable m-wallet for their needs. In fact, Malaysia is well-served by cards as there is high penetration of 44.1 million debit cards among the population of 31.6 million (Sinha et al., 2019). The m-wallet providers need to face competition against each other, including debit and credit card providers (Kumar & Krishnan, 2020). Given that cashback offers continue to lead the m-wallet market shares, smaller m-wallet companies must confront the hard fact that they cannot compete with larger players (Mitra, 2019). There are 27% of non-mobile wallet users who could accept m-wallet services in businesses (Tan, 2019). In fact, m-wallets are still in the early stages of deployment, and as a result, have limited adoption. In contrast to traditional payment methods such as cash, credit cards, and debit cards, which are extensively accepted by business entities (Mohd Sah et al., 2021). The limited acceptance by merchants hampers the convenience and compatibility of m-wallet services, thereby deterring potential users from embracing the benefits offered by these platforms.

Furthermore, the majority of Malaysians are hesitant to shift from physical cash usage to m-wallets due to concerns about system failures or security breaches during payment processes (Mohd Sah et al., 2021). This fear of system failure or hacking compromises the trust in m-wallets and discourages users from utilizing these applications for making payments. It is also undeniable that Malaysians also heavily rely on the use of cash. While there is a growing trend towards digital payment methods, particularly in urban areas, cash remains widely used in daily transactions, especially in smaller towns and rural regions. Also, setting up m-wallet accounts may be

challenging and confusing for those who do not acquire basic m-wallet knowledge (Karim et al., 2020). Not to mention the interface of each m-wallet application is also different from each other. In this case, self-efficacy and m-wallet knowledge might play essential roles in adopting the m-wallet. An individual with minor self-efficacy will consider an m-wallet difficult to be used and hence, refuse to adopt the m-wallet. M-wallets are mainly dominant among tech-savvy users compared to those non-tech-savvy users (Kumar & Krishnan, 2020). Tech-savvy users have a higher tolerance for the risk of adopting m-wallets. Therefore, the personal innovativeness of an individual could influence individuals' behavior in adopting m-wallet services.

Prior studies have mostly focused on consumers' intentions to use mobile wallets. In our study, we address the actual usage of m-wallets in Malaysia by focusing on mobile payment system characteristics and individual differences, which are essential for the success of mobile wallet providers. The proposed model of this study shifts the attention from focusing on the intention of m-wallet adoption towards an investigation of their actual usage that goes beyond the current literature gap. Moreover, the study expands upon the Technology Acceptance Model (TAM) by incorporating three consumer-centric factors, including innovativeness, mobile payment knowledge, and self-efficacy, as well as two technology-related constructs, such as convenience and compatibility. The proposed framework aims to deliver an enhanced comprehension of the factors influencing the actual usage of mobile wallets by including these additional considerations. Furthermore, this study will conduct a comparative analysis between two distinct m-wallets, namely Alipay and GrabPay. Despite Alipay's status as the leading global third-party payment system, its adoption in Malaysia still remains comparatively lower than that of GrabPay in the domestic market (Yao et al., 2018). It therefore pinpoints the key factors that significantly affect customers' choices in using the mobile wallets.

Beyond merchants, this study also provides valuable insights for mobile phone software developers, mobile phone manufacturers, and other relevant stakeholders. By understanding the specific characteristics and features that users prefer in m-wallets, these parties can enhance their product and service functionalities accordingly. Moreover, policymakers can leverage the contributions from this study to further promote m-wallet adoption and realize Malaysia's vision of transitioning into a cashless society (Fintech News Malaysia, 2019). Furthermore, financial institutions, including insurance companies and investment banks, stand to benefit from this research. As the industry evolves, partnerships and collaborations between these entities are expected to increase, leading to a clearer distinction between larger and smaller m-wallet players in the market.

In the study, the focus will be on two specific m-wallets, namely Alipay and GrabPay, out of the 43 licensed m-wallets operating in Malaysia. Both Alipay and GrabPay offer in-store and remote payment capabilities to their users (Kazan et al., 2018). GrabPay holds the largest share of approximately 21% among mobile payment system users in Malaysia (Vodus, 2021). Conversely, Alipay, a globally leading third-party payment system, boasts over 700 million annual active users worldwide (PYMNTS, 2018). The aim of the study is to inspect the factors specifically, the characteristics of mobile payment systems and individual preferences that affect the uptake of two different mobile wallets, namely the globally recognized Alipay and the locally established GrabPay.

In Malaysia, there are two prominent mobile payment platforms. First, in May 2017, Alipay was officially launched in Malaysia with the intention of providing tourists, particularly those from China, with an enhanced user-friendly environment and a secure payment experience while traveling within the country (Moorthy et al., 2020). A remarkable observation was made regarding

the implementation of Chinese mobile payment services by approximately 60% of businesses in Kuala Lumpur. Significantly, 88% of these businesses initiated these services from 2017 onwards, primarily driven by the objective of accommodating Chinese tourists. Alipay, a leading global player in the mobile payment industry, achieved significant success in establishing a largely cashless consumer economy in China during the year 2018 (Digitalasia, 2018). In the same year, Alipay captured a substantial market share of 61.2% among mobile payment users worldwide (Abrams, 2018). This notable development has also had a considerable influence on the adoption of m-wallets among certain segments of the Malaysian population (Cheng, 2019). Given the significance of this collaboration and its potential impact on the promotion of m-wallets in Malaysia, Alipay has been selected as a focal point in the study.

Second, in 2012, Anthony Tan co-founded Grab with his partner Tan Hooi Ling in Malaysia. Since its inception, Grab has experienced remarkable growth, expanding its operations to encompass over 30 cities across Southeast Asia (Azhar, 2022). At the heart of Grab's growth strategy lies a cashless payment system, which serves as the cornerstone of the company's expansion efforts. Despite transportation being its core business, Grab has strategically positioned itself as the preeminent mobile transaction platform in Southeast Asia. Furthermore, as a locally-founded enterprise, GrabPay was chosen to participate in the RM450 million e-Tunai Rakyat initiative, which the Federal Government formally launched on January 15, 2020 (Goh, 2019). GrabPay has successfully maintained its dominant position as the most preferred m-wallet among Malaysian consumers, with over 30% of respondents indicating their usage of the platform (Kaissi, 2021).

LITERATURE REVIEW AND HYPOTHESIS DEVELOPMENT

Despite the extensive use of the Technology Acceptance Model (TAM) in explaining various studies, researchers continue to explore and enhance the model (Lah et al., 2020; Chaw et al., 2022; Banerji & Singh, 2022). TAM frequently incorporates external exogenous constructs, such as system characteristics and individual differences, to elucidate the patterns of system usage (Taherdoost, 2018). Furthermore, Pertiwi et al. (2020) concluded that TAM serves as a robust model for explaining individuals' intention to use a new information technology system. A framework based on TAM provides a foundational role in comprehending technology acceptance, along with its adaptability for assessing the reception of emerging technologies such as m-wallets.

Our study builds upon TAM and applies perceived ease of use (PEOU) and perceived usefulness (PU) as mediating constructs to examine the adoption of m-wallets in Malaysia. In TAM, the mediating constructs of PU and PEOU are vital as they mediate the impact of independent constructs on users' motivation to accept and use technology. A cross-sectional survey of 401 Nigerian customers was conducted in a study by Daramola and Sopiah (2021) to assess the determinants influencing the acceptance of m-wallets. Their findings reveal that PU and PEOU in TAM significantly influence consumers' adoption of m-wallets.

Past studies on extended TAM are predominantly conducted in developed countries, such as the United States, Canada, and Korea, supporting the significant mediation effect of PU and PEOU on m-wallet adoption. These results emphasize how important it is to include PU and PEOU as mediating constructs since they can impact the likelihood of m-wallet adoption. Therefore, the study examines the interplay between independent constructs, which are mobile payment system characteristics and individual differences,

including the mediating constructs towards the impact on m-wallet adoption in Malaysia. Through the elaboration and extension of the TAM framework, m-wallet adoption in the Malaysian context can be better understood by studying the elements that influence their actual adoption.

Our study incorporates a set of five independent constructs, two mediating constructs, and one dependent construct. The five independent constructs are classified into two categories: mobile payment system (MPS) characteristics and individual differences (ID). Acting as mediators, PEOU and PU are essential constructs within the Technology Acceptance Model (TAM) (Davis, 1989). Perceived usefulness refers to a user's belief that utilizing a certain technology will enhance their capacity to complete their work. On the other hand, perceived ease of use shows how someone feels about how usable a system is and how little work is needed to use it. The dependent construct in the study is m-wallet actual adoption, which pertains to the frequency and extent of an individual's usage of the specific system (Moon & Kim, 2001).

Mobile Payment System Characteristic

Convenience is an integral aspect of mobile payment, providing consumers with timely and location-based utility (Kim et al., 2010). The convenience of mobile payments is made possible by Malaysia's improvements in internet connectivity speed, which may lead to an increase in the desire to use mobile payment methods. In consideration of this factor, the following hypotheses are formulated.

H_{1a}: Convenience has a significant positive relationship to the actual adoption of m-wallet in Malaysia.

H_{1b}: Convenience is interceded by perceived usefulness and perceived ease of use towards the actual adoption in Malaysia.

In Rogers' (1995) terminology, compatibility refers to the extent to which potential users' attitudes, requirements, and experiences align with their perceptions of innovation. When technological development can seamlessly integrate into an individual's daily life, compatibility significantly influences their willingness to embrace innovation (Yang et al., 2012). While previous research in developed countries such as Spain and the US found significant mediation effects of perceived usefulness, studies in developing countries like China, India, Vietnam, and Indonesia showed less emphasis on perceived usefulness in mediating this relationship. Given Malaysia's favourable response to recent technological advancements, the following hypotheses are proposed.

H_{2a}: Compatibility has a significant positive relationship to the actual adoption of m-wallet in Malaysia.

H_{2b}: Compatibility is interceded by perceived usefulness and perceived ease of use towards the actual adoption of m-wallet in Malaysia.

Individual Differences

Personal innovativeness refers to an individual's inclination to explore novel experiences and ideas (Agarwal & Prasad, 1998). The m-wallet users exhibit greater receptiveness to the potential benefits associated with the latest technology and possess a higher level of confidence in adopting it. Based on the several initiatives and rewards programs introduced by the Malaysian government to encourage the adoption of new mobile payment technologies, it can be inferred that Malaysia has demonstrated a rapid uptake of these innovations. Consequently, the following hypotheses are put forward.

: Personal Innovativeness has a significant positive relationship to the actual adoption of m-wallet in Malaysia.

: Personal Innovativeness is interceded by perceived ease of use towards the actual adoption of m-wallet in Malaysia.

The significance of mobile payment knowledge in m-wallet adoption has not been extensively examined in Malaysia as it can be posited that certain Malaysians demonstrate

a hesitancy to acquire an extensive understanding of mobile payments due to perceiving it as challenging to learn. According to Rogers (1995), individuals require sufficient information or knowledge from diverse sources to become aware of an innovation and recognize its potential advantages. Thus, the following hypotheses are formulated:

: Mobile payment knowledge has a significant positive relationship to the actual adoption of m-wallet in Malaysia.

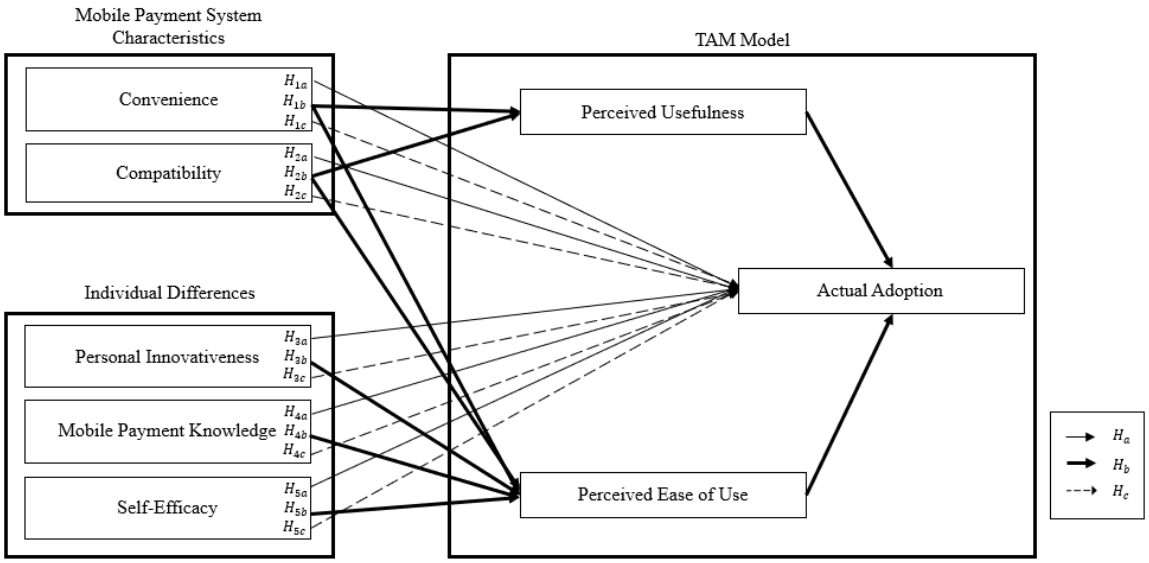
: Mobile payment knowledge is interceded by perceived ease of use towards the actual adoption of m-wallet in Malaysia.

Lastly, self-efficacy refers to a person's confidence in their capacity to carry out a given task or successfully use an invention (Bandura, 2006). In the study, Malaysians who possess self-efficacy in using an m-wallet are considered to be proficient in its utilisation. Hence, the following hypotheses are suggested.

H_{5a}: Self-efficacy has a significant positive relationship to the actual adoption of m-wallet in Malaysia.

H_{5b}: Self-efficacy is interceded by perceived ease of use towards the actual adoption of m-wallet in Malaysia.

Figure 1. Conceptual framework of m-wallet adoption in Malaysia



As depicted in Figure 1, the theoretical framework proposed for this study is built upon the TAM model, serving as a fundamental basis for investigation. The framework incorporates five independent constructs, which are categorised into two domains: mobile payment system (MPS) characteristics and individual differences (ID). Within the mobile payment system, two constructs are considered: convenience and compatibility. The domain of individual differences comprises three constructs: personal innovativeness, mobile payment knowledge, and self-efficacy. Additionally, the framework includes two interceding constructs and one dependent construct, all aimed at examining the adoption of m-wallets in Malaysia.

METHODOLOGY

Sampling Procedure and Data Collection

A purposive sampling approach is employed to specifically target individuals with prior experience using mobile payment systems, as their insights are valuable in understanding the factors that influence m-wallet adoption (Wong et al., 2019). By employing this sampling approach, we can choose individuals who exhibit particular characteristics or have experiences. The study focuses on individuals who own smartphones and have already installed and used an m-wallet application within the last three months. This time frame is considered sufficient for individuals to develop a certain level of proficiency in operating the mobile wallet, given that using m-wallets requires a certain degree of technical competence with smartphones (Amoroso & Magnier-Watanabe, 2012).

With 185.7 cellular phone subscriptions per 100 residents, the Wilayah Persekutuan Kuala Lumpur (WPKL) has been recorded to have the highest mobile phone penetration rate in Malaysia (Statista, 2020). WPKL is a prominent centre for the nation's economy, finances, and cultural activities (World Population Review, 2022). Additionally, WPKL is one of the most densely populated cities in the country, and its residents are known for their early adoption of emerging technologies, including m-wallets (Daramola & Sopiah, 2021). Residents in WPKL have diverse lifestyles, preferences, and behaviors, providing numerous socio-economic and demographic factors influencing individuals' m-wallet adoption. Hence, Suria KLCC, Mid Valley Megamall, Pavilion, Berjaya Times Square, and The Gardens Mall are selected as our sampling locations to observe the perspectives of target respondents.

To obtain high response rates, a self-administered survey was conducted in person on weekdays, involving a total of 650 respondents. Prior to completing the questionnaire, respondents were required to demonstrate that they are current users of m-wallets by presenting their installed Alipay or GrabPay applications on their smartphones. The data collection period spanned a duration of one month in 2019. A total of 641 questionnaires were successfully gathered from the respondents. However, a total of 632 usable questionnaires were selected for further analysis after incomplete questionnaires were excluded, yielding a response rate of 97.23%.

Measures and Procedures for Analysis

The research questionnaire consists of two sections. The first section includes demographic information such as the respondents' gender, age, race, education level, occupation, and income level. The second section includes a total of 38 items to measure 8 constructs using the five-point Likert scale, ranging from 1 (strongly disagree) to 5 (strongly agree). This scale choice is made to ensure respondents take less time to complete the questionnaire compared to a higher-point scale, reduce confusion, and enhance the response rate, thus leading to higher reliability. The constructs include convenience, compatibility, personal innovativeness, mobile payment knowledge, self-efficacy, PEOU, PU, and actual adoption. To enhance reliability and prevent confusion among respondents, the questionnaire is reviewed by two academic professionals, and their feedback is considered to improve the sentence structures for each item in a clear and concise manner.

Due to its applicability for theory development and prediction applications, the partial least squares-structural equation model (PLS-SEM) is used to ensure the reliability and validity of each construct (Gefen et al., 2000). The analysis involves two steps. The first step is to assess the measurement model based on several evaluation criteria in terms of validity and reliability. Convergent validity shows the degree to which more items of the same construct should be theoretically related. To meet the requirement, factor loading values

must exceed 0.5 to achieve the minimum average variance extracted (AVE) of 0.5 (Hair et al., 2011; Hair et al., 2017). Moreover, discriminant validity is based on three criteria. First, loading values for all items under each construct should be greater than those values for items in other constructs. Second, the Fornell-Larcker criterion requires the square root of AVE for each construct to be greater than the correlations with other latent constructs (Fornell & Larcker, 1981; Hair et al., 2017). Third, the Heterotrait-Monotrait (HTMT) ratio of correlations must be lower than 0.85 or 0.90 to indicate non-perfect measures among constructs (Kline, 2011; Henseler et al., 2015).

To ensure respondents rationally provide their responses on each statement, outer loadings should be at least 0.25-0.5. In the study, composite reliability is used as one of the measures for the internal consistency of reliability in scale items. The composite reliability for each construct must be at least 0.7 to demonstrate adequate convergence or internal consistency (Hair et al., 2017). If the composite reliability value is larger than 0.6, it is considered that the degree of convergent validity of the constructs has been achieved (Fornell & Larcker, 1981; Hair et al., 2017).

After establishing good measures of constructs, Q-squared is used as an indicator of model adequacy in terms of predictive relevance. A value greater than zero for Q-squared indicates the model has adequate predictive relevance, implying that the predictive validity of the model is less than zero (Hair et al., 2017). Using an adequate structural model, the second step involves assessing the structural model by examining the path coefficients and corresponding p-values for hypothesis testing. Effect sizes are estimated using f-squared to further analyze the effects. The f-squared (f 2) values of at least 0.02, 0.15, and 0.35 represent small, medium, and large effect sizes, respectively (Cohen, 1988).

Welch's t-test is referred to as an unequal variance t-test. It is used to compare the regression coefficients between the structural models of Alipay and GrabPay. Due to its capability to compare two samples with different variances or sample sizes, this statistical test has more explanatory power than the traditional t-test (Kassambara, 2019). Welch's t-test is used to compare the effects of m-wallet characteristics on online impulse buying across several groups (Lee et al., 2022).

Demographic and characteristics description.

To provide a demographic description of 632 respondents, Table 1 summarises their demographic profiles. Approximately 57.1 of them are females, and the remaining are males. In addition, 47.8% of respondents who are 25 years old to 39 years old tend to use an m-wallet. The age group is followed by 45.9% of respondents who are 24 years old and below that. For Generation X, only 6% of those respondents are 40 to 54 years old. 0.3% of respondents who are Baby Boomers aged 55 years old and above would use m-wallet. Our respondents in using m-wallet consist of 80.5% of Chinese. It is followed by 13.5% of Malay and remaining 6.5% of respondents are Indian. Since Alipay is using Chinese language as default in the application, Malay and Indian did not use Alipay.

Table 1 shows the respondents' demographic characteristics

		Alipay	GrabPay	Frequency	%
Gender	Male	127	144	271	42.9
	Female	162	199	361	57.1
Age (years old)	24 and below (Generation Z)	121	169	290	45.9
	25-39 (Millennials)	144	158	302	47.8
	40-54 (Generation X)	24	14	38	6.0
	55 and above (Baby Boomers)	-	2	2	0.3
Race	Malay	-	82	82	13
	Chinese	289	220	509	80.5
	Indian	-	41	41	6.5
Education Level	Primary or below	-	2	2	0.3
	High School or Secondary	8	23	31	4.9
	College Diploma	23	20	43	6.8
	Bachelor Degree	240	276	516	81.6
	Master Degree	18	18	36	5.7
	Doctorate Degree	-	4	4	0.6
Occupation	Student	31	131	162	25.6
	Private Employee	233	173	406	64.2
	Retiree or Unemployment	-	2	2	0.3
	Self-employed	14	31	45	7.1
	Civil Servant	11	6	17	2.7
Income Level	RM1,500 and below	28	124	152	24.1
	RM1,501-RM3,000	106	113	219	34.7
	RM3,001-RM4,500	129	66	195	30.9
	RM4,501-RM6,000	18	26	44	7.0
	RM6,001 and above	8	14	22	3.5

For education levels, 81.6% of respondents are bachelor's degree holders. 64.2% of respondents are private employees, 25.6% are students, 7.1% are self-employed, 2.7% are civil servants, and only 0.3% are retirees or unemployed individuals. Last but not least, 34.7% of m-wallet users earn between RM 1,501 to RM 3,000, while the least of them earn RM 6,001 and above. 129 respondents are Alipay users who have income between RM 3,001 and RM 4,500, and 124 respondents are GrabPay users who have the most revenue of RM 1,500.

RESULTS AND DISCUSSION

To examine their actual adoption of m-wallet, all respondents are either Alipay or GrabPay. 343 respondents (54.27%) are GrabPay users, while the remaining 289 of them (45.73%) are Alipay users. As shown in Table 2, the majority of them who use the m-wallet by around 1 -3 times in a month would make up 73.6% of total respondents, while 1.7% of them use the m-wallet more than ten times. Furthermore, 59.7% of them use an m-wallet due to the ease of transactions. Then, 24.5% of them use an m-wallet due to customer loyalty benefits, and 15.8% think that using an m-wallet is easier to access than cash. On the other hand, 60.9% of respondents have experienced less than one year of using an m-wallet. Only 9.8% of them have experience more than three years in using m-wallet.

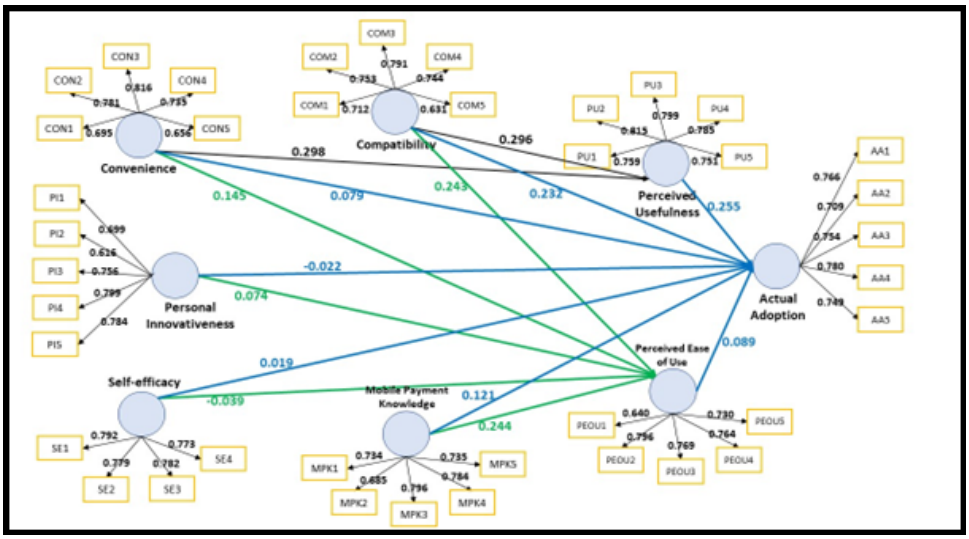
Table 2 shows the respondents' characteristics

		Alipay	GrabPay	Total	%
User Type	Existing User	289	343	632	100
M-wallet Usage Frequency per Month	1-3 times	229	236	465	73.6
	4-6 times	47	77	124	19.6
	7-10 times	11	21	32	5.1
	More than 10 times	2	9	11	1.7
Reason to Use M-wallet	Ease of Transactions	230	147	377	59.7
	Easier Access than Cash	16	84	100	15.8
	Customer Loyalty Benefits	43	112	155	24.5
Experiences in using M-wallet (years)	0-1	231	154	385	60.9
	1-2	46	139	185	29.3
	More than 3	12	50	62	9.8

Assessing the Measurement Model

The validity and reliability of the items for each construct are assessed while analysing the measurement model. Figure 2 demonstrates that the outer loading for the indicators of Actual Adoption (AA) and Perceived Usefulness (PU) is determined to be higher than the threshold value of 0.708. Furthermore, the external loadings of Compatibility (COM), Convenience (CON), Mobile Payment Knowledge (MPK), Personal Innovativeness (PI), and Perceived Ease of Use (PEOU) are lower than the threshold value of 0.708 yet higher than the minimum threshold value of 0.4. Lastly, the external loadings of Self-efficacy (SE) reached the threshold value of 0.708, while SE5 has been eliminated due to its outer loading being lower than the minimum value of 0.4.

Figure 2. PLS-SEM measurement model with path coefficients and outer loadings



There are eight constructs, including convenience (CON), compatibility (COM), personal innovativeness (PI), mobile payment knowledge (MPK), self-efficacy (SE), perceived ease of use (PEU), perceived usefulness (PU) and actual adoption (AA) are found to have Cronbach's alpha values higher than 0.7, indicating that they have high levels of internal consistency. All of the constructs in this study have average variance extracted (AVE) values greater than 0.5 and composite reliability values between 0.8 and 0.9, suggesting their validity and internal consistency. The conditions of the Fornell-Larcker criterion have been met by AA, COM, CON, MPK, PEOU, PI, PU, and SE. This demonstrates that the constructs' discriminant validity exists.

Figure 2 shows that of the items under the category AA, AA4 has the highest loading value, followed by AA1, AA3, AA5, and AA2. The next highest loading value in COM belongs to COM3, which is followed by COM1, COM2, COM4, and COM5. The greatest loading value for CON is discovered to be CON3, followed by CON1, CON2, CON4, and CON 5. MPK3 has the largest loading value of the MPK items, followed by MPK1, MPK2, MPK4, and MPK5. In terms of loading, PEOU2 is the most loaded, followed by PEOU1, PEOU3, PEOU4, and PEOU5. For PI, PI4 has the highest loading value, followed by PI1, PI2, PI3, and PI5. For PU, it is discovered that PU2 has the highest loading value, followed by PU1, PU3, PU4, and PU5. The highest loading value for SE is for SE1. SE2, SE3, and SE4 come behind it.

Table 3 shows the results of HTMT of correlations

	AA	COM	CON	MPK	PEOU	PI	PU	SE
AA								
COM	0.603							
CON	0.509	0.748						
MPK	0.439	0.432	0.393					
PEOU	0.505	0.524	0.460	0.509				
PI	0.283	0.357	0.231	0.648	0.350			
PU	0.632	0.576	0.566	0.535	0.688	0.290		
SE	0.277	0.355	0.273	0.279	0.166	0.108	0.303	

Note: AA = Actual Adoption; COM = Compatibility; CON = Convenience; MPK = Mobile Payment Knowledge; PEOU = Perceived Ease of Use; PI = Personal Innovativeness; PU = Perceived Usefulness; SE = Self-Efficacy

As shown in Table 3, all constructs are found to have HTMT values lower than the threshold value of 0.85, and hence, there is discriminant validity among the constructs. The maximum threshold value for HTMT is 0.85, where higher than the threshold value indicates a lack of discriminant validity.

Assessing the Structural Model

After establishing the adequate measures of constructs of the specified model, the next stage is to assess the adequacy of the structural model. As shown in Table 4, the results demonstrate that constructs exhibit a low degree of multicollinearity, as the variance inflation factor (VIF) values recorded were less than 5.

Table 4 shows the results of VIF

	AA	COM	CON	MPK	PEOU	PI	PU	SE
AA								
COM	1.744				1.636		1.492	
CON	1.627				1.533		1.492	
MPK	1.727				1.580			
PEOU	1.626							
PI	1.458				1.449			
PU	1.831							
SE	1.144				1.126			

Note: AA = Actual Adoption; COM = Compatibility; CON = Convenience; MPK = Mobile Payment Knowledge; PEOU = Perceived Ease of Use; PI = Personal Innovativeness; PU = Perceived Usefulness; SE = Self-Efficacy

As shown in Table 5, compatibility (path coefficient of 0.232 and p-value of 0.000) is determined to be significant to influence actual m-wallet adoption at the level of 1%, while convenience (path coefficient of 0.079 and p-value of 0.064) is significant at the level of 10%. With a coefficient value of 0.232, compatibility is discovered to have the most significant impact on the actual adoption of m-wallets. Mobile payment knowledge is significant at 5% level (path coefficient value of 0.121 and p-value of 0.011). Self-efficacy (path coefficient of 0.019 and p-value of 0.636) and personal innovativeness (path coefficient of -0.022 and p-value of 0.648) are insignificant.

Table 5 shows the results of hypothesis testing for direct effects

Hypothesis			Path Coefficient	P-Value	Supported
	CON → AA		0.079	0.064	No
	COM → AA		0.232	0.000	Yes
	PI → AA		-0.022	0.648	No
	MPK → AA		0.121	0.011	Yes
	SE → AA		0.019	0.636	No

Note: AA = Actual Adoption; COM = Compatibility; CON = Convenience; MPK = Mobile Payment Knowledge; PEOU = Perceived Ease of Use; PI = Personal Innovativeness; PU = Perceived Usefulness; SE = Self-Efficacy.

The f^2 is used as a criterion to capture effect sizes in examining the direct effects in detail. In Table 6, the f^2 value of 0.51 indicates that compatibility exhibits a small effect on actual adoption. Towards influencing actual adoption, the f^2 values of 0.049 and 0.081 indicate that perceived ease of use and perceived usefulness provide a small effect. In examining the mediating effect, convenience is found to provide a small effect on perceived ease of use (f^2 value of 0.020) and perceived usefulness (f^2 value of 0.082). In addition, mobile payment knowledge is found to have a small effect on actual adoption (f^2 value of 0.020) and perceived ease of use (f^2 value of 0.052). Given that the f^2 value is lower than the threshold value of 0.020, personal innovativeness and self-efficacy are demonstrated and could not provide significant effects on actual adoption and perceived ease of use, respectively.

Table 6 shows the results of f^2

	AA	COM	CON	MPK	PEOU	PI	PU	SE
AA								
COM	0.051				0.049		0.081	
CON	0.006				0.020		0.082	
MPK	0.020				0.052			
PEOU	0.008							
PI	0.001				0.005			
PU	0.077							
SE	0.001				0.002			

Note: AA = Actual Adoption; COM = Compatibility; CON = Convenience; MPK = Mobile Payment Knowledge; PEOU = Perceived Ease of Use; PI = Personal Innovativeness; PU = Perceived Usefulness; SE = Self-Efficacy.

Table 7 shows the results of hypothesis testing for mediating effects

Path-related Hypothesis			Path Coefficient	P-Value	Variance Accounted For	
	CON → PU & PEOU → AA		0.100	0.000	Partial Effect	Yes
	CON → → AA					
	COM → PU → AA		0.108	0.000	Partial Effect	Yes
	COM → PEOU → AA					
	PI → PU → AA		0.007	0.268		No
	PI → PEOU → AA					
	MPK → PU → AA		0.022	0.110		No
	MPK → PEOU → AA					
	SE → PU → AA		-0.003	0.485		No
	SE → PEOU → AA					

Note: AA = Actual Adoption; COM = Compatibility; CON = Convenience; MPK = Mobile Payment Knowledge; PEOU = Perceived Ease of Use; PI = Personal Innovativeness; PU = Perceived Usefulness; SE = Self-Efficacy

When considering the mediating effects shown in Table 7, it is observed that PEOU and PU partially mediate the influence of convenience on the adoption of m-wallets. The convenience factor is enhanced by the ease and flexibility of using m-wallets, which increases their portability. In addition, a significant indirect relationship is identified between compatibility and actual adoption, indicating that m-wallets incorporating user-friendly features contribute to their ease of use and usefulness. However, the perceived ease of use does not mediate the impact of personal innovativeness, mobile payment knowledge, and self-efficacy on actual adoption. This suggests that additional support is required, particularly for non-innovative late adopters, to encourage their acceptance of m-wallets. Consumers often lack training and guidance, leading to unfamiliarity with mobile wallet services and the ease of using them. Moreover, the limited acceptance of m-wallets among retailers also hinders their ease of use. These findings conclude the insignificant mediating effect of perceived ease of use in relation to personal innovativeness, mobile payment knowledge, and self-efficacy on the actual adoption of m-wallets.

Table 8 shows the results of Welch's t-test for comparing actual adoption between Alipay and GrabPay

$\mu_A \neq \mu_G$	Difference	P Value	Supported
Convenience affects actual adoption of Alipay and GrabPay differently in Malaysia.	-0.066	0.0000	Yes
Compatibility affects actual adoption of Alipay and GrabPay differently in Malaysia.	0.024	0.0000	Yes
Personal innovativeness affects actual adoption of Alipay and GrabPay differently in Malaysia.	-0.019	0.0010	Yes
Mobile payment knowledge affects actual adoption of Alipay and GrabPay differently in Malaysia.	0.045	0.0000	Yes
Self-efficacy affects actual adoption of Alipay and GrabPay differently in Malaysia.	0.040	0.1230	No

Note: Welch's t-test is chosen instead of normal t-test due to the ability in testing unequal sample sizes and variances. The hypotheses have been set to identify the difference between Alipay and GrabPay as follows: H_0: $\mu_A = \mu_G$ versus H_1: $\mu_A \neq \mu_G$, where μ_A refers to the mean of Alipay while μ_G refers to the mean of GrabPay.

In Table 8, it is surprising to note that all constructs have different effects on Alipay and GrabPay, except for self-efficacy. This discrepancy may arise because Alipay and GrabPay are relatively still new payment methods compared to traditional ones like cash. Therefore, the impact of self-efficacy remains consistent, regardless of the specific type of m-wallet adopted explaining that consumers are required to take the initiative to learn and understand how to use m-wallets or make payments through their smartphones (Kumari & Lodha, 2021). The findings indicate a positive and significant relationship between convenience and both GrabPay and Alipay. However, GrabPay has higher levels of convenience due to its user-friendly interface and greater acceptance among retailers compared to Alipay which is an international m-wallet that is not designed to meet locals' preferences. Moreover, GrabPay aligns with the definition of convenience proposed by Kim et al. (2010) by offering timely and location-based usage for consumers. On the other hand, the differences in compatibility are significant, with GrabPay being better suited to the lifestyle of m-wallet users in Malaysia. GrabPay, specifically designed for the local market, integrates well with popular complementary services like GrabCar and GrabFood, which require the use of GrabPay as a payment method. This finding is supported by Aydin and Burnaz (2016), which highlights compatibility is a primary consideration for non-users when adopting new technologies suited to their lifestyle.

In addition, Alipay and GrabPay differ in terms of mobile payment knowledge. Adopting m-wallets necessitates different levels of initiative and understanding. Alipay and GrabPay vary in terms of usage and application design and thus, insufficient training and knowledge lead users to perceive m-wallets as confusing and difficult to use (Moghavvemi et al., 2021). n. Lastly, the disparity in personal innovativeness between Alipay and GrabPay is relatively minor compared to other constructs. Individuals with higher levels of innovativeness adopt new technologies earlier than others, as they are more receptive to the potential benefits brought by the latest technology and exhibit greater confidence in adopting it. As both Alipay and GrabPay are considered new technologies in the Malaysian market, existing users demonstrate similar levels of innovativeness in adopting m-wallets (Yang et al., 2012).

CONCLUSION

Despite the presence of over 50 mobile wallets in Malaysia, our study exclusively focuses on two specific m-wallets in Malaysia, namely

Alipay and Grabpay. Alipay boasts global recognition and Grabpay enjoys popularity as a local brand, it is important to acknowledge that market dynamics are subject to change. The comparison of the actual adoption of Alipay and Grabpay could offer insights into policy making. For example, extending to other m-wallets such as Touch 'n Go and Boost. Our analysis validates constructs in the Malaysian context by exploring the mediating effect of perceived ease of use and perceived usefulness on actual adoption of m-wallets. Our findings highlight the importance of compatibility in driving m-wallet adoption among Malaysian consumers. In line with this importance, providers are suggested to offer diverse services that align with users' lifestyle. The services can ensure high ubiquity for seamless integration. Alco, retailers can provide reliable network connections.

Partnerships between providers, retailers and financial institutions are expected to emerge with smaller players thriving in niche markets. Efforts to broaden adoption should target diverse demographics, including older generations and foreign workers. Promoting the unified payment network "DuitNow" can facilitate seamless transactions. Utilizing alternative theoretical models such as the Unified Theory of Acceptance and Use of Technology (UTAUT) could offer valuable insights into the factors influencing adoption among this segment of the population. During the post-pandemic, researchers can employ UTAUT to further explore adoption shifts comprehensively, especially among late-adopters. Future studies should encompass a broader spectrum of prominent m-wallets to understand evolving industry dynamics.

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EXAMINING INFLUENTIAL ELEMENTS IMPACTING PERFORMANCE IN SUSTAINABLE MANUFACTURING WITHIN MALAYSIAN ENTERPRISE: A CONCEPTUAL ANALYSIS

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ABSTRACT

This study investigates the factors of sustainable manufacturing that affect the performance of Malaysian manufacturing enterprises. It focuses on sustainable innovation, quality, cost efficiency, delivery, and operational flexibility. By applying Dynamic Capabilities theory, the study aims to provide useful insights to Malaysian manufacturing companies. The major goal is to develop a conceptual framework for sustainable manufacturing that will improve organizational performance. It is important to emphasize that empirical validation is currently lacking in this study, necessitating additional research to examine the applicability of Dynamic Capabilities, sustainable innovation, and flexibility in predicting organizational performance. Future research should incorporate quantitative approaches and different samples to enhance the generalizability of the findings. This study emphasizes the critical roles of sustainable innovation and flexibility in influencing organizational performance, highlighting the importance of including these factors in sustainable manufacturing strategies. Furthermore, it provides stakeholders in manufacturing enterprises with insights to help them strengthen their strategic communication on the benefits of sustainable manufacturing. The study not only offers valuable information to policymakers, industry experts, and the academic community but also emphasizes the importance of conducting additional empirical research to examine and expand upon these conceptual insights.

INTRODUCTION

According to Bank Negara Malaysia (2023), Malaysia's manufacturing sector plays an essential role in the country's economic landscape, contributing the second-largest share to both GDP and Foreign Direct Investment (FDI). In 2016, this sector received RM58.49 billion in capital investment, with RM31.08 billion coming from domestic sources and RM27.42 billion from foreign investments (Economic Planning Unit, Prime Minister's Department, 2022).

This growing manufacturing industry has significantly contributed to Malaysia's GDP development, accounting for 22.78 percent, or RM253.9 billion, of the total domestic product value. Employment-wise, it has offered job opportunities to 1.05 million people, proving its importance in the labor market. The Twelfth Malaysia Plan (RMK-12) established high targets for the country, aiming for an annual GDP growth rate of 4 to 4.5 percent, with an emphasis on the services and manufacturing sectors (Ministry of Economy Malaysia, 2023). Malaysia's business establishments have grown drastically, reaching 920,624, with 98.5 percent being Small and Medium Enterprises (SMEs), comprising 907,065 establishments. This has led to a strong labor market, with 2.52 million people employed in the manufacturing sector, according to the Ministry of Economy in 2023. Overall, Malaysia's manufacturing industry remains a driving force in economic development, making major contributions to GDP, FDI, and job creation.

There has been a long discussion on organizational performance in strategic management research, primarily focusing on business organizations (Ahuja & Khamba, 2008; Lin & Wu, 2014; Brundage, Chang, Arinez & Xiao, 2016; Chan, Ngai & Moon, 2017). In the face of rising competition in the marketplace and technological advancements, organizations are compelled not only to continuously evaluate and improve their manufacturing operations but also to take the lead in developing new products and technologies, aiming for both financial gains and long-term competitive advantages (Walker, 2004; Dangelico, Pujari, & Pontrandolfo, 2017).

Recent years have seen a growing interest in understanding the intricate relationships between organizational performance (Ahuja & Khamba, 2008; Lin & Wu, 2014; Brundage, Chang, Arinez & Xiao, 2016; Chan, Ngai & Moon, 2017; Dangelico, Pujari & Pontrandolfo, 2017) and sustainable manufacturing factors (Hall, 2000; van Weenen, 2000; Amrina & Yusof, 2011; Hussin & Kunjuraman, 2015; Boron, Murray & Thomson, 2017). However, these areas of inquiry have frequently been investigated in isolation, yielding conflicting results.

To address this gap, this study examines the specific influence of sustainable manufacturing factors on organizational performance in Malaysian manufacturing enterprises. By investigating this relationship, the study aims to contribute to a more complete understanding of the dynamics of sustainable manufacturing factors and organizational performance in Malaysia's manufacturing sector. Despite government initiatives, there remains an important gap in understanding the critical factors that determine organizational performance in Malaysian manufacturing. The current body of research on sustainable manufacturing factors and organizational performance has produced conflicting results, leaving a gap in understanding the specific influence of these factors on Malaysian manufacturing enterprises. While previous research has provided some insights, there is a need for a more in-depth analysis to identify the important variables of sustainable manufacturing that influence organizational success in this context.

To fill this gap, this study aims to answer the following research question: What factors of sustainable manufacturing contribute to organizational performance in Malaysian manufacturing companies? Identifying these factors is critical for both

practitioners and policymakers, enabling them to develop effective measurements and standards for promoting sustainable manufacturing practices within organizations. This study examines the factors of sustainable manufacturing supported by the Dynamic Capabilities Theory. The paper is organized into four sections. The introduction provides an overview and comprehensively discusses the variables of sustainable innovation, quality, cost, delivery, and flexibility. The relationship between sustainable manufacturing factors and organizational performance is examined in depth, and this study summarizes the importance of understanding these factors in advancing sustainable manufacturing practices and overall organizational performance in Malaysia's manufacturing industry.

LITERATURE REVIEW

Underlying Theory

The concept of Dynamic Capabilities, also known as the Dynamic Capabilities View (DCV), is widely acknowledged as the capacity to develop, integrate, and reshape internal and external competencies, enabling organizations to adapt effectively and consistently to rapid environmental changes (Teece, 2007; Fang & Zou, 2009). DCV, described as a series of distinct organizational processes, is crucial for responding to dynamic market shifts (Eisenhardt & Martin, 2000). It elucidates how firms can navigate the dynamic landscape of resource and capability management within their business operations and production processes, adjusting to sustainable changes (Wu et al., 2012; Lin et al., 2016; Ramanathan et al., 2017). Furthermore, DCV conceptually and practically justifies sustainable changes in organizational business strategies, operations, and cost management, ultimately contributing to long-term economic viability and sustained competitive advantage (Wu et al., 2012).

This study specifically investigates the application of Dynamic Capabilities theory to sustainable manufacturing factors. Some literature suggests that sustainable manufacturing factors are dynamic entities capable of developing their own dynamic capabilities (Amrina & Vilsi, 2015; Winroth, Almstrom & Andersson, 2016). With increasing concerns about environmental regulations and societal needs, companies are increasingly compelled to integrate sustainability principles (environmental, social, and economic) into their business practices and objectives. This integration is deemed essential for attaining a sustainable competitive advantage across sectors and geographic regions. Scholars advocate for dynamic capabilities in this context as they have the potential to generate value for organizations and customers through efficient and timely production processes, ultimately leading to enhanced organizational performance and sustained competitive advantage (Wu et al., 2012; Lin et al., 2016; Ramanathan et al., 2017).

Organizational Performance

Abdel-Maksoud (2004) emphasizes that evaluating organizational performance requires a thorough analysis of both financial and non-financial aspects. Scholars such as Ittner and Larcker (2003), Pintelon, Pinjala, and Vereecke (2006), and Ahuja and Khamba (2008) all agree that including both financial and non-financial measures is critical for influencing customer satisfaction and increasing overall profitability. Non-financial factors are crucial in improving skills across multiple industrial processes, providing useful insights into specific capacities before committing to risky financial investments (Rosen & Kishawy, 2012; Lin & Wu, 2014). Hassan, Nordin, and Ashari (2015) emphasize the need to incorporate non-financial methods to address specific challenges in manufacturing production operations, which will ultimately lead to better outcomes, including enhanced monetary profits (Damanpour & Evan, 1984). As a result, this study employs a theoretical

framework that includes both non-financial and financial aspects when examining organizational performance, recognizing their interconnectivity and impact on organizational profitability (Ittner & Larcker, 2003).

The influence of sustainable manufacturing factors on performance is supported by the dynamic implications of absorptive, adaptive, and innovative capabilities, as observed by Cabral (2000) and Wu et al. (2012). Researchers such as Yang et al. (2009), Amrina and Yusof (2011), and Jain and Ahuja (2012) have examined the contributions of sustainable manufacturing factors to organizational performance, highlighting significant relationships with innovation, quality, cost, delivery, flexibility, time, and employee factors. Millar and Russell (2011) discovered that manufacturing firms in the Caribbean prioritized the health, well-being, and safety of workers, engaged in community programs, and embraced social responsibility as a strategy for enhancing brand loyalty. Their initiatives included enhancing employee morale and retention, innovating with environmentally friendly alternatives, and aligning with environmental and social expectations, positioning them ahead of competitors (Millar & Russell, 2011). In essence, this synthesis underscores the intertwined nature of financial and non-financial perspectives in evaluating organizational performance and emphasizes the critical role of sustainable manufacturing factors in driving positive outcomes for companies.

Sustainable Manufacturing Factors

Sustainable manufacturing factors have evolved as important assets for organizations, receiving extensive recognition in contemporary literature (Montabon, Sroufe, & Narasimhan, 2007; Henri & Journeault, 2008; Mani, Lyons, & Sriram, 2010; Amrina & Yusof, 2011; Vinodh & Joy, 2012). These factors are fundamental to all manufacturing processes, enabling the development of skills, technology, and work practices within manufacturing enterprises (Amrina & Yusof, 2011; Vinodh & Joy, 2012). The conceptual frameworks of Dynamic Capabilities and Knowledge-based Organization theories provide influential foundations for understanding the creation and maintenance of competitive advantage, as well as why organizations perform differently (Neches et al., 1991; Makadok, 2001; Lin & Wu, 2014; Islam, Jasimuddin, & Hasan, 2017).

Sustainable manufacturing, as applied to organizations, is evident in modern manufacturing enterprises. These businesses must integrate processes for measuring, assessing, and improving manufacturing performance across operations while also developing new products and technologies that align with various social, environmental, and economic perspectives (Peet et al., 2011; Amrina & Yusof, 2011; Amrina & Vilsi, 2015). Sustainable manufacturing is defined as the integration of abilities that promote sustainability and mitigate various business risks into all qualifications within manufacturing processes and systems (Henri & Journeault, 2008; Mani et al., 2010). This approach ensures that manufacturing processes and products are created in a sustainable, knowledgeable, and competitive manner across all job activities (Tocan, 2012). This synthesis emphasizes the critical factors of sustainable manufacturing in improving organizational performance, increasing competitiveness, and aligning with current business imperatives for sustainability and innovation.

a. **Sustainable Innovation**

Sustainable innovation is defined as a process that renews or improves products, services, technology, or organizational systems, resulting in enhanced economic performance while also improving environmental and social elements (Cabral, 2010; Jorna, 2017). Tello and Yoon (2008) describe sustainable innovation as the creation of new goods, processes, services, and technology that meet

human needs and improve well-being while respecting natural resources and regenerative capacity. Furthermore, Calik and Bardudeen (2016) define sustainable innovation as any new or substantial advance in organizational manufacturing processes that generates not only economic gains but also positive social and environmental implications.

The developing body of literature demonstrates the growing interest in sustainable innovation, emphasizing its importance as a focal point for organizations dedicated to the triple bottom line. The combination of economic, social, and environmental issues distinguishes sustainable innovation from traditional innovation methodologies (Cabral, 2010; Calik & Bardudeen, 2016). In a continuously changing environmental and business landscape, sustainable innovation has been highlighted as a key driver of long-term economic advantage (Adams et al., 2016). In today's global context, manufacturers and retailers prioritize sustainable innovation in their global sourcing and supply chain strategies to achieve operational excellence and cost-efficiency in their production systems (Ebrahimi, Moosavi, & Chirani, 2016). This synthesis emphasizes the multiple characteristics of sustainable innovation, which include economic, social, and environmental elements, as well as its critical role in gaining a competitive edge and operational efficiency in today's corporate landscape.

Few studies address the crucial link between sustainable innovation and organizational performance. According to Calik and Bardudeen's (2016) study, sustainable process innovation involves reusing, remanufacturing, and recycling materials in the manufacturing process to improve sustainability and organizational performance. Jorna (2017) also believes that sustainable innovation necessitates the use of adopters' knowledge and capacities to integrate, construct, and reconfigure their organization's manufacturing processes to decrease process failure rates and adapt to quickly changing environments. Ultimately, it would improve operational excellence and cost-efficiency in their manufacturing systems (Ebrahimi, Moosavi, & Chirani, 2016).

b. Quality

Quality is described as a product or service's ability to meet and exceed customer expectations, with customer needs determining quality objectives (Reeves & Bednar, 1994). During the early 1970s, organizations valued cost and production over quality. However, a Japanese-led organization in the United States in the 1980s demonstrated the need to focus on all three dimensions simultaneously: quality, cost, and delivery (QCD) to gain an advantage over the competition (Tomaskovic-Devey & Lin, 2011). Quality has subsequently developed into a strategy to boost organizational profitability and maximize customer satisfaction by reducing mistakes (Agus & Hajinoor, 2012).

Malaysian manufacturing enterprises are under growing pressure to offer high-quality goods while also improving efficiency in their production processes (Shakir & Mohammed, 2013; Abdul-Rashid et al., 2017). Quality and performance improvement initiatives throughout operations are critical for these organizations' long-term competitive advantage and growth (Anuar, 2015; Anuar et al., 2016). A high-quality and dependable production system is considered crucial for competitiveness, and achieving excellence in production quality is seen as a strategic imperative for manufacturing organizations. This involves improvements in manufacturing quality, customer order compliance, process defect reduction, and minimizing customer warranty problems (Ahuja & Khamba, 2008; Agus & Hajinoor, 2012; Anuar, 2015; Anuar et al., 2016).

Marin and Ruiz-Olalla (2011) found a favorable association between manufacturing quality and overall organizational success. Other studies, such as those by Ahuja and Khamba (2008) and Jain and Ahuja (2012), emphasize that organizations seeking success through manufacturing quality must first identify their motivations, set targets, and develop implementation strategies. According to Anuar (2015), the implementation of manufacturing quality should be driven by internal motivations such as incremental improvements in customer order compliance, reducing total process defects, and minimizing customer warranty issues to yield internal benefits for the organization. This synthesis emphasizes the evolving view of quality as a strategic imperative, highlighting its critical significance in organizational success and competitiveness for Malaysian manufacturing enterprises.

c. Cost

Nordin and Adebambo (2016) differentiate the economic growth factor of sustainable manufacturing practices into two components: production costs and investment costs. The descriptive analysis from Nordin and Adebambo's (2016) study shows that manufacturing costs in Malaysia are being reduced effectively throughout the industry. Manufacturing costs, which are frequently used as a quantitative measure, include both direct cost reductions (labor, materials, and other product-specific costs) and overhead cost reductions (administrative costs, equipment costs, maintenance expenses, and plant depreciation expenses) (Sillanpaa & Kess, 2011; Beamon, 1999; Chan, 2003; Chan & Qi, 2003; Theeranuphattana & Tang, 2008).

Sustainable manufacturing factors have a major impact on an organization's production costs (Ahuja & Khamba, 2008). Identifying these factors enables optimization of production costs by avoiding unexpected downtime, equipment difficulties, and waste in the manufacturing system (Shagluf, Longstaff, & Fletcher, 2014; Paprocka, Kempa, Kalinowski, & Grabowik, 2015). Previous research shows that sustainable manufacturing reduces costs, increases sales, and improves financial performance (Kasbun, Teh, & Ong, 2016; Ameer & Othman, 2012). According to Kasbun et al. (2016), the cost of investment serves as a motivator to increase resource allocation flexibility and efficiency, improve R&D productivity, and build organizational competencies to capitalize on business opportunities in a competitive market.

The competitiveness of sustainable manufacturing, particularly in cost management, entails pursuing short-term cost-cutting activities (Christmann, 2000). Transforming practices into capabilities, focusing on cost efficiency, and incorporating cost management into the manufacturing process could have a more beneficial impact on profits than relying exclusively on short-term cost-cutting measures. González et al. (2012) emphasize the prospective integration of cost management into the manufacturing process to enhance organizational performance, thereby contributing to broader organizational benefits and long-term competitive advantage. This synthesis emphasizes the interdependence of sustainable manufacturing elements, cost management, and organizational performance, with a focus on cost management's role in ensuring long-term economic growth and competitiveness.

d. Delivery

Delivery plays a pivotal role in today's knowledge-based economy (Yahya & Goh, 2002; Wong, 2005; Khosravi & Ahmad, 2014). Organizations are increasingly investing in enhancing their delivery processes to swiftly target new customer segments and identify emerging opportunities (Toni & Tonchia, 2001; Christiansen et al., 2003; Abdel-Maksoud, 2004; Jain & Ahuja, 2012). They are adopting fast, responsive, and flexible

production systems and customer services while integrating sustainable development practices (Jayal et al., 2010; Tseng, 2013; Varsei et al., 2014; Hřebíček et al., 2015). According to Tseng (2013), optimizing production systems involves a decentralized, results-oriented, and empowering approach. Additionally, organizations leverage information technologies to reengineer delivery processes, enhance services, improve efficiency, and reduce costs (Jain & Ahuja, 2012; Amrina et al., 2016).

Katayama and Bennett's (1999) study explores the relationship between agility, adaptability, and leanness among Japanese companies, categorizing delivery measures into operational, supply, order fulfillment, and product development processes. Sub-measures related to delivery include on-time delivery, delivery reliability, faster delivery times, delivery service, delivery frequencies, delivery synchronization, delivery speed, order fulfillment lead time, and supplier's delivery performance. While historically, delivery in production was confined to operative activities and not fully recognized as a competitive advantage, recent literature emphasizes its strategic role and significant positive impact on financial performance (Christiansen et al., 2003).

Delivery is deemed a crucial aspect of the firm's value chain and a strategic decision area leading to enhanced organizational performance (Christiansen et al., 2003). It is considered a fundamental pillar for developing distinctive capabilities in the production system (Tseng, 2013) and represents a vital internal factor contributing to operational capability (Jain & Ahuja, 2012). In summary, the synthesis underscores the evolving significance of delivery in production, acknowledging its strategic importance, positive influence on financial performance, and its role as a fundamental element of sustainable competitive advantage and operational capability.

Flexibility within manufacturing enterprises is commonly defined as the ability to swiftly respond to new customer demands, fluctuations in production volumes, and the introduction of novel products (Sharkie, 2003). It involves adapting to a dynamic or uncertain environment and effectively addressing challenges stemming from changes (Beamon, 1999; Theeranuphattana & Tang, 2008). Sharkie (2003) emphasizes the necessity for organizations to cultivate capabilities to manage change, focusing on attributes like agility, flexibility, and speed, and swiftly accessing knowledge and competence.

According to Bernardes and Hanna (2009), Chan et al. (2017), and Braunscheidel and Suresh (2018), the success of an organization relies on its ability to swiftly generate, capture, and disseminate knowledge. This capacity to create and continuously learn from knowledge can serve as a sustainable competitive advantage (Wu et al., 2012; Lin et al., 2016; Ramanathan et al., 2017).

Empirical studies investigating the relationship between flexibility and organizational performance have produced inconclusive findings. While some studies indicate a positive correlation, suggesting that factors such as process flexibility, delivery reliability, cost leadership, product or process innovation, and product quality act as critical intermediate performance indicators influencing overall performance (North & Kumta, 2018; Inkinen, 2015; Hung et al., 2015), others report a negative relationship (Ferdows et al., 2016; Jain & Ahuja, 2012; Golec & Taskin, 2007; Yurdakul, 2002). The synthesis underscores the complexity of establishing a definitive relationship between flexibility and organizational performance, highlighting the necessity for further research in this domain.

Conceptual Framework

The conceptual framework depicted in Figure 1 is built upon the Dynamic Capabilities Theory, serving as a robust theoretical basis for comprehending and forecasting organizational performance within Malaysian manufacturing companies. This framework amalgamates essential elements about sustainable manufacturing factors, including sustainable innovation, quality, cost management, delivery, and flexibility. These factors are recognized as pivotal components that contribute significantly to organizational performance in adapting to and leveraging these factors to achieve sustainable competitive advantage and long-term success.

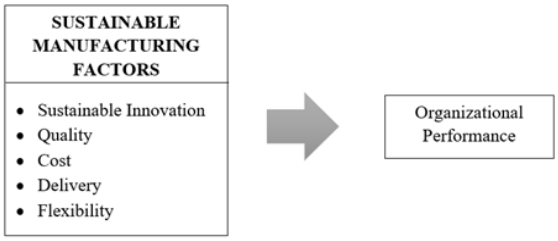

Figure 1. Conceptual Framework

Table 1 presents the proposed measurement items and their origins for the study, drawing upon prior research sources such as Ahuja and Khamba (2008), Vachon and Klassen (2008), Ramayah (2011), and Calik and Bardudeen (2021). The chosen measurement items encompass vital constructs, including organizational performance, sustainable innovation, quality, cost, delivery, and flexibility. A five-point Likert scale, ranging from 1 = "strongly disagree" to 5 = "strongly agree," is utilized for all variables.

Table 1. Measurement items and source

Field of Study		Status of Employment				Total
		Permanent	Contract	Temporary	Part-time	
Arts and Humanities	Count	12	7	3	1	23
	% within Field of Study	52.2%	30.4%	13.0%	4.3%	100.0%
Social Sciences and Business	Count	28	9	3	6	46
	% within Field of Study	60.9%	19.6%	6.5%	13.0%	100.0%
Science, Mathematics and Computer Sciences	Count	21	7	0	1	29
	% within Field of Study	72.4% (1)	24.1%	0.0%	3.4%	100.0%
Education	Count	4	8	4	2	18
	% within Field of Study	22.2%	44.4%	22.2%	11.1%	100.0%
Engineering, Architecture and Construction	Count	28	6	4	3	41
	% within Field of Study	68.3% (3)	14.6%	9.8%	7.3%	100.0%
Services	Count	12	5	0	0	17
	% within Field of Study	70.6% (2)	29.4%	0.0%	0.0%	100.0%
Healthcare	Count	5	3	0	0	8
	% within Field of Study	62.5%	37.5%	0.0%	0.0%	100.0%
Total	Count	110	45	14	13	182
	% within Field of Study	60.4%	24.7%	7.7%	7.1%	100.0%

CONCLUSION

This study investigates the influence of sustainable manufacturing factors, including sustainable innovation, quality, cost, delivery, and flexibility, on organizational performance within Malaysia's manufacturing sector. By providing a comprehensive set of measurement instruments, the research enables manufacturing companies in Malaysia to evaluate the effectiveness of their sustainable manufacturing practices and their impact on organizational performance. The conceptual framework proposed in the study

advances the understanding of sustainable manufacturing in Malaysia and serves as a foundation for future research. It offers valuable insights for policymakers and manufacturing companies in Malaysia, guiding efforts to promote sustainable manufacturing practices and improve organizational performance. However, the study's limitation as primarily conceptual, lacking empirical validation, underscores the need for further research to confirm the relevance of these variables in predicting organizational performance. Future studies could explore additional factors and employ mixed-methods approaches to provide a more comprehensive understanding of sustainable manufacturing practices' impact on organizational performance.

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THE INFLUENCE OF ADOPTING ARTIFICIAL INTELLIGENCE (AI) ON MALAYSIA'S ECONOMIC ENVIRONMENT

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ABSTRACT

This study aims to conduct a systematic review of the implications of adopting Artificial Intelligence (AI) on the economic landscape of Malaysia. Aligned with economic growth theories, the research underscores AI's pivotal role in transforming resources characterized by diminishing marginal returns into assets with increasing marginal returns. The analysis is multifaceted, addressing three fundamental perspectives. First, it examines AI adoption's impact on both microeconomic and macroeconomic dimensions. At the macroeconomic level, the study observes AI's influence on demand-pull and cost-push inflation, affecting overall price levels in the Malaysian economy. At the microeconomic level, AI adoption is linked to increased productivity and efficient resource allocation, leading to economies of scale. In an innovative and competitive business environment, AI adoption further enhances the quality of goods and services while ensuring competitive pricing strategies. Second, the study differentiates the positive and negative consequences of AI adoption across various sectors and demographic groups, providing specific examples of how different industries and population segments may benefit from or face challenges due to AI implementation. Finally, the analysis distinguishes the short-term and long-term impacts of AI adoption. In the short term, changes in employment, productivity, and consumer prices are identified, while the long-term analysis explores structural changes,

including income redistribution and sustained productivity growth. The findings highlight the net positive impact of AI adoption in Malaysia, emphasizing that its benefits outweigh the costs. The study underscores the significance of government involvement in formulating policies and providing necessary infrastructure, aligning with Romer's theory of economic growth to drive successful and sustainable AI adoption for economic development.

INTRODUCTION

It is no secret that artificial intelligence (AI) is rapidly changing the world as we know it. The development of technology that mimics human intelligence is having a profound impact on the way we live and work (Burns et al., 2023). One area where AI is significantly impacting is the global economy. Across the globe, businesses are integrating AI into their operations, and this trend is only set to continue in the future. In fact, according to PwC, AI is expected to contribute up to US$15.7 trillion to the global economy by 2030. This staggering sum highlights the scale of AI's economic impact (PwC, 2017).

One of the primary reasons AI has such a substantial impact on the economy is its ability to automate tasks that have historically required human workers, particularly in manufacturing, where robots can take over much of the production line and increase efficiency. This leads to significant cost savings for businesses, allowing them to invest more money in other areas. There is strong empirical evidence that the adoption of AI has reduced the demand for labor as well as the cost of running a business significantly, which can be elaborated from various economic perspectives.

First, the automation of tasks: AI and robotic process automation have made it possible to automate a wide range of tasks previously performed by human workers. This has led to a reduction in the demand for labor in industries such as manufacturing, logistics, and customer service. For instance, Amazon has implemented robots in their warehouses to transport and package products (Gills et al., 2014). This has significantly reduced the time taken to complete tasks and has allowed the company to process more orders without hiring additional workers, thus benefiting from large-scale production. The average cost for each unit of products produced has been reduced significantly, indicating that the company is experiencing economies of scale. According to PwC (2019), almost 20% of enterprises wanted to deploy AI in 2019, but by 2020, 90% agreed that it offered opportunities, with only 4% feeling the need to deploy it. AI automates everything from driving for the elderly to scanning the smallest tumors in medical science (McClean, 2020).

Second, AI promotes efficiency: AI systems can process large amounts of data and perform tasks much faster than human workers, improving economic efficiency and productivity, which translates to cost savings for businesses. IBM's AI system Watson, for example, can analyze large amounts of medical data and provide medical professionals with actionable insights, helping them diagnose and treat patients more efficiently. Economic efficiency is achieved because companies can produce more output with minimal input in the production process.

Third, AI has predictive analytics capabilities: AI-powered predictive analytics can help businesses make better decisions and reduce costs. By analyzing data, machine learning algorithms can predict outcomes and identify potential problems before they occur, allowing businesses to take preventative measures. Predictive maintenance systems, for instance, can identify when equipment is likely to fail and recommend maintenance or repair before it breaks down, helping businesses avoid costly downtime and repair expenses.

Fourth, AI provides excellent customer service, adding value to products: AI-powered

chatbots and virtual assistants can provide automated customer support, reducing the demand for human customer service representatives. This not only reduces labor costs but also provides a faster and more personalized experience for customers. Capital One's chatbot Eno, for example, helps customers with account-related queries, saving the company time and resources in handling customer queries (Goldstein & Chi, 2022). Empirical evidence suggests that AI has led to a reduction in the demand for labor and the cost of running a business. While this may create challenges for workers, the benefits of AI in terms of increased efficiency, productivity, and cost savings for businesses are difficult to ignore.

In addition to reducing costs through economies of scale, AI has also helped expand businesses. Another key way AI impacts the economy is through the creation of new industries and markets. As AI technology becomes more advanced, it is opening up new possibilities and creating new opportunities for entrepreneurs and businesses. One area already seeing significant growth is the development of AI-driven healthcare solutions, which have the potential to revolutionize the industry. This growth has increased market share, which can result in an increase in monopoly power for businesses.

Despite the many benefits of AI, there are also concerns about its impact on human jobs. As AI becomes more prevalent, many jobs currently done by humans could become automated, leading to significant job losses in some industries and sectors. However, it is worth noting that AI is likely to create many new jobs, particularly in areas such as data science and machine learning.

In conclusion, the impact of AI on the economy is already significant and is set to become even greater in the years to come. While there are challenges to be addressed, there is no denying the transformative power of AI. As businesses embrace this technology and invest in its development, AI will continue to shape and reshape the global economy in profound ways.

PROBLEM STATEMENT

Malaysia, like many other countries, faces significant issues and challenges in adopting Artificial Intelligence (AI) from an economic perspective. There are several empirical evidence-based challenges related to the development of AI.

First, there is a lack of awareness and infrastructure to support the adoption of AI in businesses. According to the Malaysia Digital Economy Corporation (MDEC) (2022), 68% of Malaysian businesses have not yet implemented or set up any plans for AI. This indicates a lack of awareness and readiness among businesses to adopt AI. Additionally, the lack of infrastructure in terms of training, research, and development to support AI implementation in the country is a significant challenge (South East Asia Digital Content Industry Talent Report, 2022).

Second, there is a skills gap. The lack of skilled labor is another issue Malaysia faces in the adoption of AI. According to the World Economic Forum (WEF), Malaysia ranks 83rd out of 130 countries in terms of digital skills (World Economic Forum, May 15, 2023). This highlights the need for upskilling and reskilling the current workforce to meet the demands of an AI-driven economy.

Third, AI is strongly associated with privacy and security concerns. Malaysia faces several challenges regarding data privacy and security, which could hinder AI adoption. The Personal Data Protection Act (PDPA) limits the use of personal data in AI, making it difficult for businesses to implement AI-powered solutions that rely on personal data.

Fourth, implementing AI-based production involves high costs. Implementing AI technology requires a significant investment in infrastructure and technology, posing a challenge for Malaysian businesses, especially small and medium-sized enterprises (SMEs) with limited financial resources. Fifth, there is the potential for economic disruption. The adoption of AI could lead to economic disruption in the Malaysian economy. Many jobs, particularly those involving repetitive tasks, may become obsolete, leading to unemployment and a widening income gap, creating challenges for social inclusion.

Addressing these challenges is a major concern for businesses. Therefore, this study aims to investigate the progress in confronting these challenges from various approaches, such as dimensions (microeconomics versus macroeconomics), positive versus negative impacts, and duration (short-term versus long-term impacts) from an economic landscape perspective.

RESEARCH OBJECTIVE

The overall research objective was to evaluate the impact of the booming AI on businesses from an economic perspective. The specific research objectives of the studies were as follows:

a. To discuss the impact of AI growth from the perspectives of microeconomics and macroeconomics in Malaysia.
b. To distinguish between the positive and negative impacts of AI growth in Malaysia.
c. To evaluate the impact of duration (short term and long term) on AI growth in Malaysia.

LITERATURE REVIEW

The confluence of contributions by Adam Smith, David Ricardo, and Robert Malthus during the 18th and 19th centuries posits that every economy inherently maintains a consistent GDP steady state. Any deviation from this equilibrium is considered transient, with the system naturally readjusting to the steady state—a concept contemporarily recognized as the sustainability of growth. Economic growth, denoting the augmentation of goods and services within an economy, is synonymous with heightened productivity. As GDP expands, so does the population, disrupting the economy's long-term growth trajectory away from its stable state or sustainability. The expanding population exerts heightened demands on finite resources, thereby triggering a reduction in available resources. This scarcity subsequently diminishes the population size, leading to a contraction in GDP growth until it reverts to the steady state. Conversely, if GDP falls below the steady state, a decline in population occurs, resulting in reduced resource demands. This prompts GDP to ascend back to its sustainable growth level. Consequently, it can be inferred that the classical economic concept of the steady state aligns with the contemporary understanding of the sustainable level of economic growth within a nation.

The two famous economists who developed the neoclassical theory were T.W. Swan and Robert Solow. They developed the Solow-Swan Growth Model. The growth theory focuses on three factors of production: capital, labor, and technology. The growth per unit of labor is known as output per labor, and the growth per unit of capital is known as output per capital. Output per labor increases with output per capital but at a diminishing marginal return. It will reach a point where labor and capital will experience an equilibrium state. Since a nation can theoretically determine the amount of labor and capital needed to reach an equilibrium state, technological advances are what drive economic growth. When technological advances take place, then the amount of labor and capital needed to achieve growth needs to be adjusted. It is also suggested that if all countries have the same amount of technological advances, then we would experience the same level of economic growth. The standard of living would also be

the same. The weaknesses in the model lie in explaining technological advances and the diminishing marginal returns of capital and labor.

As for the endogenous growth model, the diminishing marginal returns can be reverted to increasing marginal returns in the long run. There are increasing returns to scale when labor is given education and training. This can improve the quality of labor and increase productivity. Governments should enact policies to create new entrepreneurs, which can help create new jobs and businesses. Investment should be directed to improve infrastructure and manufacturing processes that encourage innovation. Intellectual property rights such as copyright and patents are incentives for businesses to expand their operations.

Within the framework of the endogenous growth model, prominent models include the AK Arrow Model, Uzawa-Lucas Model, and Romer Model, all of which underscore the paramount significance of technology. The AK Arrow Model, also recognized as the learning by doing model, posits that economic transformations can occur through innovation and technology. It elucidates how self-practice and innovation contribute to enhanced productivity and improved human capital, ensuring the efficient use of labor to generate one unit of output.

The Uzawa-Lucas Model serves as an economic growth model elucidating the rise in GDP per capita over time. Central to this model is the premise that technological progress, embodied in the knowledge and skills of the workforce, propels economic growth. The model identifies two primary drivers of economic growth: capital accumulation, encompassing physical capital growth like infrastructure and machinery, and human capital accumulation, referring to the augmentation of workforce knowledge and skills.

According to the Uzawa-Lucas Model, nations with high levels of human capital accumulation are poised for accelerated economic growth. This is attributed to the adeptness of a skilled workforce in adapting to technological changes, thereby fostering higher productivity and increased output. The model also posits that economic growth may decelerate over time as capital and human capital levels approach their maximum thresholds—a phenomenon known as diminishing returns to capital. In essence, the Uzawa-Lucas Model furnishes a theoretical framework for comprehending the interplay between capital accumulation, human capital accumulation, and economic growth, serving as a cornerstone in empirical research on economic growth.

Moreover, according to the Romer model, knowledge is considered a non-rival good, indicating that the generation and utilization of knowledge by one individual or company do not diminish its accessibility for others. This signifies that the creation of knowledge carries positive externalities, underscoring the significance for governments to offer incentives that foster knowledge creation and dissemination to foster economic growth. In summary, the Romer model has played a significant role in influencing policy dialogues regarding the pivotal role of human capital and innovation in fostering sustained long-term economic growth.

METHODOLOGY

A systematic review was conducted on the impact of AI on businesses in Malaysia. The analysis commences with a discussion on several approaches to dividing the discussion regarding the impact of AI from an economic perspective. In this study, three possible approaches were utilized:

a. Macroeconomic vs. microeconomic impact: One way to divide the discussion is to focus on the different levels of impact that

AI can have on the economy. Macroeconomic impact refers to the effects of AI on the overall performance of the economy, such as GDP, inflation, employment, and productivity. Microeconomic impact, on the other hand, pertains to the effects of AI on individual firms, industries, and consumers, such as changes in production processes, market structure, and consumer behavior.

There are three major issues associated with utilizing AI and robots in businesses: cost, trust, and job displacement. Since the initial investment cost for AI is high, the impact of AI may not be linear but may grow at an accelerating rate over time. This is in line with the S-curve pattern of AI adoption, which begins slowly with substantial costs and investments associated with learning and deploying these technologies. However, the acceleration must be accompanied by a cumulative effect of competition and an improvement in complementary capabilities. It takes time for productivity to unfold, aligning with the Solow Paradox.

b. Positive vs. negative impact. Another way to divide the discussion is to distinguish between the positive and negative effects of AI on the economy. Positive impacts of AI might include increased efficiency, lower costs, and higher innovation, while negative impacts might encompass the displacement of workers, higher inequality, and lack of privacy. This approach could also consider the trade-offs between the positive and negative impacts, and how they might vary across different sectors, regions, or groups of people.

c. Short-term vs. long-term impact. A third way to divide the discussion is to examine the temporal dimension of the impact of AI on the economy. Short-term impacts might include the initial adoption and diffusion of AI technologies, as well as the immediate effects on employment and productivity. Long-term impacts, on the other hand, might encompass the transformation of entire industries and the emergence of new ones, as well as changes in social norms, institutions, and values that could accompany the AI revolution. This approach could also explore the uncertainties and risks associated with the long-term impacts, such as the potential for unintended consequences or systemic failures.

Finally, the study synthesizes the findings to provide a comprehensive discussion on the impact of AI on businesses. It will identify the barriers to the adoption of AI in order to maximize the benefits of AI while minimizing its negative impacts.

FINDINGS

The development of AI can be analysed based on macroeconomic and microeconomic impact..

Macroeconomic impacts.

a. Inflation. Traditional economic theory posits various determinants of inflation. Monetarists claim that an increase in the money supply can elevate the inflation rate. Conversely, Keynesian theory emphasizes that increases in consumer expenditure, government spending, trade surpluses, and investments can stimulate demand for goods and services, creating excess demand and resulting in demand-pull inflation. However, some researchers perceive that AI can enhance business efficiency, reducing costs and boosting productivity, potentially leading to a decrease in inflation. Moreover, AI can facilitate job automation, reducing employment opportunities and dampening consumer spending, thereby potentially decreasing inflation or causing disinflation.

Financial technology (fintech) adds value to the development of financial markets. Following the 2008 financial crisis, many firms shifted from financial markets to entrepreneurship. The rise of crowdfunding, mobile apps, cryptocurrencies, and financial payment systems has increased investment, injecting capital into the economy and bolstering purchasing power. Simultaneously,

fintech can stimulate demand for goods and services through increased consumer spending, acting as an injection into the economy and potentially driving demand-pull inflation. Barro (1997) also emphasizes that AI accelerates transaction speed. According to Fisher's quantity theory of money, an increase in the velocity of money results in a rise in the general price level, known as inflation. Numerous empirical studies support the direct influence of fintech on purchasing power, attributed to its convenience in transactions, checking account balances, and performing fund transfers (Taherdoost, 2018).

b. Interest Rates. Interest rates can have both positive and negative impacts on macroeconomic fundamentals with the development of AI. The positive impact occurs when AI is introduced via fintech, enabling financial institutions to process vast amounts of data, identify trends, and make predictions more accurately and quickly. This can decrease uncertainty in financial markets, leading to more stable interest rates. Simultaneously, AI through fintech facilitates the mobilization of funds, making it easier for financial market participants to access capital. This reduces information costs within the financial system, resulting in increased demand and supply for funds and stabilizing interest rates.

Conversely, interest rates can also have a negative impact on the economy. With the development of AI, there is a possibility of inflation. In response to inflation, governments often implement contractionary monetary policies. These policies increase interest rates, thereby raising the cost of borrowing money.

c. Employment. While AI can lead to increased automation of jobs, it can also create new opportunities in fields such as data analysis, software development, and machine learning. Additionally, the increased efficiency and productivity generated by AI can contribute to overall economic growth, resulting in increased employment opportunities. The nature of employment has undergone transformation with the advent of AI, leading to a higher demand for knowledge-based AI workers. However, this may also lead to unemployment among graduates who lack the necessary skills and knowledge demanded by the job market.

Currently, Malaysia is ranked 43rd in the world for unemployment, with a rate of 3.73% in 2022 (Statista, 2023). Despite this, Malaysia is facing a shortage of labor in certain industries, particularly in agriculture and manufacturing. The Federation of Manufacturing Malaysia (2022) has reported a shortage of 600,000 workers. In 2022, approximately 1.6 million applications were received for foreign labor due to the shortage, despite the manufacturing and restaurant sectors offering attractive salary packages. However, due to social status considerations, many Malaysians are hesitant to work in these sectors (New Straits Times, February 13, 2023). The demand for AI-based knowledge and skilled labor may increase wages that firms need to pay, potentially leading to wage inflation or cost-push inflation.

The shortage of labor has been attributed to documentation problems from source countries, which are time-consuming. Additionally, the shortage is exacerbated by the lack of interest among locals and vocational graduates who do not meet the demands of businesses. Some employees who lost their jobs have transitioned to the gig economy and show little interest in returning to the formal work environment, preferring the autonomy of being self-employed (New Straits Times, February 13, 2023). Despite claims of job loss due to the introduction of robots, the reality may be more nuanced. The introduction of robots can benefit sectors facing serious labor shortages, increasing production efficiency and reducing uncertainty in the production process.

d. Exchange Rate. Artificial neural networks have recently been widely used in the field of finance, including exchange rate

prediction. Since exchange rates and gold prices are crucial for financial institutions, accurate estimation of these values is vital for the stock market and businesses alike. Güler and Tepecik (2019) utilized monthly data from 2006 to 2018 and incorporated independent variables such as the BIST 100 Index, US inflation rate, Turkish inflation rate, US interest rate, and Turkish interest rate to forecast the exchange rate between the US and Turkey. Similarly, they estimated the gold exchange rate using variables like the BIST 100 index data, silver and gold prices, US and Turkish inflation rates, and US and Turkish interest rates. Artificial neural networks provided accurate forecasting results for both the exchange rate and the gold exchange rate, enabling predictions of future financial crises. The integration of AI in international trade and finance can enhance efficiency and accuracy, leading to more stable exchange rates. Furthermore, AI can facilitate the adoption of cryptocurrencies and other digital currencies, which may also influence exchange rates.

e. Gross Domestic Product (GDP). The integration of AI in businesses promises enhanced efficiency, productivity, and innovation, thereby fostering overall economic growth. Moreover, the development and implementation of AI systems and infrastructure can generate new job opportunities and stimulate investment, further bolstering GDP growth. Projections suggest that by 2025, the adoption of AI could lead to a potential GDP increase of up to 26%, primarily driven by productivity gains (Economic Planning Unit, 2022).

However, from a corporate perspective, the adoption of AI technology can lead to a dualistic outcome. While frontrunners in AI adoption may significantly increase their cash flow and economic benefits within 5 to 7 years, after accounting for transition and investment costs, slower adopters or non-adopters may lag behind. By 2030, those firms not embracing AI technology are forecasted to experience a substantial 20% decline in cash flow (Economic Planning Unit, 2022). Therefore, the primary drivers of AI adoption and its pace are competitive dynamics within industries. Firms are motivated to adopt AI to compete with frontrunners and gain a competitive advantage, potentially shifting market share in their favor.

Microeconomic Impacts.

AI technology is already exerting a significant impact on microeconomics in Malaysia, and as its adoption continues to expand, further changes and transformations in business operations and economic performance can be expected. These changes span productivity, competitiveness, innovation, and entrepreneurship.

a. Productivity. AI technology can enhance firm productivity by streamlining time-consuming activities. According to the Center of Public Policy, the adoption of AI has led to a productivity increase from 0.6% to 1.2% in the service sector, with an anticipated 30% increase in the manufacturing sector by 2030 (The Edge Malaysia, 19 May 2023). Improved productivity, achieved with minimal inputs, translates to higher profits, enabling firms to grow through increased investments. These investments, in turn, elevate the net worth of the firm, driving demand for its stock and consequently raising stock prices, thereby facilitating future growth opportunities.

b. Competitiveness. AI can empower Malaysian businesses to gain a competitive advantage by enhancing efficiency and delivering superior customer experiences. According to a PwC survey conducted in 2017, 75% of Malaysian CEOs regard AI as a strategic priority for their business, with over 40% already using AI or planning to do so within the next three years.

c. Innovation. AI contributes to fostering innovation by improving efficiency and enhancing customer experiences. As per a PwC survey from 2017, 75% of Malaysian

CEOs consider AI a strategic priority for their business, with over 40% already utilizing AI or intending to do so within the next three years.

d. Entrepreneurship. AI is paving the way for new entrepreneurial opportunities by enabling the emergence of AI-powered start-ups. According to a study by Start-up Genome in 2022, Kuala Lumpur ranks among the top 40 start-ups ecosystems globally, with a growing presence of AI start-ups and investors.

The overall positive and the negative impact of AI based on sectors and groups of people.

Artificial Intelligence (AI) entails the development of computer systems capable of performing tasks typically necessitating human intelligence, including perception, reasoning, and decision-making. Its utilization has proliferated across various sectors and industries in recent years. While AI technology offers numerous benefits, it also poses potential negative impacts that can vary across sectors, companies, and different groups of people. From an economic standpoint, assessing the costs and benefits of AI technology is crucial to better understand its potential impact.

Positive impacts of AI technology can be examined from various perspectives. Firstly, it enhances efficiency and productivity. By automating tasks previously done manually, AI aids businesses in boosting efficiency and productivity. For instance, in the manufacturing sector, AI-powered robots can handle repetitive tasks like assembly line work, enabling human workers to focus on more complex tasks. This can result in increased outputs and reduced costs per unit, ultimately driving greater profitability.

Secondly, AI technology increases accuracy and precision. Machine learning algorithms utilized in AI fine-tune processes and enhance the accuracy and precision of outputs. This improves quality control in manufacturing and distribution, leading to fewer defects and returns, thereby enhancing customer satisfaction. Thirdly, AI facilitates faster decision-making. By leveraging big data and machine learning algorithms, AI enables businesses to make faster and more informed decisions. Through the analysis of large data sets, AI identifies patterns and predicts outcomes, aiding businesses in making accurate and effective decisions.

Conversely, negative impacts of AI include job displacement. Automation of tasks by AI poses a risk of displacing human jobs. While AI creates new job opportunities in fields such as data analysis and AI development, these jobs may necessitate a different set of skills and qualifications from those displaced by automation, resulting in a skills gap. This necessitates retraining efforts, increasing costs for both governments at the macro level and firms at the micro level. Secondly, there are concerns regarding data privacy and security. AI relies on vast amounts of data to operate effectively, raising concerns about privacy and security. As AI technology advances, there is a risk of misuse or hacking of sensitive personal information.

Lastly, bias and discrimination are potential negative impacts of AI. Machine learning algorithms are susceptible to bias if trained on biased data, leading to unfair or discriminatory outcomes. This can adversely affect individuals and communities unfairly impacted by biased algorithms.

In conclusion, while AI technology offers significant benefits to businesses and society by enhancing efficiency, accuracy, and decision-making, it also presents potential negative impacts such as job displacement, data privacy concerns, and bias and discrimination. Policymakers and businesses must carefully assess the costs and benefits of AI technology to maximize its benefits while mitigating potential negative impacts.

The impact of AI development based on sectors.
Artificial Intelligence (AI) is an emerging technology in Malaysia, with increasing use across various sectors. Here are some of the positive and negative impacts of AI in different sectors in Malaysia.

a. Health Sector.
The positive impact of AI in the health sector. AI-powered systems such as chatbots, telemedicine, and symptom checkers are being used to improve access to healthcare services and diagnosis in Malaysia. According to a survey conducted by Telenor Group (2021), 53% of Malaysians stated that they are willing to use chatbots and other digital health tools to access healthcare services. In contrast, the use of AI may also lead to medical errors if AI-powered systems are not calibrated properly. In 2021, a report by the American Medical Association highlighted the risk of bias and errors in AI healthcare systems, which could lead to misdiagnosis and incorrect treatment. (Natalia Norori et al., 2021)

b. Education Sector.
AI technology can help personalize learning for students in Malaysia. For example, AI-powered learning systems can adapt to the learning style and pace of individual students, providing tailored learning experiences. According to a report by Hoot suite and We Are Social (2022), 74% of Malaysians believe that online learning is an effective way to improve their skills. Adversely, the use of AI in education could lead to job displacement for educators and support staff. According to a report from the World Economic Forum (2023), up to 50% of teachers' work in Malaysia could be automated by 2030.

c. Retail Sector
AI-powered systems such as chatbots and personalized recommendations can improve the customer experience. According to a report by McKinsey & Company, personalizing the customer experience with AI-powered recommendation engines can lead to a 1-5% increase in revenue for retailers in Malaysia. Unfortunately, the use of AI in retail could lead to job displacement for retail workers. McKinsey & Company's report also states that up to 47% of retail jobs in Malaysia could be automated by 2030. (Julien Bouset, Brian Gregg, Kathryn Rathjie, Eli Stein & Kai Volhardt, July 18, 2019)

d. Finance Sector.
AI technology can help improve fraud detection and risk assessment in the financial sector. According to a report by Accenture, AI-powered systems can reduce the risk of fraud by up to 40% and improve risk assessment accuracy by up to 90%. But the use of AI in finance could lead to job displacement for finance workers. Accenture's report also states that up to 31% of finance jobs in Malaysia could be automated by 2030. (Hannah Unkefer, 2017)

While the use of AI technology can bring significant benefits to different sectors in Malaysia, such as improved efficiency and productivity, there are also potential negative impacts such as job displacement and the risk of errors or bias. Policymakers and businesses need to carefully assess the costs and benefits of AI technology in specific sectors to ensure that its use maximizes the benefits and minimizes the negative impacts.

The impact of AI based on the group of people.
Artificial Intelligence (AI) technology also has the potential to impact different groups of people in Malaysia in unique ways. Here are some examples of the positive and negative impacts of AI technology based on different groups of people in Malaysia.

a. Workers
AI technology can help improve the productivity and efficiency of workers in Malaysia. According to a report by Accenture, by 2035, AI could add up to MYR 155 billion to Malaysia's annual GDP and increase labor productivity by up to 30%. (Hannah Unkefer, June 21, 2019) But the use of AI in industries such as manufacturing, retail, and finance could lead to job displacement for workers.

According to a report by the World Economic Forum (2023) up to 54% of jobs in Malaysia are susceptible to automation by 2025.

b. Consumers

AI-powered systems can improve the customer experience for consumers in Malaysia. For example, chatbots and personalized recommendations can help consumers find the products and services they need more easily. According to a survey conducted by PwC (2017), 89% of consumers in Malaysia are willing to share their data with companies in exchange for personalized experiences. In contrast, the use of AI could lead to privacy concerns and a lack of transparency. Consumers may be unsure of how their data is being used and whether it is being protected. According to the 2020 Data Protection Survey by the Centre for Governance, Institutions and Organisations, 67% of Malaysians are concerned about how their personal data is being used. (Ipsos, March 18, 2018).

c. Elderly

AI-powered systems can be used to improve healthcare services for elderly people in Malaysia. For example, AI-powered wearable devices can monitor vital signs and alert healthcare providers in case of an emergency. According to a survey conducted by Telenor Group, 56% of elderly people in Malaysia would be willing to use digital health tools to manage their health. But the use of AI in elderly care may lead to concerns about data privacy and a lack of human interaction. Some elderly people may prefer human caregivers to AI-powered systems. (Natalia Norori et al., 2021).

While the use of AI technology can bring significant benefits to different groups of people in Malaysia, such as improved productivity and customer experiences, there are also potential negative impacts such as job displacement and privacy concerns. Policymakers and businesses need to carefully assess the costs and benefits of AI technology for specific groups of people in order to maximize its positive impacts and minimize the negative ones.

Short term versus long term impact with the development of AI.

Several studies and reports shed light on the potential impacts of AI on the Malaysian economy in both the short run and the long run.

In the short term, AI-powered automation can boost productivity by reducing manual tasks and expediting processes, leading to cost savings and enhanced efficiency across industries such as agriculture, manufacturing, and logistics. Additionally, AI creates new job opportunities even as it displaces low-skilled labor, particularly in industries like call centers and manufacturing. Finally, it fosters competitiveness, offering significant advantages to early adopters over their counterparts.

Looking at the long-term effects, AI has the potential to narrow the income gap, particularly addressing the middle-income trap. By facilitating higher productivity, advanced manufacturing, and innovation across sectors, AI could propel Malaysia beyond its middle-income status. However, it also poses challenges related to inclusion and inequality. Concentrated adoption among large firms or industries could exacerbate economic inequality, creating a digital divide between those with access to AI and those without. This is because larger firms typically have the resources to invest in R&D, driving long-term growth, innovation, and foreign investment in the country.

Overall, while the adoption of AI holds significant long-term benefits for Malaysia's economy, careful planning and strategic investment are imperative to address potential negative impacts and ensure equitable distribution of AI's benefits across society. (Refer to Table 1)

Table 1 shows the summary on the impact of ÀI on Malaysia

Impact of AI adoption in Malaysia	Positive Impact.	Negative Impact
Inflation rate	Economic growth through injection, disinflation	Demand-pull inflation Cost-push inflation
Interest rate	Reduces the cost of borrowing money due to digital currency	Increase in interest to curb inflation. Increases cost of borrowing money.
Employment	Transformation in the type of labour. Higher skills and pay	Increases cost of labour. Job displacement.
Exchange rate	Better prediction on the exchange rate and the gold exchange rate.	None.
GDP	Productivity Increases. Production efficiency.	Dualism in the economy is where you have front runners and the slow or no adopters.
Microeconomics		
Productivity	Increases.	None
Cost of production	Economics of scale	Initial high cost for the infrastructure.
Competition	Quality goods with competitive prices. No price discrimination.	Competition destroys the business if not equipped.
Innovation	Competitive advantage	None
Entrepreneurship	Increase the number of entrepreneurs	None
Sectors.	Manufacturing, health, finance, agriculture and service sectors.	
Group of people	All age groups.	
Short term	Productivity, Increased efficiency, high skill labour and competitiveness	High cost of the infrastructure
Long term	Productivity, eradicating middle-income trap, investment and R&D.	

CONCLUSION

As we enter the era of AI, assured economic growth is substantiated by various economists through their theories on economic growth. The indispensability of technology is emphasized, and its synergy with human resources and capital is crucial. Both human resources and capital exhibit diminishing marginal returns with increased utilization, necessitating the integration of technology for sustained increasing marginal returns. The advent of AI significantly influences the fundamental macroeconomic aspects, dynamically impacting local economies heavily reliant on trade and foreign direct investment. The introduction of AI introduces external influences to the domestic economy, altering GDP, inflation rates, interest rates, employment, and exchange rates.

In response, Malaysia must exhibit resilience at the micro level to adapt to

these changes. Failure to adapt can lead to uncertainty, risks, reduced competitiveness, and job displacement. However, a proactive approach can effectively address these issues over time, facilitating a smooth transition and minimizing the short-term and long-term adverse effects of adopting AI. Despite acknowledging the challenges, the positive net benefits of AI adoption outweigh the costs, making it imperative for businesses to strategically incorporate artificial intelligence. The effectiveness of this adoption relies on the institution, with the Malaysian government playing a pivotal role in crafting appropriate policies and infrastructure, aligning with Romer's theory of economic growth.

Malaysia is one of Southeast Asia's fastest-growing economies and has made some strides in developing its AI capabilities. However, there are several economic barriers the country is facing that may hinder its progress toward full AI development. Some of the key challenges are as follows:

1. Lack of awareness and understanding. A lack of awareness or understanding of AI's potential is a primary barrier to adoption in Malaysia. According to a 2018 survey by Microsoft, only 29% of small and medium-sized businesses in Malaysia have adopted AI technologies, with 62% of businesses unaware of technologies that could help them.

2. Insufficient infrastructure. Limited infrastructure, including data storage and processing capability, restricts the development and deployment of AI systems in Malaysia. Data privacy regulations also create complications in collecting, managing, and sharing data.

3. Scarce funding and investment. Despite the government's efforts to promote the adoption of AI, Malaysian businesses and start-ups still face difficulty receiving funding and investment for AI development. As per a Deloitte report, Malaysia's investment in R&D for AI is negligible compared to other countries like Singapore, South Korea, and China.

4. Shortage of AI experts: The insufficient supply of skilled AI professionals is another challenge that Malaysia faces. The country has relatively few qualified data scientists or machine learning experts to help companies implement sophisticated AI solutions.

5. Regulatory issues: The absence of a standardized regulatory framework makes it difficult to evaluate and benchmark technology among industry players, hampering AI's adoption.

Addressing these challenges will be key to Malaysia's development of a competitive and sustainable AI industry. The government's initiatives to increase awareness, invest in infrastructure and R&D, and introduce a regulatory framework can help to alleviate these concerns and improve Malaysia's AI readiness.

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BIG FIVE PERSONALITY AND MENTORING EFFECTIVENESS AMONG UNIVERSITY STUDENTS: MODERATING EFFECT OF INTERACTION

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ABSTRACT

This study investigates the impact of individual personality traits on mentorship effectiveness in the presence of interaction. Employing a quantitative approach, data from undergraduate students in a Malaysian private university were analyzed using the Big Five Personality model and Mentorship Effectiveness Scale. Results reveal a significant positive correlation between Agreeableness and Extraversion with Mentorship Effectiveness, tempered by a negative moderating effect of Interaction. Besides that, the study offers a valuable framework for assessing personality's role in mentorship effectiveness, aiding institutions and researchers in their future research.

INTRODUCTION

Mentoring has shown a great impact on the development of an individual and the concept has been well adapted by many institutions in both the education and business sectors (Allen et al., 2004). However, institutions are still facing difficulties in identifying the suitable mentor and mentee to leverage the best possible outcome due to the lack of research and review on the effects of personality on the mentorship effectiveness (Ragins & Kram, 2007).

As important as mentoring may be, there are few questions remain unanswered about the conditions and types of interventions required to maximize the benefits and effectiveness for young people. Factors such as gender, race, age, education and personality which are used to evaluate the mentorship effectiveness are rarely discussed (Berk et al., 2005; Dubois et al., 2011; Nkrumah & Scott, 2022; Ragins & Kram, 2007).

In particularly, the individual personality was not being examined together under the research of mentoring (Ragins & Kram, 2007). At the same time, the Big Five Personality assessment is one the most validated and cost-effective instruments as compared to other personality tools which may incur cost such as the MBTI personality assessment (Furnham, 2022). Moreover, previous researches conducted in Malaysia also highlighted the validity and reliability of the Big Five Personality scale especially in the education context in Malaysia (Bazkiaei, 2020; Bhagat et al., 2019; Karim et al., 2009).

Curran et al. (2017) proposed that an individual's personality plays a key role in explaining mentoring outcomes. They further stressed on the tools of evaluating personality using the Big Five Personality model in predicting mentoring effectiveness using the Mentorship Effectiveness Scale. Thus, upon conducting this proposed research, a valid and reliable framework and tools shall be identified to lay a foundation for institutions and researchers.

Previous researchers have found that one of the most important characteristics of a successful mentorship programme is interaction as it will affect the academic accomplishment and psychological development correspondingly (Dubois et al., 2011; Hernandez et al., 2016; Mullen & Klimaitis, 2019; Terrion & Leonard 2007). Nevertheless, empirical studies on the function of interaction between the Big Five personality traits and mentorship effectiveness remain scant, particularly in the context of Malaysian private higher education institution.

Therefore, the purposes of this study include: (a) To determine the influence of Big Five Personality of mentee towards mentorship effectiveness; (b) To identify the moderating effect of interaction between Big Five personality of mentee and mentorship effectiveness

LITERATURE REVIEW

Big Five Personality

The Big Five Personality is also commonly known as the Five-Factor Model (FFM). The key personality in this model includes Agreeableness, Conscientiousness. Extraversion, Neuroticism and Openness. FFM is often adapted by other research in evaluating various outcomes such as job performance, academic achievement and mentoring relationships (Costa & McCrae, 2012; Jones et al., 2014, Sosik et al., 2004; Terrion & Leonard, 2007). Agreeableness refers to being helpful, cooperative and sympathetic towards others (Costa & McCrae, 2012). Individuals with a high degree of agreeability appear to be actively looking for intimacy and are more unselfish. Such people do very easily overcome disputes and enjoy mutual learning (Judge & Cable, 1997). Conscientiousness is exemplified by being disciplined, organized and achievement-oriented (Costa & McCrae, 2012). Certain traits which are rooted from the domain of conscientiousness such as locus of control and upward striving affect the willingness of mentor in forming a mentoring relationship with mentee (Allen et al., 1997).

Extraversion is manifested in greater sociability, assertiveness, talkativeness and self-confidence (Costa & McCrae, 2012). Individuals who are more people oriented, a characteristic of extraversion are often a reason that cause mentee become more attractive to the mentor (Allen et al., 1997). Neuroticism refers to the degree of emotional instability, anxiety, depression and anger (Costa & McCrae, 2012).

The world is often viewed in either positive or negative point of view by individuals with neuroticism. Emotional instability was found to be negatively linked to the expectation and quality of mentoring relationship (Arora, 2016; Goldner, 2016). Openness is reflected in intellect and the extent of cultural interests, fantasy and creativity (Costa & McCrae, 2012). Based on Allen et al.'s (1997) research, mentors reported that they are more likely to be drawn to mentees who embody characteristics such as 'openness to learn' and 'openness to accept constructive feedback'.

Big Five Personality and Mentorship Effectiveness

Several studies have explored the underpinning concept of the quality of mentoring relationships and found correlations between personalities and mentorship effectiveness. For instance, extraversion and agreeableness were found to have positive correlations with mentorship quality (Cavell et al., 2020). Meanwhile another research which discussed the influence of the Big Five Personality on the perceived effectiveness of executive coaching found that there is a significant positive relationship between extraversion and perceived coaching effectiveness (Jones et al., 2014). Similarly, an earlier study by Niehoff (2006) showed that individuals who were positively associated with extraversion, conscientiousness and openness to experience would have higher tendency to participate in a mentoring programme as a mentor.

There are findings where mentees who scored high on openness and agreeableness received more mentoring. At the same time, low levels of extraversion were negatively associated with mentoring received, while high levels of extraversion were positively associated with mentoring received. Additionally, having high levels of conscientiousness and emotional stability had a positive relationship with mentoring receipt (Bozionelos, 2014; Schuster et al., 2017).

Based on the literature review above, the following hypotheses are proposed:

H_1: The trait of agreeableness in a mentee has a positive influence on mentorship effectiveness.

H_2: The trait of conscientiousness in a mentee has a positive influence on mentorship effectiveness.

H_3: The trait of extraversion in a mentee has a positive influence on mentorship effectiveness.

H_4: The trait of neuroticism in a mentee has a negative influence on mentorship effectiveness.

H_5: The trait of openness in a mentee has a positive influence on mentorship effectiveness.

Moderating Effect of Interaction between Big Five Personality and Mentorship Effectiveness

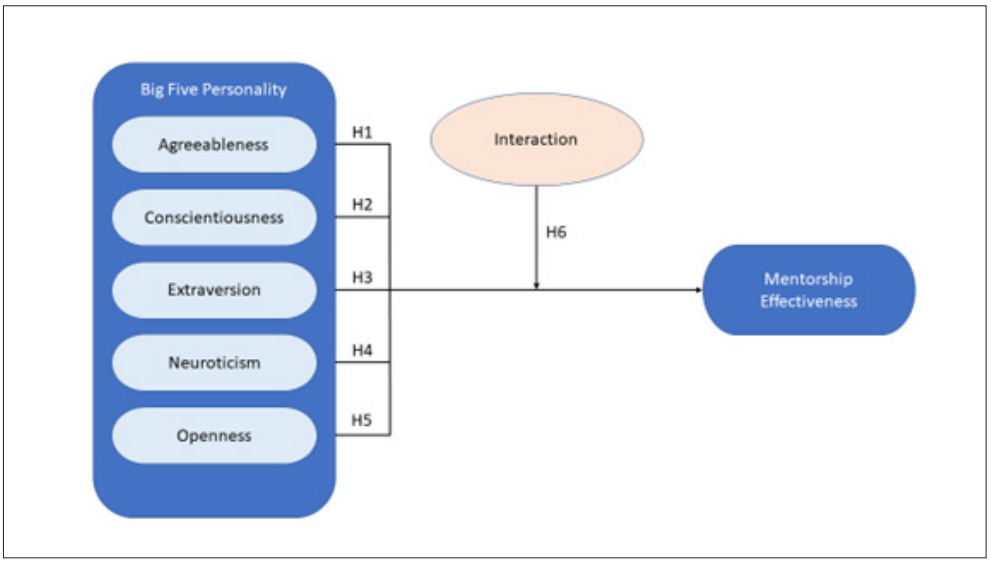
Research has shown that interaction frequency, which is part of the mentorship program characteristic, would serve as a moderating variable which would have potential influence as a catalyst or lead to a positive outcome on mentoring-program effectiveness (Dubois et al., 2011; Eby et al., 2013; Hernandez et al., 2016). Besides that, interaction between mentor and mentee would also affect the relationship between mentee's personality and mentorship effectiveness. With a higher interaction score, mentee could have a better perception of the personalities of their mentor. This is because even with just a one-minute interaction between individuals, they would tend to have a substantial understanding of the personalities of others (Tackett et al., 2016). Aryee (as cited in Menges, 2015) found that mentees with personalities such as extraversion will be positively related to the mentoring experience, and thus, they tend to be engaged more frequently with mentors.

In this study, interaction consists of both interaction frequency and interaction quality. This enhances the richness and accuracy of relationship assessments, providing a more reflective and practical measure for understanding and evaluating connections between individuals or entities. Therefore, this led to the development of the following hypothesis, and the proposed research framework is shown in Figure 1.

H_6: Interaction will moderate the relationship between Big Five Personality dimensions of mentee; (a) agreeableness, (b) conscientiousness, (c) extraversion, (d) neuroticism, (e) openness and mentorship effectiveness.

Conceptual Framework and Hypothesis of The Study

FIGURE 1. CONCEPTUAL FRAMEWORK



METHODOLOGY

The current study used a cross-sectional design, and a quantitative research methodology was employed. Partial Least Square-Structural Equation Modelling (PLS-SEM) was used for data analysis. The method of collecting data is through survey where a self-administered questionnaire was validated and distributed to the respondents who meet the criteria.

Participants and Procedure

The data for this study were obtained mainly from the undergraduate students at one of the prominent private universities in Malaysia. The suitable sampling size is 172 based on the G-Power Protocol with standard criteria of effect size $f^2 = 0.15$, α error probability = 0.05, Power (1-β err prob) = 0.95 and number of predictors (inclusive of the interaction terms) = 10 (Faul et al., 2009).

At the beginning of the semester, new groups of undergraduate students will be assigned to university service-learning courses. Students enrolled in these disciplines must organise an out-of-classroom activity/project and work in groups with their classmates to complete several assignments, projects and events. A senior student was designated as the group leader, in charge of the other junior pupils. Then, a mentor-mentee connection was developed, with the students' group leader serving as the mentor and the remaining members serving as the mentee.

The mentor and mentees then interacted with each other during the semester and the mentor played a role in providing leadership advice and managing the group's project with the mentees. The questionnaires were distributed to the mentees after 14 weeks, which is at the end of the semester to determine the perception of mentorship effectiveness among mentees. A total of 644 undergraduate students were approached to take part in the study and a total of 310 valid data from the mentees were obtained. The final response rate for the survey was 48.1%. The data was collected from August 2021 to October 2022 where the undergraduate students are affected by the COVID-19 lockdowns and were undergoing virtual learning in Malaysia.

Instrument Development

The study utilized a well-validated instrument based on existing literature to measure key constructs. The first section captures the demographic profile of participants. Subsequent sections focus on measuring the personality traits of mentees, evaluating interaction dynamics and assessing mentorship effectiveness.

Big Five Personalities was adopted from John and Srivastava (1999), consists of 44 items to measure agreeableness (9 Items), conscientiousness (9 Items), extraversion (8 Items), neuroticism (8 Items) and openness (10 Items). A 5-point Likert scale to measure range from 1=Strongly Disagree to 5=Strongly Agree. ***Interaction*** was adapted from Buhrmester and Furman (2008) consisting of 4 items with a 4-point Likert scale 1=Little or None to 4=The Most. ***Mentorship Effectiveness*** was developed by Berk et al. (2005), consists of 12 items measured with 5-point Likert scale from 1=Strongly Disagree to 5=Strongly Agree.

Pilot Test

Pilot Test has been conducted on 50 samples prior to the actual study to ensure the reliability of the survey instrument. The Cronbach's alpha for Big Five Personality ranged from 0.714 to 0.937, while alpha values reported for frequency interaction is 0.783 and mentoring effectiveness is 0.924. All variables showed a Cronbach's alpha value of > 0.7 (Hair et al., 2020). Thus, the reliability of the scale was established.

Data Analysis

The data from 310 mentees collected from this study was first entered into IBM-SPSS statistical software and further analysed in SmartPLS 4 software to test the hypotheses of the study. The data was analysed using PLS-SEM approach to find the fundamental relationships between the Big Five Personality, interaction and mentorship effectiveness. PLS-SEM method allows researchers to analyse complex models which consist of many variables, constructs or structural path without having the influence of distributional assumptions on the data. Besides that, PLS-SEM is a SEM which practices causal predictive approach which focus on prediction in estimating statistical models which is designed to give causal explanation (Hair et al., 2019).

FINDINGS

Demographic Profile

A total of 310 valid and useable samples were collected from 137 male (44.2%) and 173 female (55.8%) undergraduate student mentees age from 18 to 27, Year 1 to Year 5 of study from various faculties such as business, science, information technology, arts and etc.

Preliminary analysis

Normality test was performed to test for data normality through skewness and kurtosis analysis. As shown in Table 1, the values of all key variables fall within the range of ± **3** for skewness and meet the criteria of ± 10 for kurtosis (Brown, 2006).

TABLE 1. SKEWNESS AND KURTOSIS

	Skewness	Kurtosis
Agreeableness	0.120	0.114
Conscientiousness	-0.498	-0.236
Extraversion	0.008	-0.109
Neuroticism	0.075	-0.316
Openness	-0.830	0.864
Interaction	-0.659	0.058
Mentoring Effectiveness	-0.600	0.439

Measurement Model Evaluation

The construct ensured that all items' loadings are above 0.7 for individual item reliability to be accepted. All the constructs in Table 2 show that both the Cronbach's Alpha and composite reliability values are > 0.7, indicating good reliability (Hair et al., 2020). Thus, these results indicate that the instrument used in this study has great internal consistency. Besides, the AVE values of all the key constructs in this study are above 0.5, thus convergent validity is adequate (Hair et al., 2020).

TABLE 2. RELIABILITY STATISTICS AND VALIDITY

Constructs	Cronbach's Alpha	Composite Reliability	Average Variance Extracted (AVE)
Agreeableness	0.911	0.923	0.615
Conscientiousness	0.884	0.890	0.591
Extraversion	0.878	0.897	0.610
Neuroticism	0.932	0.970	0.703
Openness	0.942	0.968	0.678
Interaction	0.879	0.887	0.734
Mentorship Effectiveness	0.959	0.961	0.711

Next, the measurement model's discriminant validity was measured. The best approach in assessing the discriminant validity would be by using the heterotrait-monotrait ratio of correlations (HTMT). The accepted cutoff value is 0.9 to interpret the HTMT value where discriminant validity is established when the value of HTMT is below 0.9 (Gold et al., 2001). From the result in Table 3, all HTMT values are lower than 0.9. Thus, discriminant validity is regarded to be established in this construct. The findings from the assessment of the measurement model above represent satisfactory values and thus indicate that the approach has attained a sufficient level of validity and reliability (Hair et al., 2020).

TABLE 3. HTMT OUTPUT

Constructs	Agreeableness	Conscientiousness	Extraversion	Neuroticism	Openness	Interaction
Agreeableness						
Conscientiousness	0.326					
Extraversion	0.077	0.138				
Neuroticism	0.096	0.139	0.387			
Openness	0.145	0.134	0.075	0.049		
Interaction	0.42	0.945	0.074	0.08	0.163	
Mentoring Effectiveness	0.397	0.495	0.209	0.135	0.154	0.536

TABLE 4. PATH COEFFICIENT, STANDARD ERROR, P-VALUE, F2, HYPOTHESES TESTING, VIF

Hypothesis	Description	Std_Beta	Std_Error	P Values	f^2	Decision	VIF
H1	**Agreeableness -> Mentoring Effectiveness**	**0.186**	**0.051**	**0*** **	**0.05**	**Supported**	1.238
H2	Conscientiousness -> Mentoring Effectiveness	0.162	0.114	0.156	0.011	Not Supported	3.851
H3	**Extraversion -> Mentoring Effectiveness**	**0.144**	**0.048**	**0.003*** **	**0.03**	**Supported**	1.237
H4	Neuroticism -> Mentoring Effectiveness	-0.02	0.052	0.702	0.001	Not Supported	1.197
H5	Openness -> Mentoring Effectiveness	0.038	0.05	0.449	0.002	Not Supported	1.112
H6a	**A x I -> Mentoring Effectiveness**	**-0.146**	**0.06**	**0.015** **	**0.04**	**Supported**	1.439
H6b	C x I -> Mentoring Effectiveness	-0.024	0.05	0.626	0.001	Not Supported	1.698
H6c	E x I -> Mentoring Effectiveness	0.06	0.055	0.276	0.005	Not Supported	1.575
H6d	N x I -> Mentoring Effectiveness	0.019	0.062	0.763	0	Not Supported	1.51
H6e	O x I -> Mentoring Effectiveness	-0.022	0.048	0.645	0.001	Not Supported	1.293

Note. *p<0.1, **p<0.05, ***p<0.01. A=Agreeableness, C=Conscientiousness, E=Extraversion, N=Neuroticism, O=Openness, x I = with inclusion of interacting as moderating variable

Structural Model Assessment

The structural model was assessed by performing bootstrapping procedure with 5000 re-sampling. Table 4 shows that all items are below the Variance Inflation Factor (VIF) of 3. If the VIF score is more than 3, there is likely to be significant multicollinearity between the exogenous variables (Hair et al., 2020). Thus, there are no serious multicollinearity issue in this model.

Table 4 shows that agreeableness has the most significant positive influence on mentoring effectiveness (β = .186, p < .01). Meanwhile, the trait with the second highest significant positive influence on mentoring effectiveness is extraversion (β = .144, p < .01). Thus, Hypothesis 1 and 3 were supported. However, traits such as conscientiousness (β = .162, p > .05), neuroticism (β = -.02, p > .05) and openness (β = .037, p > .05) show non-significant result. Therefore., Hypothesis 2, 4 and 5 were not supported.

The analysis of the moderating effect, interaction on the relationship between agreeableness (β = -.146, p < .05) and mentorship effectiveness shows significant result while conscientiousness (β = -.024, p > .05), extraversion (β = .060, p > .05), neuroticism (β = .019, p > .05) and openness (β = -.022, p > .05) show non-significant results. Thus, Hypothesis 6a was supported while Hypothesis 6b to 6e were not supported. The R^2 value of mentorship effectiveness was 0.357 after the inclusion of interacting as a moderating variable. This shows that the exogenous variables account for 35.7% of the variance in mentorship effectiveness

The f-Square represents the change in R-Square when an exogenous variable is removed from the model and F-Square is the effect size where (>= 0.02 is small; >= 0.15 is medium; >= 0.35 is large) (Hair et al., 2019). Based on the result from Table 5, only Agreeableness (f^2 = 0.045), Extraversion (f^2 = 0.027) and Agreeableness x Interaction (f^2 = 0.042) show significant results. Thus, f^2 value on Agreeableness, Extraversion and Agreeableness x Interaction which are > 0.02 have a small effect on the R^2 value. A Q^2 value of above zero (0.288) represents that the model has predictive relevance (Hair et al., 2020).

DISCUSSION

This study would present a framework to provide insights to education institutions wishing to improve the effectiveness of their existing mentorship programme. The findings align with prior research, indicating a positive correlation between agreeableness

and mentoring effectiveness. Specifically, individuals with higher levels of agreeableness as mentees are likely to receive more substantial mentoring support (Cavell et al., 2020; Goldner, 2015; Niehoff, 2006; Younginer & Elledge, 2021; Zacher & Frese, 2009).

Meanwhile, several research also indicated that extraversion was positively correlated with mentoring effectiveness (Bozionelos, 2004; Goldner, 2015; Jacobi, 1991; Schuster et al., 2017). Mentees with trait of extraversion were more likely to receive instrumental support, such as job leads and networking opportunities and to engage in active listening and empathic responding. This led to greater career success for the mentees (Allen et al., 2004; Jones et al., 2014).

Therefore, the findings brought a new insight of the mentoring programme. The study was conducted during the Covid-19 lock-down period where most respondents mainly interacted virtually instead of physically. Interaction which occurs virtually may be more effective, however it greatly reduces the interaction quality as virtual interaction would ignore the important elements in interaction such as voice tone, emphasis, body language and emotional attachment. At the same time, prior research found that a team with low agreeableness interacting virtually would even outperform a team with high agreeableness communicating physically (Bradley et al., 2013). Thus, due to the Covid-19 situation which happened during the course of this study, most students who are only able to interact via virtual communication methods may also have an impact on the findings.

Theoretical Implication

From the theoretical perspective, our findings showed that mentees who are extroverts and high in agreeableness contribute to mentoring effectiveness compared to other personality traits. Moreover, interaction was found to be a significant moderating effect in the relationship between agreeableness to mentorship effectiveness. The evaluation of personality and mentoring effectiveness might indeed be culturally sensitive, suggesting that what is considered effective in one culture may not hold true in another. This study, therefore, contributes to the existing literature by fortifying and refining our understanding of the relationship between personality and mentorship effectiveness, emphasizing the need for a nuanced approach that considers cultural variations.Besides that, the finding of this study contributes to the existing literature as the majority of the previous research were conducted in a business environment instead of academic institutions (Bozionelos, 2004; Niefhoff, 2006; Turban et al., 2016; Waters, 2004). As such, the findings from this study could lay a foundation in the academic setting for future research.

Managerial Implication

The findings of this study are useful in designing a more effective mentorship programme for the students which is beneficial in improving students' academic attainment as well as improved psychosocial support throughout their course in the institution (Astin et al., 2000; Cheah et al., 2015; Colvin & Ashman, 2010; Morris, 2017). Thus, this study has provided insight into how institutions could use the concept of personality, particularly the Big Five Personality assessment tools, to identify the traits of individuals in order to have a better understanding of the students in order to cultivate successful mentorship programmes in the future.

In light of findings that demonstrate the validity and reliability of the Big Five Personality assessment tools and the Mentorship Effectiveness Scale, university and academic faculty management may utilize these measurements to facilitate specific mentorship programs by identifying mentee personalities prior to the commencement of the mentorship program. Institution may also further strengthen their mentorship programmes by constantly evaluating

their programme by using the Mentorship Effectiveness Scale and make any necessary adjustments to the programme's setting.

Moreover, the finding from this study has shown that interaction do play a role in moderating the relationship between individual's personality and mentorship effectiveness. Thus, this insight prompts institutions to consider tailoring their programs, whether physical or virtual, based on the nuanced performance and feedback of each student.

CONCLUSION

In conclusion, mentoring is a common practice in both working and educational environments that aims to provide career and psychosocial support to an individual. The Big Five Personality Traits assessment tools, which are widely recognized has shown that individual's personality may influence mentoring effectiveness measured by using the Mentorship Effectiveness Scale. The researchers hope that findings from this study will contribute to a better understanding of how individual's personality affect the effectiveness of mentoring relationships with the presence of interaction as a moderating factor.

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