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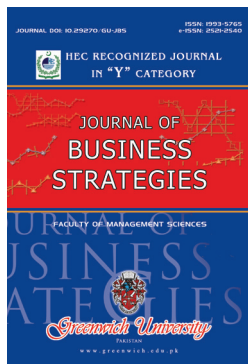
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EDITORIAL NOTE

Building Justice Through Economic Policy

The ultimate goals of international economists remain clear: to improve working and living conditions, to safeguard human rights, and to promote productive employment. Such ambitions, however, can only be realized within a favorable working environment.

Enduring international peace rests on the foundation of social justice. It is built on the universal right of all human beings “to pursue both material well-being and spiritual development in conditions of freedom and dignity, of economic security and equal opportunity.” The timeless reminder that “poverty anywhere constitutes a danger to prosperity everywhere” resonates even more strongly today.

Central to these principles are the freedom of labor unions, the abolition of forced labor, and the elimination of discrimination in employment. Other standards extend across the spectrum of work-related issues—minimum wages, fair labor–management relations, and social protections. Internationally, bodies such as the AFL-CIO continue to advocate vigorously for these norms. True economic growth, moreover, cannot be measured by GDP alone. It must also reflect improved purchasing power and greater equity across society.

In this light, Pakistan’s federal budget for 2025–26 should be understood not in isolation, but in the broader context of recent global and national challenges. To appreciate its framing, we must revisit the fiscal policy landscape of 2021–22.

That period was profoundly shaped by the COVID-19 pandemic. The global economic slowdown disrupted trade, weakened foreign reserves, and placed unprecedented pressure on healthcare systems. Soon after, the Russia–Ukraine war deepened supply chain disruptions, driving up prices of basic commodities and limiting access to essential goods.

In 2022–23, Pakistan’s economy was further unsettled by political instability and difficulties in meeting IMF requirements, which fostered uncertainty and weakened investor confidence. These developments continue

to shape the government's fiscal planning. Now, the ongoing conflict between Iran and Israel has created fresh volatility in the global environment, a reminder that Pakistan's economic trajectory is inseparably linked to regional and international geopolitics.

It is in this turbulent context that the 2025–26 budget must be evaluated. Sound fiscal planning requires not only addressing immediate challenges but also advancing the deeper goals of social justice, human dignity, and economic opportunity. Only by aligning national policy with these universal principles can Pakistan hope to ensure stability at home and contribute meaningfully to peace abroad.

Finally, as we present this third issue of the Journal of Business Strategies after securing the “Y” category from HEC Pakistan, we reaffirm our commitment to publishing research that engages with these critical questions. We trust our readers will find in this volume fresh insights into the intersection of economics, society, and justice.

Professor Dr. Shafiq ur Rehman

Editor

Journal of Business Strategies

Greenwich University

Pakistan

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FINANCIAL DEVELOPMENT OF PAKISTAN AND THE ROLE OF REMITTANCES: A COMPARATIVE ANALYSIS

Anum Hayat

PhD Scholar at Department of Economics, Jinnah University for Women, Karachi, Pakistan. anum.hayat@juw.edu.pk

Saghir Pervaiz Ghauri

Professor at Department of Economics, Jinnah University for Women, Karachi, Pakistan. saghir.ghauri@juw.edu.pk

ABSTRACT

Purpose:

This research intend to explore the role of remittances inflow in financial expansion of Pakistan. This study is essential because Pakistan is facing financial crises since decades therefore, this research is intended to discover impact of disaggregated remittances and aggregated remittances with financial sector of Pakistan.

Design/Data/Methodology:

The time series yearly data of remittances, FDI, ODA, public debt as financial inflows along with money supply and local private credit as proxy of financial development from the time span of fiscal year 1981 to 2023 has been used in this study. Furthermore, this study explored about long run association of disaggregated remittances inflow with financial development and association of total remittances as compare to other financial inflows with financial development. To check the cointegration in the study ARDL model/VECM has been used where appropriate.

Findings

This study found that in the model 1 the USA has statistically significant and positive impact on domestic private credit in short and negative impact in long term while UK and other countries which include Japan, Australia, Malaysia, Norway, and Switzerland have statistically significant and negative impact on money

supply and positive impact on domestic private credit respectively in short term only. Furthermore, these results indicated that country-wise remittance at disaggregated level have more impact on domestic private credit of Pakistan. Additionally, another model of this study estimated about relationship between total remittances and financial sector of Pakistan as compare to other financial inflows. As a result it is concluded remittances have optimistic impact on financial sector of Pakistan in short term while in the long term they have statistically significant impact on money supply only while, FDI has positively significant impact in brief and long term however public debt has adverse effect on financial sector of Pakistan in the long period. Conversely, during short period public debt and ODA has negative impact at lag 2 on supply of money and local private credit respectively.

Policy implication:

The government body should encourage remittances receiving families invest more and foreign Pakistanis to send more remittances in the form of investments this will accelerate financial sector of Pakistan. Furthermore, in future this study can be expended to panel data comparative analysis of top remittances receiving country regionally.

Novelty:

The novelty of this study is to explore the influence of the disaggregated remittance on financial sector of Pakistan and the analysis cover the latest period (FY 1981-2023).

JEL classification: F0 and G1

Keywords: *Country-wise Remittances, Foreign Financial Inflows and Economic Growth.*

INTRODUCTION

The resolution of this research is to investigate whether remittances have a role in financial development of Pakistan. This study is essential because Pakistan is facing financial crises since decades therefore; this research is intended to discover association of disaggregated and aggregated remittances with financial sector of Pakistan. Pakistan's economy is still dependent upon

these loans and burdened with high interest rates and strict conditions imposed by them. After covid-19 outbreak, it became a more essential financial inflow for the whole world as well as for Pakistan's economy. In this condition we need to focus on new sources of capital and finance like Remittances which is second largest source of capital after FDI and greater than official development assistance ODA moreover it is less volatile than other sources according to IMF while according to World bank it is on the pathway to the major capital source in emerging countries like Pakistan which help them to break this long term bubble around the economy which will allow growth and development of economy.

1.1 What are worker/ migrant's remittances?

(The World Bank, 2017) determined that remittances, commonly assumed as money sent back by emigrants to their families and friends in countries of origin, are possibly the most significant and direct association between workers migration and development. Within international balance of payments BOP data collected by remittance-recipient states, remittances are calculated as the amount of two types of transactions: "workers 'remittances'" and "workers' compensation." Workers 'remittances are cash and non-cash resources sent to domestic households by immigrants living abroad. Transactions in this classification are described specifically as one-sided dealings, which do not require an economic exchange.

When many people consider the global financial flow to developing countries, they concentrate on those that happen by companies, governments and monetary institutions, namely, official development assistance ODA, FDI, and portfolio investment. However, since the late 1990s, worker remittances have surpassed ODA and portfolio investment, exceeding the magnitudes of FDI flows in the previous few years. As per the report of the World Bank worldwide remittances are slow but remain resilient and are expected to increase by 1.1 per cent to US\$ \$840 billion in 2023, including US\$ 528 billion to developing countries and they are projected to increase by 3.7 percent in 2019 to US\$ 715 billion, including US\$ 549 billion for developing nations while, remittances to low and middle-income countries is slowed down to \$ 656 billion in 2023 up by 1.4 % as compared to 8.0 in 2022 (Bank et al., 2023).

According to the SBP report, Pakistan has established a total of US\$ 29.45

billion in global remittances in the previous fiscal year and \$31.2 billion in fiscal year 2022; however, in 2023 a decline was recorded for the first time in six years.

1.2 Remittances as a source of capital/finance in Pakistan:

Within global BOP data, remittances are calculated as two categories of transactions: “workers’ remittances” and “workers’ compensation.” Workers’ remittance flows are cash and gifts sent to domestic households by immigrants living abroad. Worker remittances are transactions, which do not need exchange, and it is a one-way transaction. However, Employee pay signifies the earnings of migrant workers who are abroad and thus whose incomes are expected to send back to their country of origin with the workers upon return relocation. For reporting purposes of the balance of payments, migrants are deemed “residents” after having been in the foreign country for one year or more than one year. However in the vast majority of cases the parties to the remittance dealings are families.

According to a world bank report (Bank et al., 2023) and data, the top five remittances receiving countries in terms of US dollars during the year 2022 are India, Mexico, China, Philippine, Pakistan, Egypt, Bangladesh, Nigeria, Guatemala, Ukraine respectively and most of them are Asian countries. The figure 1 below shows remittances received by countries in the world.

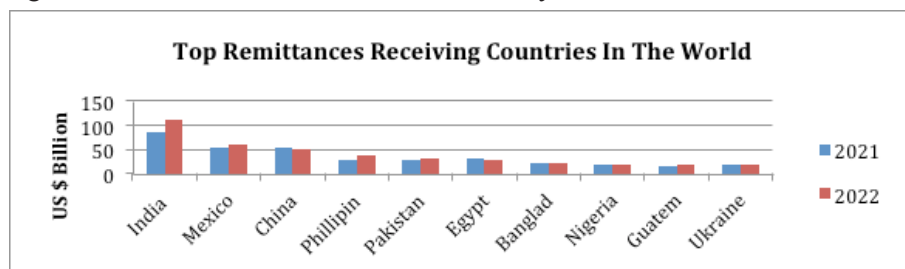


Figure 1, Source: World Bank Report

The flow of remittances to Pakistan slowed down and reached to \$31.3 billion in 2022, apparently due to a slowed down of economic activities in high income and other host economies due to contractionary monetary policy, high inflation, fiscal expenditure during covid-19 and lower oil demand (State Bank of Pakistan, n.d.). According to a report issued by the Bureau of Emigration and Overseas Employment (BE&OE), on average, more than 2000 Pakistani nationals everyday found employment in foreign countries in

the year 2022 which is same in 2021. Many migrants lose their jobs in Gulf countries due to lack of confidence of employers on Pakistani employees during previous year. While current government is working for improvement of diplomatic relationship with Gulf countries particularly Saudi Arabia and UAE which are largest destination for Pakistani migrant workers these diplomatic efforts along with stability of oil prices resulted in positive impact on employment opportunities for Pakistanis.

1.3 Major host countries, which are source of remittances in Pakistan:

Looking at country-by-country remittances in Pakistan, it is discovered that the utmost important amount of investment originates from the Gulf countries and Middle East. The figure 2 show the country-by-country remittances and its amount in FY 2022 and 2023 including Saudi Arabia– UAE– UK– USA– Gulf Cooperation Council GCC countries– European Union and other countries such as, Switzerland, Malaysia, Japan, Norway, Canada etc. contribute a substantial amount altogether.

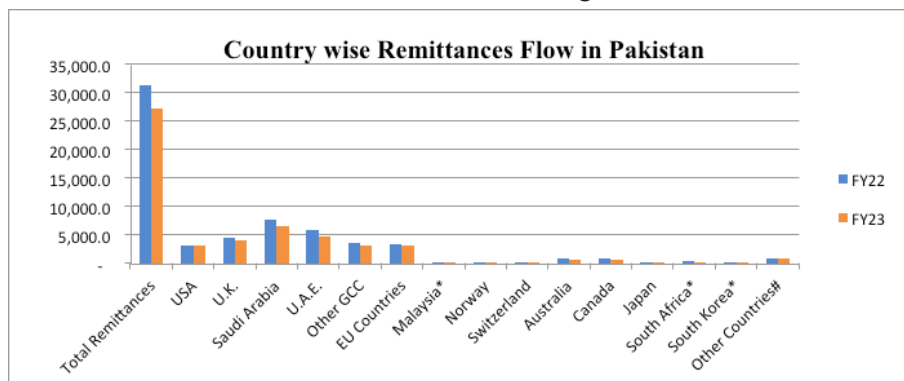


Figure 2, source: author's own figure

1.4 Remittances Effect on Financial Development:

The remittances effect on financial development is uncertain, it can be positive if its inflow is through the legal channels of financial institutions like banks along with financial inclusion, which lead to increase in deposits, credit creation and money supply. Moreover, an increase in the inflow of worker's remittances increases the saving and investment, which further enhances financial development in receiving countries. On the other hand if remittances are not inflowing through the legal channels and the banking sector is not productive then its impact can be negative or may have no impact on financial development (Bettin & Zazzaro, 2012a).

Significance of Study

The resolution of this research study is to examine whether remittances have a role in financial development of Pakistan. This study is essential because Pakistan is facing financial crises since decades and badly trapped in this bubble. Consequently, this research is intended to discover association of disaggregated and aggregated remittances with financial sector of Pakistan. Moreover, exploring disaggregated country-wise remittances provides important insights to economists, policy makers and financial analysts to optimize their decisions and benefits while mitigating risks of economic slowdown in host country. Appropriate and in depth managed remittances can lead to sustainable economic and financial growth along with improved living standard in recipient economies.

Contribution of Study

Many studies have been conducted on the research topic internationally but no published research was found with context of disaggregated country-wise influence of remittances on financial sector of recipient country during most recent fiscal period (1981-2023).

Objectives of the Study

Pakistan is a lower middle income and labor intensive economy while availability of capital resources in Pakistan is highly insufficient therefore; following are the aims of this research.

- To study the magnitude of link between aggregated remittances and disaggregated country-wise remittances inflows and financial development so that policy makers and financial analysts effectively utilize worker remittances to develop financial systems which lead to economic growth and development in Pakistan.

Hypothesis

H1: There is a statistical association between country-wise worker remittances and the financial sector.

H2: There is a statistical association between total worker remittances and the financial sector as compared to other foreign financial inflows.

LITERATURE REVIEW

Literature about the impact of remittances on the economy is widespread which is fitted into several hypotheses and factors like economic factors,

financial factors and social factors. This section will give a brief review of previous studies about effect of remittances on financial sector including national and international studies.

International studies

The study about the association remittances and financial growth done by (Biyase & Naidoo, 2023) for this purpose the ARDL analysis applied during 1980 to 2017, and they demonstrated a positive influence of worker remittances on financial expansion. In contrast, NARDL estimations suggest a mixed influence of migrant remittances on financial progress over the long term. In another research article titled (Adekunle et al., 2022) discusses the association between worker remittances and progress in financial division in Africa. The study used a theoretical framework and model specification to analyze the remittance's effect on financial sector progress and provided insights into the dual gap theoretical model and its application in African countries. It also explored the role of remittances in bridging the investment deficit and contributing to the expansion of the financial division. With the same objective (Das & McFarlane, 2022) in their study about Jamaica examined the intricate association of financial development and remittance inflows over the period from 1980 to 2017. They employed the (ARDL) bound check and concluded two outcomes, first, a cointegration link exists. Second, this association is characterized by non-linearity. Specifically, they find that financial development follows a U-shaped trajectory concerning remittances. Initially, rising remittance inflows negatively impact financial development. However, beyond a certain threshold, these inflows exhibit a positive association with financial development. In one more study related to remittances and financial expansion (Haouas et al., 2022) examined the causality in the MENA region by employing the bootstrap rolling Granger non-causality approach on data from 1980 to 2015, as a result they found granger predictability from remittances to financial development, with the predictability from financial development to remittances contingent on the chosen FD indicator. (Emara & Zhang, 2021) investigate the effect of digitalization, a fictitious term for fintech, on remittance inflow in the BRICS countries which are developing nations with a large number of workers living abroad but a low level of digital transfers. According to the paper's findings, advances in digitization may initially enhance remittance inflows, resulting

in a rise remittances inflow. However, when digitization index reaches its threshold level, further progress in digitization tends to slow as penetration grows, resulting in a fall in the pace of remittances influx. This finding shows that the marginal effect of digital dispersion is greater when it is at its lowest point. Moreover, (Azizi, 2020) in his research paper examined the association of international remittances with financial growth in emerging countries. For this purpose he used a panel data of 124 developing countries from 1990 to 2015 and applied an instrumental variable-fixed effect model to address the endogeneity of remittances. The findings show remittances are positively associated with financial expansion, with a 10 percent upsurge in remittances leading to increases in local private sector credit, bank credit, bank deposits, and liquid liabilities. Furthermore, (Qamruzzaman et al., 2020) in their study explored the association of remittance with money supply, non- performing loan and financial volatility during 1976-2017 by applying ARDL. As a result they suggested the presence they found long term association between them and remittances along with financial development is essential for financial stability while money supply is responsible for financial instability. (Chowdhury, 2011) investigated the same relationship in Bangladesh using Johansen cointegration test for checking long-run relationship and VEC block exogeneity test for causality and found significant and positive relationship and suggested that increase in remittances flow leads to increase in financial deepening in Bangladesh. Similarly, (Noman & S.Uddin, 2012b) investigated interaction among remittances, investment sector expansion and economic growth in four South Asian countries by applying Johansen cointegration test the multivariate granger causality and panel granger test and found existence of influence of remittances and banking development on GDP per capita in for south Asian countries but causality between remittances and banking sector development in not same. In another parallel research study (Bettin & Zazzaro, 2012) explored the question that remittances and banking efficiency work as a compliment to each other in economic growth or not? This question is tested by applying OLS, SGMM and GMM estimator techniques on qualitative and quantitative panel data of social, political and economic indicators from 1991–2005 on two different models and they found that there is an uncertain effect of remittances on financial growth and that only a few countries with a productive national banking sector will benefit

from this growth moreover, they also find that an adequate management of financial market , control on corruption within institutions and secure property rights boost the inflow of remittances led growth. However, (Giuliano & Ruiz-arranz, 2009b) in their research paper studied about link between remittances and growth through financial sector capacity and development using control economic and social variables of over 100 countries by applying ordinary least square OLS technique and the results showed that if there is less credit in financial sector then through the investment channel remittances have potential impact on growth of these countries.(Brown et al., 2013) investigated nexus between financial expansion and migrant remittances using micro and macro dimension They applied methodology of two stages least square 2SLS for macro level dimension within the context of cross country panel data and for micro level they use questionnaire to collect information about household financial literacy for Azerbaijan and Kyrgyzstan. Finally they found that remittances and financial development have a negative relationship between them in context of macro level and micro level. There is a weak but progressive effect of worker remittances on the likelihood of holding a bank account in Kyrgyzstan only. In an empirical study (Motelte, 2011) determined the association of worker remittances with financial expansion in Lesotho by applying co-integration test and granger causality test. They concluded the presence of co-integration between worker remittances on financial expansion however in the short-run there is no impact while only financial development causes remittances. Furthermore, (R. R. Kumar, 2013) studied the cointegration between remittance inflows and interaction with financial development, information and communication technology (ICT), trade openness and overseas development assistance (ODA) in the Philippines. For this purpose they applied a bound testing approach (ARDL), ordinary least square OLS and granger causality to estimate effectiveness and significance of relationship among them. Finally they concluded that the association of remittances with ICT has positive effects on revenue. However, the relationship of ODA and remittances with financial development has negative effects while openness to trade is not statistically significant. Likewise, For the cases of 18 high income and middle income countries (Hunte, 2004b) determined the relationship between welfare of migrants, remittances and financial deepening

including other explanatory variables such as inflation, household income, interest rate and exchange rate applying ordinary least square OLS estimation technique. Finally this paper confirmed the theory of remittance decay, in which remittances diminish as household income rises which means remittances have a negative impact on household income while remittances positively influence on deepening the financial sector. However, (Fromentin, 2017b) analyzed how remittances influence on financial growth of emerging and developing countries with various controlled variables like economic development, quality of legal institution, inflation and trade openness by using Pooled Mean Group (PMG) approach, cross-section dependence and co integration tests and author found that with the exception of low-income countries, short and long time but boosting link between worker remittances and financial expansion. There is good indication therefore supporting the result that long-run remittances raise financial growth in developed countries, but in the short term the impact could be different. Conversely, (Qayyum& Nawaz, 2014) theoretically explored the sufficient source of worker remittances inflow through well-established financial institutions with advanced technology led to economic growth. For this purpose they incorporate models developed by Ramsey (1928), Cass (1965), and Koopmans (1965) and latest innovations in financial sector development and found that the theoretical approach has significant implications as workers 'remittances need improvements and new technologies in the financial sector that further speed up the economic growth cycle. Higher remittance inflows contribute to higher consumption, which appears as the growth indicator in an open economy system. (Karikari et al., 2016) empirically examined the question of whether remittances promote financial growth or not? Moreover they also checked causality between them in some of the African countries by using random and fixed effects estimation and VECM and determined that to some extent remittances encourage some dimensions of financial growth while a stronger financial system facilitates remittance receipts. In the short term the influence of causality is seen but not in the long run. Whereas, (SIRKECI, 2010) in their academic review analyzed the relationship between remittances and financial crises through numerous case studies around the world and concluded that remittances are an important source of external financing for developing countries. Although in some cases, remittances have been

interpreted as shock absorbers alleviating poverty and economic difficulties in migrants sending countries, while in the current crisis, a link formed by the remittances will transmit the crisis to the countries of origin.

National studies:

The case study of Pakistan (Luqman & Haq, 2015) aimed to investigate the part of the financial division in the contribution of migrants and growth by including control variables such as human capital, physical capital and trade openness. For this purpose they applied the ARDL model and discovered the financial sector had a positive impact on overseas workers which led to enhanced economic growth in Pakistan. Likewise, (Shahzad et al., 2014) empirically examined the influence of migrant's remittances on financial progress in five South Asian countries including Pakistan, India, Bangladesh, Sri Lanka and Nepal by using panel data techniques Pooled (OLS) model and GMM Estimates. After applying empirical techniques, authors found that encouraging effect of remittances on financial development. Additionally, (KHURSHID et al., 2017) wrote a note on link of remittances, financial and economic growth in Pakistan. For this purpose they applied GMM and Granger causality test and concluded that system GMM results show worst remittance effect on financial development and growth in cases where they are not targeted towards investment. The resulting full-sample causality shows a unidirectional causality from financial growth to remittances. The results of the sub-samples rolling window estimation showed bidirectional causality between remittances and financial growth.

DATA AND METHODOLOGY

This section discusses data, methodology and models used in this study. It includes the type of data its source, unit and abbreviation along with statistical tests and research methodology used in this study. Moreover, this chapter also includes econometric models used in this study.

1. Data:

Annual data of Remittances in aggregate and country-wise disaggregate form, foreign direct investment, official development assistance and public debt has been taken as independent and controlled variable while financial sector data including money supply and domestic private credit as dependent variables are taken from Economic survey of Pakistan and State Bank of Pakistan during fiscal years 1981 to 2023. All the variables are transformed

into logged values to avoid variance. Table 1 below shows abbreviations of the data series along with measures and sources.

Table 1: Source of Data				
Series	Abbreviat ion	Measure	Source	Category
<u>Financial Sector</u>		\$	State Bank of Pakistan	Dependent
Money Supply & Domestic Credit to Private Sector	M2 & DCP			Independent
<u>Country wise Remittances Inflow</u>				
Remittances from USA	USA			
Remittances from UK	UK			
Remittances from Saudi Arabia	SA			
Remittances from UAE	UAE			
Remittances from Other GCC Countries	GCC			
Remittances from European Union	EU			
Remittances from Australia	AUS			
Remittances from Canada	CAN			
Remittances from Japan	JAP			
Total Remittances	Trem			
Foreign Direct Investment	FDI		World Bank	Control Variable
Offical Development Assistance	ODA			
Public Debt	PDBT			

METHODOLOGY

The methodology includes econometrics techniques and models, following are the steps included in this dissertation.

Step 1: Descriptive Statistics:

Descriptive statistics is essential for the research study because it helps researchers to analyze mean, skewness, kurtosis, standard deviation and normality of each series individually.

Step 2: Unit Root Test: Augmented Dickey Fuller (ADF) and Phillip Perron Test (P.P)

It is crucial to determine each series level of integration for stationary of data to avoid spurious results. For this purpose Augmented Dickey Fuller in 1984 and Phillip Perron in 1988 proposed unit root test, mostly both tests are used by research community to check the robustness of the outcomes and both of them have similar asymptotic distribution and null hypothesis (H_0 = there is a unit root in series).

Step 3: Pairwise Correlation

It is essential to identify one of the major econometrics issues of multicollinearity among independent variables by using pairwise correlation matrix. Existence of the issue of multicollinearity means correlation among independent variables which may result in biased relationships between dependent and independent variables.

Step 4: Cointegration test

Cointegration is the influential method to explore the existence of equilibrium between variables of the model. Moreover, nonexistence of cointegration indicates spurious regression which makes the results worthless. To check the existence of cointegration, the ARDL and ECM models (Pesaran and Shin 1999 and Pesaran et al. 2001) and Johanson's cointegration (1990) are widely used econometric techniques for analyzing the relationships between variables.

Step 5: Residual Diagnostic and Stability tests

The residual diagnostic tests are essential to check major issues in the residuals of the models so the model fulfills the assumption of BLUE and robustness of the outcomes as the both models are based on OLS assumption. The serial correlation LM test by Breusch-Godfrey is used to ascertain whether the model contains autocorrelation, which was performed (Breusch & Godfrey, 1981).

The result of the ARCH test is applied to identify heteroskedasticity in the model.

To ascertain whether the model contains autocorrelation, the serial correlation LM test was performed (Breusch & Godfrey, 1981).

Additionally, the stability of the ARDL model was evaluated using (CUSUM) and (CUSUMSQ) stability tests proposed by (Brown et al., 1975). The CUSUM and CUSUMSQ stability diagnostic tests were used to evaluate the stability of the cointegration model.

3. Econometrics Models of the study:

This study focuses on the association of disaggregated and aggregated remittances with financial sector of Pakistan therefore; the models are categorized in aggregated and disaggregated level.

Worker Remittances and Financial Sector

$$LM2_t = \beta_0 + \beta_1 lTrem_t + \beta_1 lFDI_t + \beta_1 lODA_t + \beta_1 lPDEBT_t + e_t \quad \text{eq. (i a)}$$

$$LM2_t = \beta_0 + \beta_1 lUSA_t + \beta_1 lUK_t + \beta_1 lTGCC_t + \beta_1 lEU_t + \beta_1 lOTH_t + e_t \quad \text{eq. (i b)}$$

$$LDCP_t = \beta_0 + \beta_1 lTrem_t + \beta_1 lFDI_t + \beta_1 lODA_t + \beta_1 lPDEBT_t + e_t \quad \text{eq. (ii a)}$$

$$LDCP_t = \beta_0 + \beta_1 lUSA_t + \beta_1 lUK_t + \beta_1 lTGCC_t + \beta_1 lEU_t + \beta_1 lOTH_t + e_t \quad \text{eq. (ii b)}$$

RESULTS WITH DISCUSSION

This section included empirical test and analysis of the study by applying vector error correction, Johanson's cointegration test and ARDL model, and where appropriate to check the long run association among the selected variables with remittances depending on the prerequisite of the unit root test.

1. Unit Root Test:

Table 2 ADF and PP Test				
Series	Probability of ADF Test I(0)	Probability of P.P Test I(0)	Probability of ADF Test I(1)	Probability of P.P Test I(1)
INDEPENDENT VARIABLES				
LTREM	0.73	0.84	0.00	0.00
LUSA	0.34	0.34	0.00	0.00
LUK	0.61	0.61	0.00	0.00
LTGCC	0.46	0.38	0.00	0.00
LEU	1.00	1.00	0.00	0.00
LOTH	0.33	0.23	0.00	0.00
LFDI	0.71	0.58	0.00	0.00
LODA	0.31	0.49	0.00	0.00
LPDBT	0.88	0.87	0.00	0.00
DEPENDENT VARIABLES				
LM2	0.89	0.89	0.00	0.00
LDCP	0.18	0.14	0.00	0.00
Ho: there is a unit root/no stationarity in series At level of significance 5%.				

Table 2 depicts that the entire series is stationary at 1st Difference. In case of current account deficit P.P test at level has been rejected while null hypothesis of ADF test at level has been accepted however, at 1st difference null hypothesis of both tests has been rejected which shows robustness of stationarity at 1st difference. Hence, all the series of this study are stationary at 1st difference therefore we can apply all the chosen econometrics tests in this study.

2. Remittances and Financial Development:

In this section empirical analysis of association between remittances and the financial sector has been conducted. For this purpose money supply and domestic private credit has been used as indicators of financial sector. Therefore, this sections consist of two model.

Table 3 Country wise Remittances and Financial Sector			
Model 1.1: LM2=LUSA LUK LEU LTGCC LOTH Model 1.2: LDCP=LUSA LUK LEU LTGCC LOTH			
VAR Model at lag 1 $D(LM2) = -0.01*(LM2(-1) - 0.61*LUSA(-1) - 2.14*LUK(-1) + 0.06*LEU(-1) - 1.34*LTGCC(-1) - 0.13*LOTH(-1) - 7.91) + 0.08*D(LM2(-1)) + 0.01*D(LUSA(-1)) - 0.12*D(LUK(-1)) - 0.02*D(LEU(-1)) - 0.06*D(LTGCC(-1)) - 0.02*D(LOTH(-1)) + 0.01$			
ARDL COINTEGRATION EQUATION: (1,1,1,1,1,0) $D(LDCP) = 0.14*D(LUSA) + 0.05*D(LUK) + 0.05*D(LEU) + 0.10*D(LTGCC) + 0.07*D(LOTH) - 0.13*(LDCP - (-0.52*LUSA(-1) - 0.87*LUK(-1) - 0.48*LEU(-1) - 2.07*LTGCC(-1) + 0.55*LOTH(-1) - 4.66))$			
ARDL BOUND TEST	COINTEGRATION	M2	DCP
		Inconclusive	Yes
JOHANSON'S COINTEGRATION	TRACE & MAX-EIGEN TEST	Exist in both tests	Exist in both tests
IMPACT OF COUNTRY-WISE REMITTANCES IN SHORT-RUN	LAG OF DEPENDENT VARIABLE	0.079 [0.46]	Nil
	DLUSA	0.010 [0.24]	0.142* (0.05)
	DLUK	-0.115* [-2.04]	0.049 (0.58)
	DLEU	-0.017 [-0.56]	0.045 (0.37)
	DLTGCC	-0.064 [-1.33]	0.096 (0.30)
	DLOTH	-0.016 [-0.60]	0.073* (0.09)
IMPACT OF COUNTRY-WISE REMITTANCES IN LONG-RUN	LUSA	-0.607* [-4.25]	-0.519* (0.09)
	LUK	-2.138* [-5.67]	-0.868 (0.15)
	LEU	0.060 [0.27]	-0.483 (0.21)
	LTGCC	-1.339* [-2.70]	-2.064 (0.16)
	LOTH	-0.127 [-0.55]	(0.544) (0.12)
SPEED OF ADJUSTMENT TOWARDS EQUILIBRIUM	COEFFICIENT OF VECM/ECM	VECM -0.011 [-0.68]	ECM -0.133* (0.07)

RESIDUAL DIAGNOSTIC TESTS	HETEROSCEDASTICITY (ARCH Test)	No	No
	AUTOCORRELATION (Breusch-Godfrey Serial Correlation LM Test)	No	No
	NORMALITY (Histogram Test)	No	Yes
S TABILITY TEST	CUSUM	Yes	Yes
	CUSUM OF SQUARE	Yes	Yes
***, **& *indicate 1, 5 or 10% level of significance. () indicate p-value [] indicate t-value			

Since, the results of ARDL bound test of model 1.1 are inconclusive as F- statistics is between lower and higher limit at 0.05 significance level indicating the ARDL is inappropriate for this model. Since ARDL model is inappropriate Johanson's cointegration test has been applied to check the existence of cointegration, as a result this test indicated the existence of cointegration in both trace and Max-Eigen tests. Furthermore, to identify short and long term impact of remittances on money supply of Pakistan along with the speed of adjustment towards equilibrium VECM model has been applied after identification of cointegration through Johanson's cointegration test. The outcome of VECM indicated that remittances from the UK has negative but significant effect on money supply in both short and long run however, remittances from TGCC countries and USA have negative but significant effect on money supply in the longtime period only.

On the other hand ARDL bound test is conclusive for model 1.2 indicating the existence of cointegration between country-wise remittances and domestic private credit. Moreover, the ARDL model depicted that remittances from the USA and other countries including Australia, Japan, Canada and Switzerland have positive and significant influence on domestic private credit in the short run; however, remittances from the USA have a sole but negative impact on the domestic private credit of Pakistan.

Furthermore, the coefficient of ECM of the model is -0.133, which is statistically significant and negative indicating the robustness of cointegration. Moreover, the negative value of ECM coefficient confirmed the convergence towards the equilibrium with the 13.3% speed of adjustment at 10% level of significance.

The above-mentioned outcomes indicated that remittances from USA and UK have a major but negative impact on the financial sector of Pakistan.

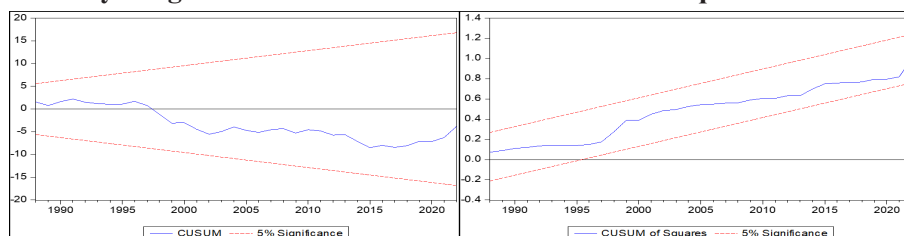
Residual Diagnostics:

VEC Residual Heteroskedasticity test applied for VECM model 1.1 to identify the issue of heteroskedasticity. The results shown in table 5 in appendix indicated that probability is more than 0.05 therefore; the H0 has been acknowledged at 5% level of significance. On the other hand, ARCH test applied for ARDL model 1.2. The outcomes shown in table 8 depicted that the p-value of observed R squared is more than 0.05 therefore, the H0 is acknowledged at 5% level of significance. Hence, the variance is constant in both the models.

Similarly, the table 6 in appendix show the outcomes of VEC Residual Serial Correlation LM test which indicated that probability of LM stats is higher than 5% therefore H0 is acknowledged at 5% level of significance. However, the result table 9 of equation 1.2 depicted the results of Breusch-Godfrey Serial Correlation LM Test for detection of autocorrelation. According to the result it is indicated that observed R-square's p-value is more than 5% therefore, H0 has been acknowledged at 5% level of significance. Hence, there is no autocorrelation in both the models.

Furthermore, the outcome of histogram normality test in table 7 in appendix indicated that in model 1.1 the p-value of jarque-bera is less than 5% therefore, the H0 normality has been rejected at 5% level of significance for model 1.1. However, in model 2.1 the p-value of jarque-bera shown in table 10 is more than 5% therefore, the H0 normality has been accepted at 5% level of significance for model 1.2.

Stability Diagnostics Tests: CUSUM and CUSUM of Squares Test



Additionally, the above figure 3 indicated the results of CUSUM and CUSUM of Squares Tests used to identify the stability of the ARDL model. The outcomes of both the stability tests indicated that throughout the selected period, values of both tests are between the upper and lower bands of 5% significance indicating robustness of stability in the model 1.2.

Cointegration:

Table 4 Total Remittances, Other Financial Inflows and Financial Sector			
Model 3.2.1: LM2=LTREM LFDI LODA LPDBT Model 3.2.2 LDCP=LTREM LFDI LODA LPDBT			
ARDL COINTEGRATION EQUATION: (2,1,0,0,3) $D(LM2) = -0.14*D(LM2(-1)) - 0.21*D(LTREM) - 0.16*D(LFDI) + 0.05*D(LODA) - 0.11*D(LPDBT) + 0.37*D(LPDBT(-1)) - 0.07*D(LPDBT(-2)) + 0.00*(LM2 - (19.42*LTREM(-1) + 19.58*LFDI(-1) - 5.35*LODA(-1) + 37.23*LPDBT(-1) + 74.17))$			
ARDL COINTEGRATION EQUATION: (1,2,0,4,2) $D(LDCP) = 0.38*D(LDCP(-1)) - 0.04*D(LDCP(-2)) + 0.42*D(LDCP(-3)) - 0.11*D(LTREM) + 0.41*D(LTREM(-1)) - 0.32*D(LTREM(-2)) + 0.14*D(LTREM(-3)) + 0.04*D(LFDI) - 0.15*D(LODA) + 0.02*D(LPDBT) + 0.03*D(LPDBT(-1)) + 0.02*D(LPDBT(-2)) + 0.11*D(LPDBT(-3)) - 0.82*(LDCP - (0.03*LTREM(-1) + 0.05*LFDI(-1) - 0.18*LODA(-1) - 0.28*LPDBT(-1) + 12.00))$			
ARDL BOUND TEST	COINTEGRATION	M2	DCP
		Yes	Yes
JOHANSON'S COINTEGRATION	TRACE & MAX-EIGEN TEST	Exist in both tests	Exist in both tests
IMPACT OF REMITTANCES & OTHER FINANCIAL INFLOWS IN SHORT-RUN ARDL	LAG OF DEPENDENT VARIABLE	at lag 1 0.338** (0.02)	Nil
	D(LTREM)	0.077** (0.02)	(0.151) (0.11) at lag 1 0.232** (0.02)
	D(LFDI)	0.041*** (0.00)	0.050** (0.03)
	D(LODA)	(-0.022) (0.24)	(-0.106)** (0.02) at lag 1 0.062 (0.17) at lag 2 0.043 (0.39) at lag 3 (-0.104)** (0.05)
	D(LPDBT)	(-0.012) (0.61) at lag 1 0.007 (0.77) at lag 2 (-0.041)* (0.08)	(-0.024) (0.65) at lag 1 0.068 (0.21)

IMPACT OF REMITTANCES & OTHER FINANCIAL INFLOWS IN LONG-RUN ARDL	LTREM	0.073*** (0.00)	0.082 (0.16)
	LFDI	0.072*** (0.00)	0.088** (0.02)
	LODA	(-0.039) (0.23)	(-0.229) (0.13)
	LPDBT	0.081*** (0.00)	(-0.380)*** (0.00)
SPEED OF ADJUSTMENT TOWARDS EQUILIBRIUM	COEFFICIENT OF ECM	(-0.571)*** (0.00)	(-0.568)*** (0.00)
RESIDUAL DIAGNOSTIC TESTS	HETEROSCEDASTICITY (ARCH Test)	No	No
	AUTOCORRELATION (Breusch-Godfrey Serial Correlation LM Test)	No	No
	NORMALITY (Histogram Test)	Yes	No
STABILITY TEST	CUSUM	Yes	Yes
	CUSUM OF SQUARE	Yes	Yes
***, **& *indicate 1, 5 or 10% level of significance. () indicate p-value [] indicate t-value			

Subsequently, the results of ARDL bound test of model 2.1 and 2.2 displayed that the value of F- statistics of both models are greater than upper bound at 5 % level of significance indicating the presence of cointegration in both the models. To check the robustness of ARDL bound test's results Johanson's cointegration test applied, as a result this test specified the presence of cointegration in both trace and Max-Eigen tests. Furthermore, to identify short and long-term impact of remittances on money supply of Pakistan along with the speed of adjustment towards equilibrium ARDL model applied because it is appropriate for small sample size of data. The outcome indicated that in short run remittances have significant and positive impact on money supply as well as at domestic private credit but at lag 1. Similarly, FDI has statistically significant and positive impact on money supply as well as on domestic private credit. Conversely, current and at lag three values of ODA have negative and significant effect on domestic private credit while public debt has \negative influence on money supply at second

lag. However, in the long time period remittances, FDI and public debt have statistically significant and positive impact on money supply however, FDI has positive and public debt has negative but statistically significant impact on domestic private credit.

Furthermore, the coefficient of ECM of model 2.1 and 2.2 is -0.571 and -0.568 respectively, which are statistically significant and negative specified the presence of cointegration in the model is robust. Moreover, the negative value of ECM coefficients confirmed the convergence towards the equilibrium with the 57.1% and 56.8% speed of adjustment respectively at 5% level of significance.

The above-mentioned outcomes indicated that remittances, FDI and public debt increase the money supply of Pakistan however, only FDI increases the domestic private credit in the long run. Conversely, public debts are deteriorating the domestic private credit of Pakistan.

Residual Diagnostics:

Likewise, ARCH test applied for ARDL model 2.1 and 2.2 to identify the issue of heteroskedasticity. The results shown in table 11 and 14 in appendix respectively indicated that observed R-square's p-value is more than 0.05 in both models therefore, the H0 acknowledged at 5% level of significance. Hence, the variance is constant in both the models.

Similarly, the table 12 and 15 in appendix show the outcomes of Breusch-Godfrey Serial Correlation LM Test for detection of autocorrelation. According to the result, it has indicated that observed R-square's p-value is more than 5% therefore, H0 acknowledged at 5% level of significance. Hence, there is no autocorrelation in both the models.

Furthermore, the outcome of histogram normality test for model 2.1 in table 13 in appendix indicated that probability of jarque-bera is more than 5% therefore; the H0 normality has been accepted at 5% of significance level. Conversely, the conclusion of histogram normality assessment for model 2.2 in table 16 in appendix indicated that probability of jarque-bera is less than 5% therefore; the H0 normality rejected at 5% level of significance hence there is no normality in the model.

Stability Diagnostics Tests: CUSUM and CUSUM of Squares Test

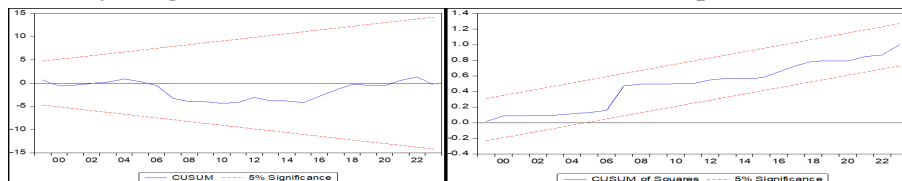


Figure: 4

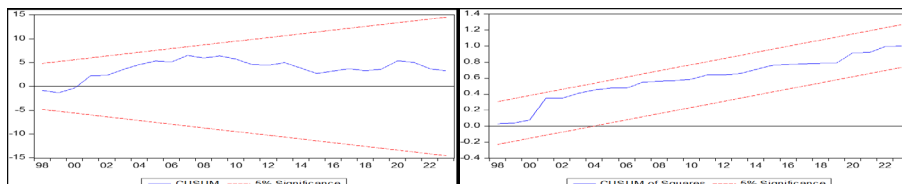


Figure: 5

Additionally, the above figure 4 and 5 indicated the results of CUSUM and CUSUM of Squares Tests used to identify the stability of both the ARDL models. The outcomes of both the stability tests indicated that throughout the selected period, values of both tests are between the upper and lower bands of 5% significance indicating robustness of stability in the model 2.1 and 2.2.

DISCUSSION

This part of the study indicated that only remittances from the USA and UK have a significant impact on the financial sector therefore, hypothesis H5 is partially accepted. However, total remittances have insignificant impact on the financial sector therefore, hypothesis H6 rejected.

The results exposed that remittances from USA, UK and TGCC countries have a negative impact on the financial sector while total remittances have no impact on the financial sector. The outcomes indicate that remittances are second largest foreign income inflows of Pakistan which improves budget constraint of recipients and lead to lower demand of domestic credit and have negative impact on financial market (Keho, 2020). Moreover, Pakistan is a consumption oriented economy therefore they consume more as compared to saving and investing which lead to decline in money supply. Furthermore if remittance flows are not used to save or invest it leads to insignificant impact on the financial sector (Qiang et al., 2019). However, public debt does increase the money supply but it is not use to create domestic credit rather it is use in non-productive areas, which cause a negative impact on the financial

market. Conversely, FDI is the major financial inflow which has favorable impact on the financial sector of Pakistan because it is the only foreign inflow which has been used to invest in the economy to improve the financial sector and economic growth of Pakistan (Aggarwal et al., 2006).

CONCLUSION

In this study after empirical analysis of disaggregated remittances and financial sector it is concluded that in the USA has statistically significant and positive impact on domestic private credit in short and negative impact in long term while UK and other countries which include Japan, Australia, Malaysia, Norway, and Switzerland have statistically significant and negative impact on money supply and positive impact on domestic private credit respectively in short term only. Furthermore, these results indicated that country-wise remittance at disaggregated level have more impact on domestic private credit of Pakistan. Additionally, another part of this dissertation estimated about relationship between total remittances and financial sector of Pakistan as compare to other financial inflows. As a result it is concluded remittances have significant and positive impact on financial sector of Pakistan in short term while in the long run they have statistically significant impact on money supply only while, FDI has significant and positive impact in short and long term however public debt has negative impact on financial sector of Pakistan in the long run. However in the short run Public debt and ODA has negative impact at lag 2 on money supply and domestic private credit respectively. Hence it is concluded that FDI has major impact on financial sector development while remittances only increases money supply of Pakistan in the long run due to consumption oriented expenditure while, public debt has negative impact on financial sector of Pakistan because high debt burden cause increase in budget deficit and tax burden which lead to decline in money supply and domestic credit.

FUTURE PROSPECT

The future prospect based on this study suggest that Pakistan is facing crucial financial crises and remittances are increasing money supply of Pakistan therefore, government body should encourage remittances receiving families should invest more and foreign Pakistanis to send more remittances in the form of investments this will accelerate financial sector of Pakistan. Furthermore, in future this study can be expended to panel data comparative analysis of top remittances receiving country regionally.

APPENDIX

Model 1.1

Table 5: VEC Residual Heteroskedasticity Tests: No Cross Terms (only levels and squares)		
Sample: 1981 2023		
Included observations: 41		
Joint test:		
Chi-sq	df	Prob.
287.2325	294	0.6001

Table 6: VEC Residual Serial Correlation LM Tests		
Null Hypothesis: absence of serial correlation		
Sample: 1981 2023		
obs: 41		
Lag	LM-Stat	Probablity
1	34.24467	0.5522
Probs from chi-square with 36 df.		

Table 7: VEC Residual Normality			
Component	Jarque-Bera	Df	Prob.
1	1.599	2	0.449
2	22.277	2	0.000
3	0.761	2	0.684
4	3.419	2	0.181
5	14.561	2	0.001
6	106.737	2	0.000
Joint	149.355	12	0.000

Model 1.2

Table 8: Heteroskedasticity Test: ARCH			
F-statistic	0.484	Prob. F	0.491
Obs*R-squared	0.503	Prob. Chi-Square	0.478
H0: There is not anyheteroscedasticity			
At 5% level of significance.			
Table 9: Breusch-Godfrey Serial Correlation LM Test			
F-statistic	1.859	Prob. F	0.183
Obs*R-squared	2.450	Prob. Chi-Square	0.118
H0: There is not any autocorrelation			
At 5% level of significance.			
Table 10: Histogram Normality Test			
Jarque-Bera	18.680	P-value	0.000
H0: There is a normality			
At 5% level of significance.			

Model 2.1

Table 11: Heteroskedasticity Test: ARCH			
F-stats	0.342	Probability	0.562
Obs*R ²	0.357	Probability	0.550
H0: There is not any heteroscedasticity			
At 5% level of significance.			
Table 12: Breusch-Godfrey Serial Correlation LM Test			
F-stats	0.094	Probability	0.761
Obs*R ²	0.134	Probability	0.714
H0: There is not any autocorrelation			
At 5% level of significance.			
Table 13: Histogram Normality Test			
Jarque-Bera	0.622	P-value	0.733
H0: There is existence of normality			
At 5% level of significance.			

Model 2.2

Table 14: Heteroskedasticity Test: ARCH			
F-stats	0.165	Probability	0.687
Obs*R ²	0.174	Probability	0.677
H0: There is not any heteroscedasticity			
At 5% level of significance.			
Table 15: Breusch-Godfrey Serial Correlation LM Test			
F-stats	0.000	Probability	0.984
N*R ²	0.001	Probability	0.979
H0: There is not any autocorrelation			
At 5% level of significance.			
Table 16: Histogram Normality Test			
Jarque-Bera	18	P-value	0.000
H0: There is an existence of normality			
At 5% level of significance.			

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FINTECH AND ITS CONTRIBUTIONS TO FINANCIAL INCLUSION: A BIBLIOMETRIC REVIEW PAPER

Muhammad Amin

*Department of Mathematics, NED University of Engineering & Technology,
Pakistan. amin1992.ah@cloud.neduet.edu.pk*

Hanadi Sabir

*Department of Mathematics, NED University of Engineering & Technology,
Pakistan. sabir4400920@cloud.neduet.edu.pk*

Ammar Sheikh

*Department of Mathematics, NED University of Engineering & Technology,
Pakistan. sheikh4405575@cloud.neduet.edu.pk*

ABSTRACT

This research paper explores the key factors influencing fintech, assesses its impact on financial inclusion, and analyzes how fintech applications contribute to expanding financial accessibility and inclusion. A sample of 845 articles was selected from 1999 to June 2023 from the Database of Web of Science. The meta-analysis is done through the bibliometric software VOS Viewer, Biblioshiny, and Microsoft Power BI. It includes co-authorship, co-occurrence, three-factor analysis, and a country publications map. This study finds that the top-ranking countries in FinTech research are the People's Republic of China (PRC), the USA, and the UK. Furthermore, the keyword analysis reveals financial inclusion as the most prominent research stream whereas notable FinTech applications contributing to financial inclusion include mobile payment systems, blockchain, P2P lending, and digital banking. The results obtained from the literature review offer valuable insights into the most impactful elements of FinTech literature and emphasize the substantial role of different FinTech applications in promoting financial inclusion. These findings can serve as a foundation for future research and

informed policymaking in this domain.

Keywords: *FinTech; Financial Inclusion; Meta-review; Mobile payment systems; P2P Lending*

INTRODUCTION

Financial Technology (or ‘fintech’) is a fusion of two vast worlds: finance and technology. These two domains now collaboratively run the financial landscape which produces technology-led businesses and novel market participants. New startups are developing platforms, goods and services that conventional financial institutions do not provide today. (Karen P. Y. Lai, Michael Samers, 2020) The traditional financial industry which is mostly operated by banks has been assisted by fintech as their long-term growth and development partner for the past twenty years (Babar, et al., 2020). Fintech offers the same services as banks but makes them more convenient and secure. Therefore, in the current financial world, banks should collaborate with fintech startups to digitalize their services. In addition, it is the ideal platform for banks to interact with clients and provide them with investment and asset management guidance. (Eric Brown, et. al., 2021; Babar, et al., 2020)

Apart from its penetration in the traditional financial industry fintech has become a foundation of advanced innovative technologies and services such as RegTech, InsurTech, blockchain, cryptocurrencies, crowdfunding, robo-advisors, wealth management, etc. From simple online transactions to advanced regulation, and investment decisions everything has been transformed by the inundating influx of information technology in our daily lives. One of the major fintech services that make up our daily lives is the Mobile payment service (MPS), that is among the services with the quickest rate of innovation and adoption of new payment features (Shin & Jae, 2018). Fintech has also contributed to the horizons of insurance and investment through InsurTech, robo-advisory and crowdfunding platforms. (Bajwa, et al., 2022) And many define fintech as an interdisciplinary field involving blockchain, data capture, data analysis, and artificial intelligence (AI). (Schinckus, 2020) All of this actually demonstrates, by improving process security and transparency, how fintech is having a big influence on the rapidly evolving financial industry. (Bajwa, et al., 2022)

Several pieces of research in fintech literature have highlighted the social implications of fintech such as financial inclusion and sustainable development. Solomon Odei-Appiah, et al. (2022) say that FinTech is

considered to have the ability and potential to enhance financial inclusion by reducing costs, expanding accessibility, and extending financial services to remote areas that lack conventional financial institutions. Others such as Eric Brown, et al. (2021) and Babar, et al. (2020) have highlighted that fintech is a technological advancement which can benefit consumers, including those who have restricted banking services or are totally inaccessible, by solving their problems. However, some argue that people now have more availability of financial solutions thanks to globalization and technological advancements, but making financial decisions is getting more difficult. People need to be financially literate to avoid financial mistakes. (Sconti, 2022) With the elapsing time financial inclusion and sustainability are becoming major research objectives in fintech literature. Some researchers have specifically highlighted the contribution of fintech-based technologies to financial inclusion Schinckus (2020) who accounts that blockchain technology can replace conventional business models and reduce the cost of financial services, as it allows public to enter the financial sector, thereby boosting financial inclusion and increasing the fair distribution of economic wealth. However, fintech literature is scant on the influence of various technologies on financial inclusion, let alone their role in promoting sustainability.

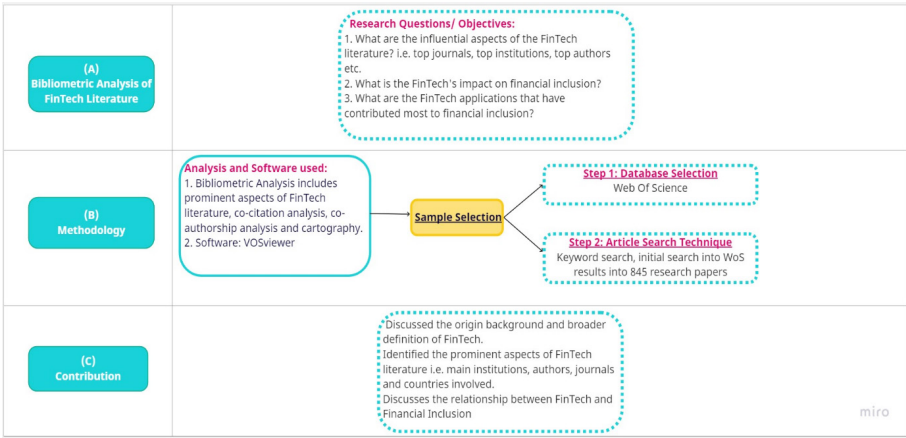
The purpose of the study is to explore the connection between financial technology and the accessibility of financial services, therefore answers three fundamental questions:

- (1) What are the influential aspects of FinTech literature?
- (2) How does FinTech influence financial inclusion?
- (3) How do FinTech applications contribute to financial inclusion?

Researchers have conducted an extensive literature review on the existing literature from 1999 to June 2023. WOS database was selected from which 845 articles made it to the final selection. A bibliometric review analysis has been conducted, which is built upon the methodology used in a recent study by Bajwa, et al., 2022 relevant to FinTech literature.

RESEARCH METHODOLOGY

The research methodology for this paper follows a bibliometric review approach, structured into three stages, as depicted in the methodology flowchart in Fig. 1.



Sample Selection Process

The first step is Database Selection. For the database selection, the Web of Science (WoS database) has been used. The Clarivate Analytics' Web of Science is one of the oldest and reputable databases of research papers and citations that are most often utilized. (Caroline Birkle, et. al., 2019) It is comprised of over 12,000 high impact and multi- disciplinary journals across 55 social science disciplines (Analytics).

Secondly, an article search technique was designed to gather the required sample. For this purpose, a keyword search criterion was set. The keywords were chosen carefully to cover all the aspects of the selected genre of research literature. The selected keywords were Fintech, FinTech, Financial Technology, and Financial Inclusion. The article search was refined by setting English as the language, and document types were limited to articles and review papers. According to the keyword criterion and filters, a sample of 845 articles was selected ranging from 1999 to June 2023. A wider time series was chosen to get better results on the yearly research trends in fintech literature.

The meta-literature review was conducted through VOS Viewer, Biblioshiny, and Microsoft Power BI. It includes co-authorship, co-occurrence, three-factor analysis, and a country publications map.

META LITERATURE REVIEW AND ANALYSIS

The Meta-Literature Review was carried out in accordance with the approach outlined in the study by Ishtiaq Ahmed, et. al. (2022). It was also done systematically following certain steps. The first step was identifying

the prominent elements of fintech literature, specifically the influential countries, articles, authors, institutions, etc. This was followed by a co-authorship, citation, and cartography analysis. Lastly, the study was wrapped by a content analysis to conclude the research streams.

The citation and co-authorship analysis was done through VOS Viewer. The citation analysis helped determine the influential aspects and the co-authorship analysis facilitated the identification of authors, organizations, or countries engaged in similar fields of research. Furthermore, the cartography results derived the frequency with which author keywords appear together, helped identify research streams in FinTech. Microsoft Power BI was used to obtain the trends of yearly research publications and total citations. It was also used to map the total publications of countries.

Key Influential Factors in Fintech Research

Before moving on to the influential factors, we will explore the volume of research influx of FinTech literature throughout the years. Fig. 2 shows the total times cited and publications year-wise. From the figure, the surge in FinTech literature was observed in 2015 and has continued since. The graph also shows a decline resulting from the time series. The latest year of the selected sample is the current year 2023, which is ongoing, therefore the graph shows a decline in the representation of papers published in 2023 as it is from January to June only.

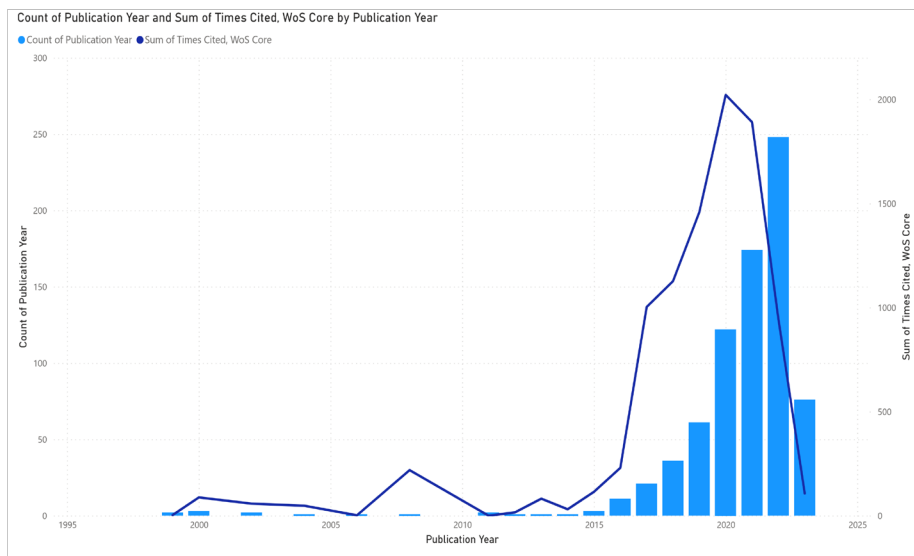


Figure 2. Yearly Research Trends

Table 1: Summary of FinTech Review Papers			
Titles/authors/years	Research Objectives	Scope	Methodology (Sample, technique, database, period)
Fintech in Islamic finance literature: A review M. Alshater et. al. (2022)	The report gives a summary of the environment and difficulties faced by Islamic fintech and focusses on publications on the subject	Illustrates the basic characteristics of Islamic fintech publications	Uses a hybrid process combining bibliometric analysis and content analysis
A review of FinTech research Takeda et. al. (2021)	This paper aims to review previous research on FinTech	Covers 173 academic papers from Elsevier's Scopus database	A systematic review of academic papers that have high SJR2017 scores
Decoding the trinity of Fintech, digitalization, and financial services Amola Bhatt, et. al. (2022)	This research addresses the key areas and ongoing trends concerning Fintech, digitalisation, and financial services while also proposing future research directions	Examines a collection of 583 journal articles from 1984–2021 that are included in the Scopus database	Carries out a thematic assessment of the literature after doing a bibliometric analysis
Challenges and Trends of Financial Technology (Fintech): A Systematic Literature Review R. R. Suryono et. al. (2020)	The paper aims to evaluate the present status of fintech research, point out gaps in the body of knowledge, and pinpoint important issues and new developments in the field	Presents an analytical structure for financial technology analysis from a systemic perspective and discusses the creation and development of fintech technological concepts	It uses the systematic literature review approach of Kitchenham and other methods such as thematic and meta-analysis
Trends and Directions of Financial Technology (Fintech) in Society and Environment: A Bibliometric Study A Nasir, et. al. (2021)	It emphasizes several conceptual and significant facets of financial technology innovation over the previous ten years in the fields of environmental, social, and computer sciences	Examines the use of environmentally friendly computer programs to promote the development and welfare of society	Comprehensive bibliometric analysis of the three aspects highlighted before

Financial Technology Solutions for Financial Inclusion: A Review and Future Agenda Neelam and Sonali Bhattacharya (2022)	The study examines the body of existing research and the role that digital technology plays in fintech	Research publications that address issues, contributing variables, and gaps in the usage of digital technology are included in the literature review	An approach proposed by Cook and West (2012) was used to perform a systematic literature review
Adoption of FinTech Products: A Systematic Literature Review A. F. Utami, et. al. (2021)	It aims to draw attention to how FinTech products have been used throughout the last few decades	Reviews and summarizes the literature on FinTech product adoption and offers a fresh theoretical framework to help the market accept it	Systematic literature review on the FinTech product adoptions during the last decades
Financial Technology: Review of Trends, Approaches, and Management E. Abad-Segura, et. al. (2020)	This study discusses the evolution of the knowledge base of financial technologies	Analyses the global financial technology research between 1975 and 2019	Bibliometric analyses to compile the knowledge framework on financial technologies within a global context
Financial technology: a review of Extant literature V. Sangwan, et. al. (2020)	A thematic review to summarise and identify research gaps in academic fintech literature	Includes 130 studies from various sources, including SSRN and Scopus.	A comprehensive analysis that separates fintech literature into three main areas: laws, innovation, and the financial sector

Most Influential Countries

Table 1 presents a compilation of the leading countries that have had the most significant influence on FinTech research. The influential countries are ranked according to the number of papers published (PP > 20) and total citations. It is concluded from the country-wise analysis that PRC, the USA, and the UK are the leading countries in the FinTech research realm. These three countries are leading in both categories, as seen in Table 1. PRC is ranked first in both categories (PP = 221, TC = 2645), followed by the USA in the papers published category (PP = 143), and the UK in the total citations category (TC = 2245). The USA is ranked third in the total citations with 2233 citations and the UK is ranked third in the papers published category with 108 publications. Indonesia and India fall fourth and fifth in the first category with 52 and 49 publications respectively. On the contrary Australia and South Korea fill the fourth and fifth position in total citations with 917 and 676 total citations respectively.

Table 2: Most Influential Countries in FinTech Research				
Rank	Country	Papers Published (PP)	Country	Total Citations (TC)
1	China	221	China	2645
2	USA	143	UK	2245
3	UK	108	USA	2233
4	Indonesia	52	Australia	917
5	India	49	South Korea	676
6	Malaysia	48	Spain	409
7	Taiwan	46	Malaysia	332
8	Australia	45	Indonesia	296
9	South Africa	28	France	288
10	South Korea	28	Taiwan	287

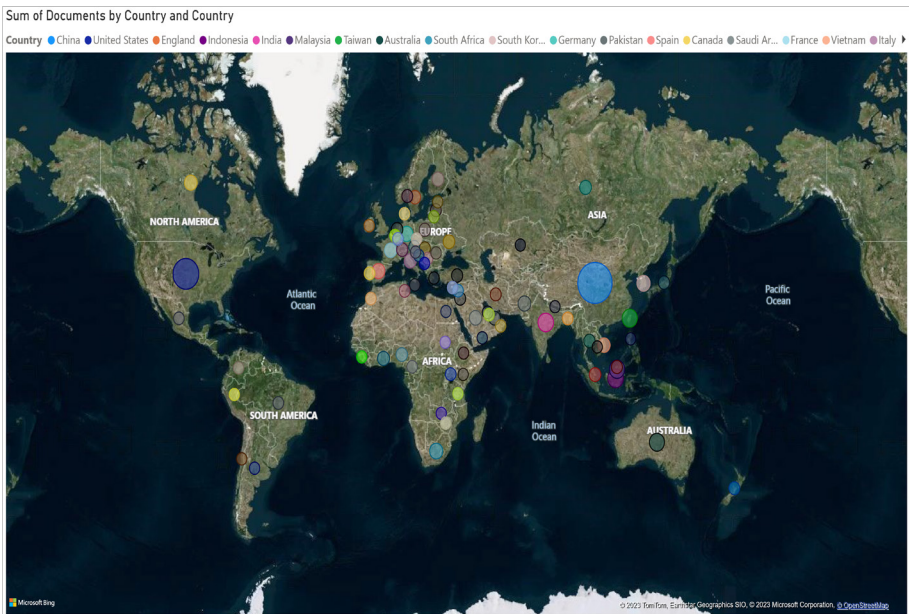


Figure 3. The map shows the number of publications in every country, and the size of marks on the countries represents the volume of publications.

Most Influential Institutions in FinTech Research

After analyzing the most influential countries in FinTech literature, we have used the same bibliometric software VOS Viewer to analyze the

most influential institutions in FinTech literature. The ranking is based on two categories: the number of papers published and total citations. Table 3 delineates the outcome of the analysis. The table shows that Hong Kong University ranks first in both categories with 14 published papers and 242 total citations, making it the most productive institution in the FinTech literature. The University of Sydney is next in line with the second-greatest number of papers published (PP = 10). On the contrary, the Southwestern University of Finance and Economics, PRC ranks second in the category of total citations, accumulating a total of 192 citations. Additionally, Peking University, Oxford University and the University of Malaya were also the major contributors to the influence of FinTech literature.

Table 3: Most Influential Institutions in FinTech Research				
Rank	Institutions	Papers Published (PP)	Institution	Total Citations (TC)
1	Hong Kong University	14	Hong Kong University	242
2	University of Sydney, Australia	10	Southwestern University of Finance & Economics, China	192
3	Peking University, China	7	University of Sydney, Australia	172
4	Vaasa University, Finland	6	Vaasa University, Finland	150
5	Southwestern University of Finance & Economics, China	5	Peking University, China	133
6	University Malaya, Malaysia	5	University Malaya, Malaysia	99
7	Oxford University, UK	5	Oxford University, UK	87
8	University of Indonesia	5	University of Indonesia	59
9	Xian Jiao Tong Liverpool University	5	Sichuan University, China	44
10	Renmin University of China	5	Wuhan University, China	40

Influential Authors in FinTech Research

Table 3 presents the ten most influential authors in FinTech literature. They are ranked in accordance to the number of aggregate citations. Peterson K. Ozili is the most influential author with 369 total citations and 4 publications. The authors with the highest number of publications among the top 10 are Douglas W. Arner (PP = 6), who is ranked fourth with 176 total citations, and Klaus Grobys (PP = 5), who ranks fifth in the top 10 with 81 total citations. Jianping Li occupies the last rank with 43 total citations and 2 published papers.

Table 4: Most Influential Authors in FinTech Research			
Name of Author	Affiliation/ Institution	Papers Published (PP)	Total Citations (TC)
Peterson K. Ozili	Central Bank of Nigeria, Nigeria	4	370
Douglas W. Arner	University of Hong Kong, China	6	179
Ross P. Buckley	University of New South Wales, Australia	2	172
Nick Bernards	University of Warwick, England	4	121
Ioannis Anagnostopoulos	Kingston University, England	2	114
Klaus Grobys	University of Vaasa, Finland	5	81
Daniel Gozman	Henley Business School, England	2	71
Niranjan Sapkota	University of Vaasa, Finland	4	56
Hasanul Banna	University of Malaya, Malaysia	4	50
Jianping Li	University of New South Wales, Australia	2	43

Co-authorship Networks

The next thing after the determination of the ten most influential authors is the co-authorship network between authors, countries, and organizations. VOS Viewer was used for this analysis and the purpose of this analysis is to determine the collaboration between authors from different organizations and countries. The results are presented below, Fig. 4 illustrates the networks of co-authorship between authors. Fig. 4 shows two main clusters of collaborations between authors.

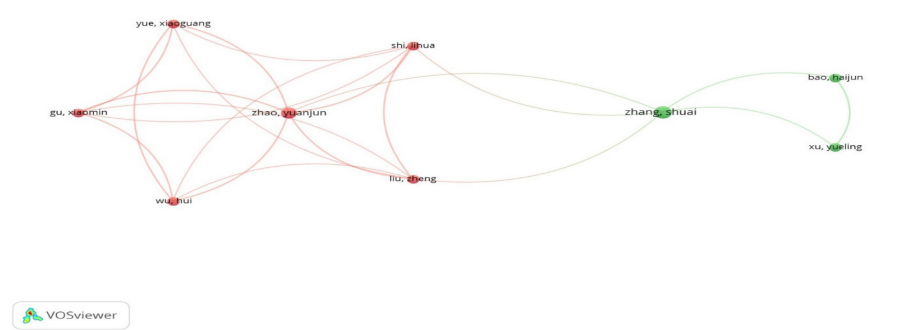


Figure 4. Co authorship Networks

Fig. 5 exhibits the aforementioned co-authorship networks between organizations. Some major co-authorship networks were found between University of Sydney with University of Hong Kong, which are also among the influential organizations of FinTech literature.

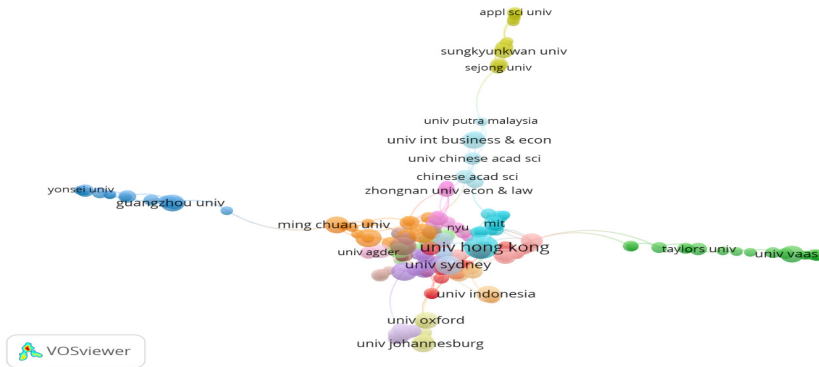


Figure 5. Co authorship between organizations

Fig. 6 portrays the collaboration of authors from different countries. It can be seen in the figure that the major collaborative countries are the PRC, USA, and England.

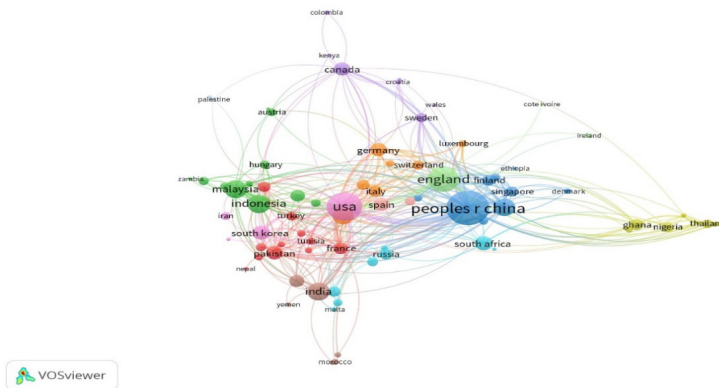


Figure 6. Co authorship between Countries

Influential Articles

Table 4 highlights the ten most impactful and widely cited articles in FinTech research. The most cited work is that of Peterson K. Ozili (2018), which has the highest citations among all, and thus positions him as a prominent figure in the field, with his research focusing on the process by which digital finance promotes inclusion in emerging and developing economies. The second most cited article belonged to Gabor et al. (2017) explores the growing prominence of digital financial inclusion as a mechanism for delivering development projects. The article ranked third is written by Au, et al. (2008) which talks about the economic perspective of mobile payments. Some other prominent articles include articles by Haddad, et al. (2019) that

investigate economic and technological determinants to establish ventures to reinvent financial technology, Eyal (2017) explores the gaps in blockchain research that are covered by emerging bitcoin research streams and what challenges remain.

Table 5: Ranking of Top 10 Influential Articles in FinTech Literature			
Rank	Authors(s) and Year	Journal	Total Citation (TC)
1	Ozili (2018)	Bosra Istanbul Review	290
2	Gabor, et. al. (2017)	New Political Economy	222
3	Au, et. al. (2008)	Electronic Commerce Research and Applications	219
4	Haddad, et. al. (2019)	Small Business Economics	157
5	Eyal (2017)	Computer	145
6	Kou, et. al. (2021)	Financial Innovation	144
7	Belanche, et. al. (2019)	Industrial Management and Data Systems	142
8	Chang, et al. (2020)	Technological Forecasting and Social Change	119
9	McDonald, et. al. (2020)	Administrative Science Quarterly	110
10	Anagnostopoulos (2018)	Journal of Economics and Business	109

Keyword Analysis

Observations of the keyword analysis are displayed in the figure below. The outcome of the cartography study was obtained using the program VOS Viewer. Five is the lowest chosen scale for the co-occurrence of the chosen terms. 55 of the 1381 writers' keywords satisfied the criterion. This analysis is a significant step in identifying the primary areas of research explored within the chosen FinTech literature. The clusters represent the closely related research streams. The size and distance between the spheres show the link strength and the number of occurrences. The bigger bubbles imply that the keyword has greater occurrences. The longer the distance between bubbles the weaker the links amongst keywords.

The Fig. 7 shows seven main clusters. The light blue clusters are the most prominent, showing the keywords that are corresponding to the financial technology and financial inclusion streams. The second main cluster, which is represented in orange covers all keywords that link fintech with sustainable development and economic growth. Moreover, the dark blue cluster indicates all the relevant keywords to applications of fintech such as bitcoin, cryptocurrency, crowdfunding, Islamic fintech, etc. The cluster in red is the fourth main cluster that includes keywords that are related to

reach financial services. (Hasan, et. al. , 2021) With the increase in fintech services, the internet, and mobile phones have become more easily accessible, especially after COVID-19, serving as the driving force for the widespread penetration of financial technology. Fintech has empowered individuals to make informed financial decisions through financial literacy. With the aid of digital platforms and tools, fintech companies can provide financial education resources, budgeting tools, and personalized recommendations, contributing to improved financial knowledge and inclusion. (Pollari, 2016)

Apart from financial literacy, fintech applications such as MPS, P2P payment apps, blockchain, etc. have contributed to financial inclusion. Fintech has facilitated digital payment systems, enabling individuals to conduct transactions and remit funds more conveniently and securely. Mobile money platforms, peer-to-peer payment apps, and blockchain-based remittance services have empowered unbanked individuals and migrant workers to access and transfer funds. (Chen, et. al., 2021) Fintech is transformative through its many applications, to increase the accessibility of financial services while also making it affordable. To date, it has proven instrumental in bringing down the cost of financial services for people living abroad, low-income families, and populations in developing regions. Fintech has expanded financial inclusion by navigating challenges including, but not limited to, geographical distance, complicated documentation requirements, and steep service charges.(Khadidos, et al., 2022)

FinTech Applications and Financial Inclusion

Peer-to-peer lending

Peer-to-peer (P2P) lending functions as an online private lending system which relies on Internet technologies to operate. This unique business concept enables development of a platform to connect both lenders and borrowers. (Suryono et al. (2020) The P2P lending network functions as an information clearinghouse and transaction framework that connects investors of spare funds with debt seekers in need of capital. Financial innovation during the digital era through P2P lending demonstrates how technology enhances resource integration as well as efficiency in information management. The development of P2P markets started in industrialized nations which possessed stable credit infrastructure together with efficient financial systems and effective law enforcement. (Jiang et al., 2018)

A study based in America by (Maskara, et. al.) highlights that there

are communities that are referred to as “banking deserts”, places that lack connection to mainstream banks. Therefore, such communities turn to alternate service providers. P2P platforms, however, transcend geographic limitations. The study finds that in communities where there are fewer traditional financial institutions P2P platforms serve as major contributors to financial inclusion. Consequently, even in other parts of the world P2P lending can reach a wider customer base through online platforms, mobile applications, AI, and blockchain. Moreover, by accessing data points from social media, e-commerce transactions and utility bill payments, fintech can assess creditworthiness, enabling them to serve borrowers who have no or very limited credit histories.

Digital Banking

According to (Vijai, D. , 2019) the technology itself is getting better and smarter day by day, making it easier for more industries to embrace AI for different uses. Likewise, in the banking industry, FinTech is considered an integral determinant of strategic planning (Belanche, D. C., 2019) (D. Jung, V. D., 2018) To stay competitive in the marketplace, banks are now seeking AI solutions to replace expensive, tedious, and routine activities (Kaya, O. S., 2019)

The digital banking sector functions as a decisive strategic element that drives modern financial industry development to reach more underprivileged populations (Francisco Jesus Galvez-Sanchez, 2021). Research centered on financial access in recent times gives digital banking special emphasis due to its inclusion of banking services that utilize mobile devices and internet access. (Haider, 2018) explains digital banking provides higher affordability and more convenience than traditional banking systems. Digital banking goes beyond mobile and online banking operations, to include total banking customer contact automation including the digitization of financial services and all associated operations.

However, digital financial services have not achieved broad outreach to society because of disparities between financial resources and service accessibility along with usage challenges, despite their recognized advantages (Ozili, 2018). As a result, financial inclusion is therefore still a major and enduring gap in digital banking, implying that it should receive increased scholarly examination and policy attention.

Mobile Payment Systems

Mobile payments involve financial operations that occur on mobile telecommunications network devices (Arkady Trachuk, 2017). Such financial tools have proven essential for advancing financial inclusion mainly in developing nations because they solve concerns with conventional banking institutions. People can execute financial operations right from their handheld devices through mobile payments while bypassing conventional banking facilities. (Donovan, 2012) proved to be correct when he predicted that mobile payments would advance financial inclusion at a substantial level.

Mobile payment systems lower security risks by reducing the need to carry cash which lowers the possibilities of theft as well as loss (Salameh, 2020); (Bezovski, 2016). Mobile payments provide assistance to underbanked individuals because of their geographic separation from banking facilities or having insufficient funds to meet bank account requirements. (Lutfi, 2021); (Alqudah, 2022)

The expansion of financial services acts as a fundamental factor to enhance income levels and economic opportunities in countries focusing on economic growth enhancement. Mobile payment services serve two key roles in financial inclusion since they either merge new bank customers with the banking system or grow the number of excluded financial users. The World Bank promotes mobile payment approaches because mobile payment provides customers opportunities to create fee-free accounts. Thus, mobile payments represent a strategic resource for developing financial inclusion and opening more banking service access while simultaneously reducing the number of non-banked individuals. (Ali Mahmoud Alrabei, 2022)

The combination of affordability along with accessibility, easy usage and secure systems, the mobile payment system helps drive startup ventures and new financial methods. Mobile payments helps develop trust in the financial system, particularly among people who have unfavorable banking experiences. Developing nations need to resolve multiple challenges to ensure widespread application and successful implementation and integration of MPS. The removal of existing obstacles requires co-operation between governments and mobile payment companies along with important stakeholders to improve mobile payment effectiveness and financial inclusion in these territories. (Song, Wu, & Zou, 2023)

Blockchain

A blockchain system functions through peer-to-peer connection across the Internet through a distributed network of computer processors which perform real-time transaction validation and record-keeping. (Bajwa, et al., 2022) The FinTech industry received a transformational boost through blockchain technology because it enables protected operations for financial transactions. The FinTech domain implements blockchain technology to perform multiple operations including payment processing and money transfer services that achieve swift reliable economical and stable transactions. Users can avoid service fees because digital payment solutions eliminate the requirement for branch banking facilities. The blockchain system enables crucial applications in smart contracts in addition to digital identification confirmation, asset arrangement and supply chain funding. A decentralized electronic payment system has become possible due to this innovative development. The protocol of blockchain guides all participants called ‘miners’ through established rules since the system lacks central governing control. The novel process of blockchain simplification of traditional financial components leads to both increased operational speed and substantial expense reduction.

Traditional financial activities now operate with efficiency improvements because they adopted digital procedures in transactions. People continue to express worries about centralization since it generates data ownership monopolies together with tampering vulnerabilities and privacy threats and control capabilities. Blockchain technology represents a decentralized transaction solution that attracts broad acknowledgment to remove the requirement for third-party entities in the transaction process including centralized exchanges (Tara Renduchintala, H. A., 2022).

Since its introduction, blockchain in the market shows potential to improve financial access throughout the population while making remittance procedures standardized. Current efforts by financial experts and regulators are evaluating blockchain technology as an infrastructure improvement and potential replacement for existing frameworks used in remittance and payment systems (Rella, L., 2019). Blockchain reduces transaction expenses and improves transparency which creates substantial opportunities for enhancing financial inclusion coupled with economic resource distribution fairness.

The social benefits of blockchain receive extensive research attention

because it enhances multiple financial management systems. However, the implementation of blockchain technology faces multiple challenges even though it shows strong potential for transformation. Blockchain technology enables systemic disruption in financial systems but endures several societal constraints which encompass regulatory challenges and energy requirements and governance management problems (Schinckus, 2020).

CONCLUSION

This study conducted a bibliometric literature review using Clarivate Analytics Web of Science database as its source. The research used a keyword selection method which led to the selection of 846 research articles. The tools VOS Viewer, Biblioshiny along with Microsoft Power BI enabled an all-encompassing evaluation of the gathered data during the meta-review analysis.

The review paper focuses on answering three detrimental research questions. The analysis begins by identifying critical aspects from FinTech research literature involving top nations and authors as well as their top publications across main academic journals. The study utilized citation analysis together with co-occurrence mapping and three-factor analysis in addition to cartography to evaluate influential factors.

The paper also evaluates how FinTech enables financial inclusion by showing how modern financial service innovations have expanded the access to financial systems. Moreover, the study investigates how FinTech applications contribute to promoting financial inclusion. Since financial technology and financial inclusion operate in complete alignment, therefore the study highlights how FinTech delivers streamlined access to financial products and develops proficiency and brings operational solutions for public who lack adequate financial services. Financial inclusion has seen important transformations through FinTech innovations due to significant advancements in mobile payment platforms, digital banking services, peer-to-peer lending models and blockchain technology, by bridging the financial gap for individuals and businesses worldwide.

While reviewing the sample fintech literature for the influence of FinTech on expanding financial inclusion, we also figured out some limitations. Security and regulatory framework are the prominent limitations of FinTech. Fintech companies' heavy reliance on digital platforms and storing massive

amounts of personal and financial data makes them vulnerable to security concerns such as cyber theft. Similarly, innovations in financial technology with each passing year make it harder to keep up with the necessary regulatory framework required to deal with screening, transaction monitoring, and reporting of suspicious activities that cause security concerns. Furthermore, fintech literature lacks in-depth studies of the impact of different fintech applications such as blockchain, and P2P lending on financial inclusion.

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THE IMPACT OF INTEREST RATE ON ECONOMIC ACTIVITIES? A SYSTEMATIC REVIEW

Syed Muhammad Hamza

*M.Phil Research Scholar, Applied Economics Research Centre,
University of Karachi. mhamza.mh15@gmail.com*

Syed Ammad Ali

*Assistant Professor, Applied Economics Research Centre, University of
Karachi. ammadayed@aerc.edu.pk*

Tehseen Jawaidd

*Tehseen Jawaidd, Associate Professor, Department of Economics,
University of Karachi. stjawaidd@gmail.com*

ABSTRACT

Purpose: *The interest rate is one of the most important macroeconomic variables in all conventional schools of economic thought. On the other hand, it is prohibited under Islamic economic principles. Through this study, we aim to evaluate the findings of existing economic literature to determine whether interest rates have a positive or negative impact on key macroeconomic variables, namely output, employment, and inflation.*

Methodology/approach/design: *The study adheres to PRISMA (preferred reporting items for systematic reviews and meta-analysis) guidelines to review a total of 155 full-text articles which were retrieved from Scopus database aggregator. The articles are classified into four sub-topics- the individual effects of interest rate on inflation, output, and employment and also the joint effect of interest rate on these key macroeconomic variables. The Journal rankings of ABDC (Australian Business dean's council) are harnessed to ensure credibility and quality in the systematic review. And the existing literature retrieved is synthesized through qualitative synthesis method.*

Findings: *The overwhelming majority, 19 out of 26 studies, found a significant negative impact of interest*

rate on output; indicating higher interest rate retarded economic activities. The results of 16 out of 39 studies show Interest rate significantly increases inflation.

Limitations/implications of Research: *The study concedes and mentions the potential biases including citation bias, language bias, and temporal bias owing to the adherence of strict exclusion criterion. The study findings are based on only Scopus listed journals.*

Originality value: *This study is unique as it applied PRISMA protocol to identify the effect of interest rate on key macroeconomic variables. It is a pioneer study which consolidate the existing literature related to interest rate and its impact on output, employment and inflation.*

Keywords: *Systematic review, PRISMA, Interest rate, Macroeconomic Variables*

INTRODUCTION

In the context of macroeconomics, the nexus between interest rate, inflation, output, and employment plays a pivotal role in shaping the economic and business conditions which ultimately reflects on the prosperity and well-being of the citizens. Interest rates, in any economy serves as a lever of monetary policy which has a profound impact on the whole economy. The role of interest rate goes beyond the regulation of cost of borrowing money, spending patterns of Consumers, and investment decisions. It is imperative to understand and grasp the far-reaching consequences of interest rate which ultimately affects the trajectory of the economies. The transmission mechanism of interest rate can be in several ways such as by credit availability and wealth effects which helps to determine how monetary policy decisions turn into economic outcomes. A minor change in interest rate affects the opportunities pertaining to employment, the extent and magnitude of output and economic growth, and inflationary pressures in the economy.

As we steer through the analysis, the synthesis of empirical findings, theories, and economic propositions is of great importance. This paper seeks to explore the complicated interconnectedness among the four variables to explain and elucidate the multidimensional impacts of changes in interest rate on economic misery and output levels within the economy.

This systematic review attempts to elucidate and address research gaps in the available literature between theoretical perspectives and real-world implications to provide an evidence based detailed synthesis pertaining to the intricate dynamics of the effect of interest rate on inflation, output, and employment and as an endeavour to assist the relevant stakeholders, economists, and policymakers. Through a careful analysis and assessment of contemporary and empirical literature, this study aims to contribute to the prevalent discourse regarding economic governance. In addition to this, there is no single research that has been conducted based on systematic reviews as per the best knowledge of the Researcher. Hence, this systematic review will contribute to the textual flows on the effect of interest rate on inflation, output, and employment.

The main objective of this systematic review is to analyse the relationship between the interest rate and key macroeconomic variables. This systematic review answers the following questions:

- How does interest rate impact inflation?
- How does interest rate impact overall output/economic growth?
- How does interest rate impact employment?

Addressing these questions will contribute to a deeper understanding about the dynamic nexus about the relationship between interest rate, inflation, output, and employment which have profound implications for economic robustness and stability.

METHODOLOGY

The objective of the systematic review is to analyse the effect of interest rate on inflation, output, and employment. For data collection and retrieval in this study, PRISMA statement is followed to conduct and present the systematic review. The most relevant literature is collected from Scopus database search engine/aggregator.

1. Search strategy

The search strategy was to use keywords searching to extract the most relevant literature review from Scopus database. Proxies of the keywords were also used to ensure better aggregation of the articles. The keywords used in the study are shown in Table1. Initially, the Researcher searched for the keywords and their relevant proxies under the field “Article title, abstract, and keywords”.

Table1: List of Keywords Used to Search research articles for review						
Effect of interest rate on inflation	Interest rate	Inflation	Consumer price index	Commodity prices	Core inflation	
Effect of interest rate on output	Interest rate	Output	Producer price index	Gross domestic product	Global economic conditions	
Effect of interest rate on employment	Interest rate	Employment	Labour force participation rate			
Effect of interest rate on inflation, output and employment	Interest rate	Inflation	Consumer price index	Commodity prices	Core inflation	
	Output	Employment	Labour force participation rate	Gross domestic product	Global economic conditions	Producer price index

2. Selection criteria

Regarding the quality, reliability, and credibility of the articles selected, this study selected only those articles that were published in the best quality journals. The author applied some filters such as years, language, document type, and relevancy criteria and the ABDC- Australian business deans council journal rankings list as an endeavour to ensure quality assessment of the overall review. The list comprises A, B, and C category journals. Secondly, the Researcher selected only those articles from these journals that were pertinent and the most relevant to the topic of study- The effect of interest rate on inflation, output, and employment. To conclude the review, the Author planned to encapsulate and incorporate diverse and distinct dimensions of the topic in the systematic review. The search span for the retrieval of the available literature was from 1) 2011-2023 for the two sub-topics- the effect of interest rate on inflation and the effect of interest rate on output and 2) 2006-2023 for the other two sub-topics- the effect of interest rate on employment and the effect of interest rate on inflation, output, and employment. The Author also harnessed a criterion for the exclusion of articles to ensure quality assessment of the overall review.

The first exclusion criteria were to exclude all the articles before 1) 2006 and 2) 2011 for the sub-topics discussed above. The second exclusion criteria were to exclude the articles on the basis of languages other than English such as French, Russian, Portuguese, and Turkish. The third exclusion criteria were to exclude articles on the basis of document type where the Author included only articles and excluded document types such as Book chapters,

conference papers, reviews, Books, chapters, notes, short surveys, editorials, erratum's, letters, and data papers. The fourth exclusion criteria were to limit the articles on the basis of relevancy criteria(keywords) where the Researcher searched for relevant keywords and their relevant proxies ("INTEREST RATE" "INFLATION", "INTEREST RATE" "OUTPUT", "INTEREST RATE" "EMPLOYMENT", "INTEREST RATE" "INFLATION" "OUTPUT" "EMPLOYMENT") in the abstract and article title only option in Scopus, excluding the keywords option which was initially included in the initial database searching phase in the search bar to ensure better results and credibility of the literature that was available.

Finally, in the last phase of the systematic review the Author meticulously read and analysed the full text articles to analyse and evaluate the available literature and to assess the research paths chosen by different Authors. After reading and analysing the full text articles, the Researcher further excluded 94 articles on the basis of relevancy criteria where the articles in which the dependent and independent variables differed from the variables under study were excluded. After reaching this last step, the Author was able to successfully develop a methodological procedure for content authentication.

3. Reporting biases

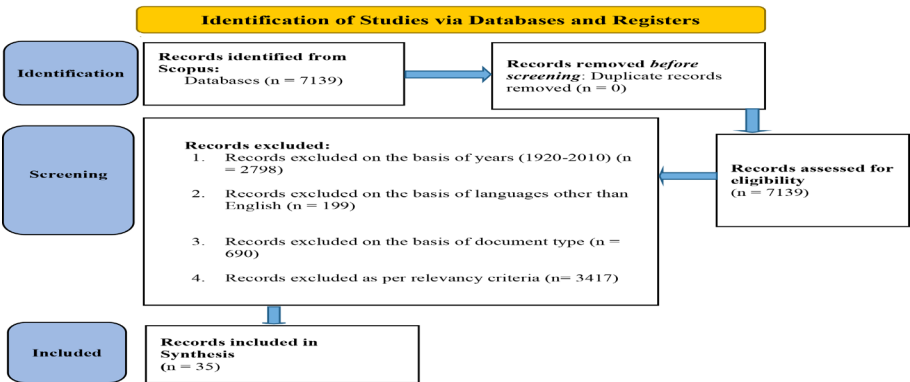
During the data extraction, retrieval, and analysis phases a strong emphasis was given to the reliability, quality, and credibility of the available literature streams for qualitative synthesis. To ensure this, journal rankings from ABDC'S list was harnessed to specify the rankings of each article in the systematic reviews. A total of 18 out of 61 articles were identified during the retrieval phase which did not have any ranking in accordance with the ABDC journal list of rankings as per the best knowledge of the Researcher. This unavailability and absence of information regarding the journal rankings represents data quality bias in the systematic reviews. ABDC'S list of journal rankings is a renowned metric to assess the quality, reputation, and the credibility of the journals in which the articles are published. It is pertinent to concede the unavailability of the information pertaining to journal rankings as it may affect the overall credibility of the systematic review. The purpose of the limpidity in mentioning this data quality bias is important for Readers and future Researchers to have a nuanced and comprehensive understanding of the topic of the study by critically evaluating the validity of the studies included in this systematic review.

RESULTS

1. Study selection

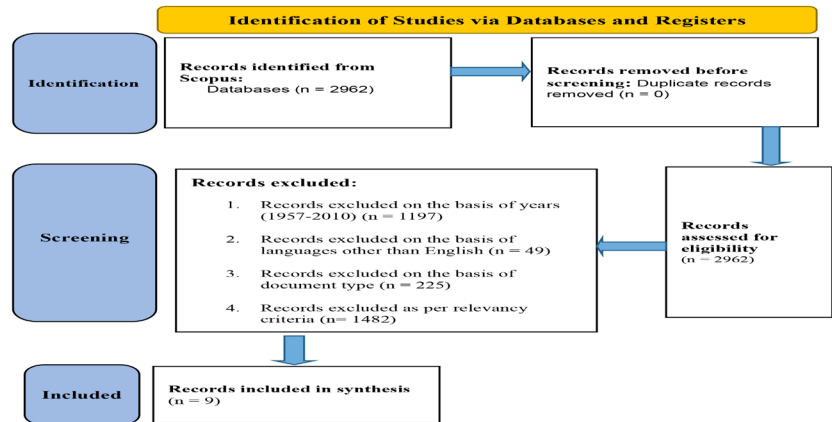
The Figure-1 shows the flowchart of the impact of interest rate on inflation where the records retrieved from initial database searching and eligibility were 7139, having no duplicates. The records excluded on the basis of years, language, document type, and relevancy criteria are 7104, leaving 35 articles for qualitative synthesis.

Figure1: Interest rate-Inflation flowchart



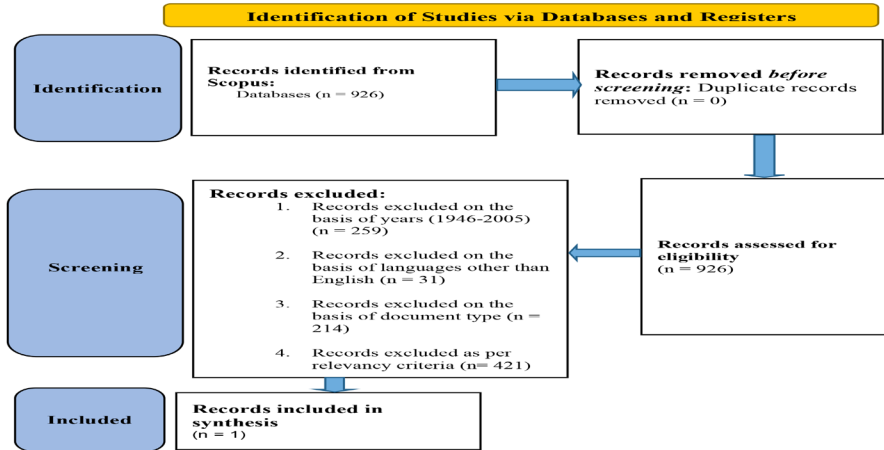
The Figure-2 shows the flowchart of the impact of interest rate on output where the records retrieved from initial database searching and eligibility were 2962, having no duplicates. The records excluded on the basis of years, language, document type, and relevancy criteria are 2953, leaving 9 articles for qualitative synthesis.

Figure2: Interest rate-output flowchart



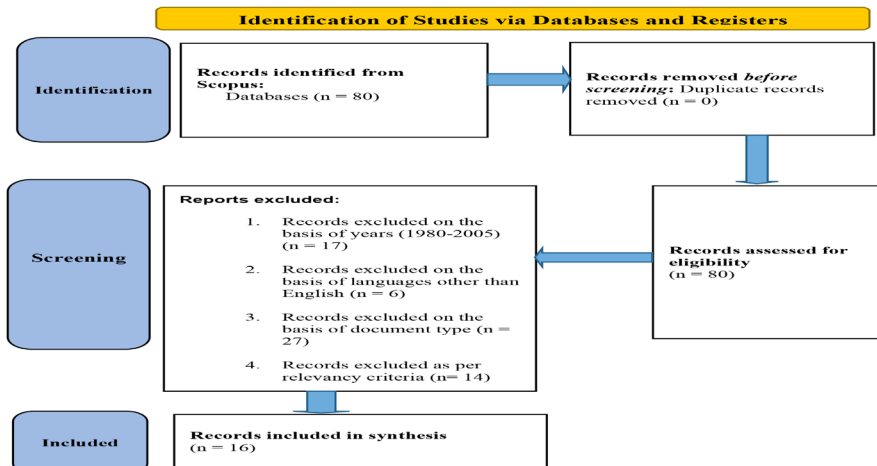
The Figure-3 shows the flowchart of the impact of interest rate on employment where the records retrieved from initial database searching and eligibility were 926, having no duplicates. The records excluded on the basis of years, language, document type, and relevancy criteria are 925, leaving 1 article for qualitative synthesis.

Figure3: Interest rate & employment flowchart



The Figure-4 shows the flowchart of the impact of interest rate on output where the records retrieved from initial database searching and eligibility were 80, having no duplicates. The records excluded on the basis of years, language, document type, and relevancy criteria are 64, leaving 16 articles for qualitative synthesis.

Figure4: Interest rate-inflation, output, and employment



2. Results of synthesis

The articles and studies analysed shows varied and diversified findings on the impact of interest rate on inflation, output, and employment. (Adi et al., 2022) studied the nexus between interest rate and GDP for Indonesia and his findings suggest that interest rate has no significant impact on GDP. Similarly, a study by (Akbas et al., 2019) studied the relationship between interest rate, inflation, and GDP which resonates with the monetarist perspective and his findings reveal that interest rate has no significant impact on the GDP whereas, interest rate has a negative and significant impact on inflation, manifesting that interest rate may impact inflation without impacting GDP. (Ali et al., 2013) also highlighted the impact of interest rate on inflation which was aligned with the study conducted by (Akbas et al., 2019). A study by (Ergene, S., 2015) underscored the role of interest rate in shaping economic growth and revealed that there is a negative and significant impact of interest rate on growth. The study by (Hayat et al., 2021) revealed a new perspective which revealed that there is a two-way relationship between interest rates and inflation. The study by (Khumalo et al., 2017) introduced another unique finding to the literature which stated that there is a positive impact of interest rate on inflation.

The studies by (Lukmanova et al., 2023) for united states and (Ozen et al., 2019) for Indonesia, Turkey, and other developing Countries reveal a positive and significant impact of interest rate shocks and interest rates on inflation which resonates with the well-known monetary theory, suggesting a varied relationship between the two variables in different economies. Similarly, the studies by (Mpofu et al., 2011) for Ghana, Malaysia, and South Africa and (Saeidi et al., 2011) for Poland are in harmony, revealing a negative and significant impact of interest rate on inflation which aligns with the well-known theory, suggesting the role of interest rate in controlling inflation. The studies conducted by (Mckinnon et al., 2011) for emerging markets of Asia and Latin America and (Tiwari et al., 2019) for Japan and Turkey reveals variations in the negative impact on interest rate in different regions and economies of the World. The study conducted by (Wesolowski et al., 2018) for Poland and United States reveals that interest rate has a positive and significant impact of interest rate on GDP which contradicts with the traditional theory and focuses on the complicated nexus between interest rate and output. The study conducted by (Habanabakize et al., 2020) for South Africa contributes to the existing literature with a different perspective, indicating the specificities of

employment when assessing the effect of interest rate which varies across different sectors of the economy. The study reveals that interest rate has a negative and significant impact on social services employment in the long run.

The study conducted by Summers (2014) for United States suggests a positive and significant impact of real interest rates on full employment which contradicts with the traditional economic theory, suggesting a negative and significant impact of interest rate on full employment. (Shangle et al., 2020) conducted a study for Malaysia, revealing a negative and significant impact of expansionary monetary policy on the GDP which resonates with the economic theory which acknowledges the role of interest rate in shaping the economic growth of an economy. Selim (2019) also conducted a study for Malaysia and introduced an alternative unconventional monetary policy in the available literature streams, suggesting a negative and significant impact of Qarz-al-hasan based interest rate (interest-free loan) on full employment which contradicts with the study by Summers (2014), highlighting the disadvantage of interest-free loans which is an alternative interest rate policy impacting economic stability and employment levels in the economy. (Khalaf et al., 2023) conducted a study for European Countries, suggesting a negative and significant impact of interest rate on economic growth which aligns with the traditional economic theory. Laina (2019) conducted a study for United States which is in harmony with the conventional economic theory and wisdom, highlighting a negative and significant impact of interest rate on inflation, output, and employment – higher interest rates in the economy will lead to a reduction in employment and economic activities.

Rescriter (2011) conducted a study for United States and assessed the impact of nominal and real interest rate on inflation, introducing a distinct dimension for the review. The study revealed a positive and significant impact of nominal interest rate on inflation; negative and significant impact of real interest rate on inflation. (Gimeno et al., 2012) conducted a study for Spain and introduced a new dependent variable – inflationary expectations. The study suggests a positive and significant impact of nominal interest rate on inflationary expectations. The study by (Demary et al., 2015) contradicts with the conventional economic wisdom and theory and suggests a positive and significant impact of interest rate on inflation. Moreover, the studies conducted by Chaudhry (2023), (Datta et al., 2021), and (Hall et al., 2011) for United states are in harmony with the economic theory and in analyzing

the relationship between variables- interest rate has a negative and significant impact on inflation. The studies conducted by (Kose et al., 2012) for Turkey, (Candido et al., 2017) for United states, (Azim et al., 2017) for United States, (Bataa et al., 2019) for United Kingdom, and (Lopez et al., 2019) for Mexico analysed the impact of interest rates on both, output and inflation. The studies by (Kose et al., 2012), (Candido et al., 2017), (Azim et al., 2017), and (Lopez et al., 2019) suggested a negative and significant impact of interest rate on inflation and output which shows the role of interest rate in stabilizing inflation and output in the economies of Turkey and United States whereas, the study by (Bataa et al., 2019) suggests a positive and significant impact of interest rate on inflation and output. Similarly, the studies conducted by (Bhattarai et al., 2011) for United Kingdom and (Naqellari et al., 2018) for Albania are in harmony in assessing the effect of interest rate on output/ economic growth, suggesting a negative and significant impact of interest rate on output and economic growth which contradicts with the conventional economic theory.

The summary Table-2 of all sub-topics, showing the relationship and impact of interest rate on the three key macroeconomic variables which can be either 1). Positive and significant. 2). Negative and significant. 3). Insignificant are as follows.

Table-2: Summary of Findings			
Topics	Positive and significant	Negative and significant	Insignificant
The effect of interest rate on inflation	16	21	2
The effect of interest rate on output	3	19	4
The effect of interest rate on employment	2	2	None
The effect of interest rate on inflation, output, and employment	None	3	1

CONCLUSION

Keeping it all in a nutshell, the study covered and analysed a good number of literatures related to the effect of interest rate on inflation, output, and employment. To achieve the objective of this research, the literature streams

were assessed and analysed through PRISMA statement to put forward the scope and limitations of this systematic review. The systematic review identified several research gaps which are important to be narrated. The Researcher reviewed a total of 155 full-text articles related to the domain of the effect of interest rate on inflation, output, and employment. The available literature streams helped to explore and analyse different research findings for the variables under study, that is some articles revealed a negative and significant impact on the key macroeconomic variables while others showed either a positive and significant or insignificant impact on the key macroeconomic variables. The exact numbers are mentioned in the summary table above. This systematic review finds a notable research gap, that is there is a dearth of studies based on PRISMA guidelines. The review of available literature shows multi-dimensional relationships and impacts of interest rate on macroeconomic variables which are crucial to understand for better policy-making, decision-making, and economic governance. The exploration of empirical and theoretical studies shows far-reaching impacts and consequences of variations in interest rate, extending beyond the cost of borrowing money which affects buying, purchasing patterns of the Consumers, credit availability, and investment decisions. This systematic review synthesizes a plenty of literature from different Countries that was available which manifested multi-dimensional impacts of interest rate on inflation, output, and employment according to different Regions, providing valuable insights. The meticulous analysis of the literature streams revealed that some of the findings were aligned with the conventional economic theories while other findings contradicted with the traditional theories however, they introduced new perspectives for the systematic review. Qualitative synthesis method was harnessed to draw meaningful conclusions from both, numerical and non-numerical findings from individual studies. As an endeavor to address the objectives, this systematic review contributes to a comprehensive and nuanced understanding about the dynamic relationships between interest rate, inflation, output, and employment. The analysis of the context-specific and diversified findings is beneficial for stakeholders including policymakers, economists, and politicians so that they make informed decisions to ensure better economic growth and stability. This systematic review bridges the gap between theoretical viewpoint and real-world implications as a contribution to the existing literature, setting the stage for unceasing exploration and analysis and future investigations.

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THE PPE MODEL: A STRATEGIC RESPONSE TO EDUCATIONAL DISRUPTIONS IN CHALLENGING TIMES

Irum Naz Sodhar

*Assistant Professor, Department of Information Technology,
Shaheed Benazir Bhutto University, Shaheed Benazir Abad, Pakistan.*

Email: irumnaz@sbbusba.edu.pk,

Abdul Hafeez Buller

*Lecturer, Quaid-e-Awam University of Engineering,
Science & Technology, Nawabshah, Pakistan*

Email: engrabdulhafeezbuller@gmail.com,

Asadullah Laghari

*Postgraduate Scholar, Chengdu University of Technology
Chengdu-China. Email:* asadullahlaghari@gmail.com

ABSTRACT

The COVID-19 pandemic has improved the adoption of online getting to know structures, offering both challenges and opportunities for higher schooling and professional development. However, ensuring the pleasant of online studying, in particular all through the home-based distance getting to know section, remains a vital issue. This examine introduces the PPE Model (Planning, Process, Evaluation) as a strategic framework to cope with these demanding situations and optimize the delivery of online getting to know courses. The model emphasizes three core levels: planning the direction shape, dealing with the procedure of transport, and comparing the effectiveness of the mastering experience. The take a look at uses a qualitative research approach to analyze student remarks and become aware of key boundaries confronted via students and institutions, including technological boundaries, engagement difficulties, content material transport issues, and evaluation strategies. The study proposes actionable guidelines to enhance the great and sustainability of on-line education, that specialize

in strategic planning, powerful implementation, and thorough assessment. This study gives precious insights into how educational institutions can adapt to pandemic disruptions and make sure outstanding mastering in a swiftly evolving digital international.

Keywords: Online-Education, Communication Tools, Higher Education, Coronavirus Disease, Distance Learning, Qualitative Method.

INTRODUCTION

Online mastering has end up an increasingly prominent instructional model, providing flexibility and accessibility for college students who may face challenges attending conventional lecture room-based totally guides (Gao & Zhang, 2020; Memon et al., 2019). It encompasses any sort of schooling that occurs over the Internet, providing college students with the potential to learn at their very own tempo and from any region. This flexibility has been mainly valuable for the ones balancing research with artwork, own family, or exclusive commitments (Birenbaum, 2023; Masoud ul Hassan Bukhari Scholar et al., 2021). The growing demand for online training, in particular within the wake of the COVID-19 pandemic (Mosadeghrad et al., 2024; Romero-Hall & Jaramillo Cherrez, 2023; A. N. Sodhar, 2022), has solidified its vicinity in better training, particularly in the realm of open and distance learning to know (ODL). ODL establishments have embraced on-line learning as a good-sized tool for turning in satisfactory training to a broader target market, mainly in regions wherein physical establishments may be inaccessible or impractical.

Online learning to know has hooked up itself as a critical part of traditional similarly education structures, providing a platform that supports lifelong learning to know and non-stop expert improvement (Harmey & Moss, 2023; Kantawala, 2021; Muhiyuddin, et al., 2019). Its growth is powered by way of technological improvements, extended access to the Internet, and a shift in the direction of extra pupil-focused learning environments. As an end result, on-line learning systems are evolving, with institutions international incorporating virtual equipment and platforms to decorate their instructional services (Memon et al., 2019).

1. Quality Assurance

In better education, retaining first-rate is a significant issue, particularly in open universities and distance studying establishments (Zuhairi et al.,

2020). The task of presenting great schooling in those settings is heightened with the aid of the diverse nature of the student body, varying assets, and the geographical distribution of novices. Quality warranty (QA) is therefore vital to make sure that the standards of teaching, curriculum design, and pupil help meet the specified stages of excellence (Meng et al., 2024; Zuhairi et al., 2020).

This study focuses on examining the implementation of exceptional guarantee systems in three Asian open and distance mastering establishments: the University of the Philippines Open University (UPOU), Universitas Terbuka (UT), and Allama Iqbal Open University (AIU) (Zuhairi et al., 2020). Each of these institutions has long hooked up great guarantee mechanisms aimed toward retaining instructional requirements. These systems were fundamental in shaping the instructional techniques and effects in those universities, even before the COVID-19 pandemic disrupted conventional studying fashions globally (Chatzipanagiotou & Katsarou, 2023; Gao & Zhang, 2020; Harmey & Moss, 2023).

The objective of this studies is to offer insights into how these QA systems had been advanced and applied within the context of ODL and on-line learning environments. By inspecting the stories of those three universities, this take a look at ambitions to make a contribution to the improvement of more effective QA techniques that can be implemented to the evolving landscape of online training(Chatzipanagiotou & Katsarou, 2023; Gao & Zhang, 2020; Pather et al., 2020). Additionally, the research will discover the impact of the COVID-19 pandemic (Somabut et al., 2024)on these QA frameworks, mainly how institutions have adapted their great warranty mechanisms to accommodate the rapid shift to completely online education during the global fitness crisis(Fang et al., 2023).

2. Quality Assurance and Online Education

Quality guarantee in online schooling is an important element in ensuring that academic applications meet each educational and regulatory requirement(Taridi et al., 2024). According to a 2015 study carried out with the aid of the International Council for Open and Distance Education (ICDE), extra than forty best preferred fashions or suggestions from regulatory QA government across the world have been reviewed (Ershov & Chekmenyova, 2024; Svalina & Ristivojević, 2022; Zuhairi et al., 2020) . Quality Assurance The take a look at categorised those standards into 3 number one overall

performance areas: management, products, and services (Ibrahim et al., 2022). Each of these areas plays an essential function in making sure the great of online mastering packages(Svalina & Ristivojević, 2022; Zuhairi et al., 2020).

1. Management refers to the institutional plans, visions, and to be had sources that guide the improvement and delivery of online training packages. This consists of strategic planning, useful resource allocation, and leadership commitment to retaining educational pleasant.
2. Products are related to the curriculum and module production techniques, which contain the design and shipping of tutorial content. This consists of the development of direction substances, studying sports, and checks that align with educational desires and guide pupil learning.
3. Services embody the guide furnished to students, faculty, and the institution itself, along with get entry to a generation, tutoring, mentoring, and different instructional and administrative offerings. These services are essential in retaining scholar engagement and ensuring the powerful delivery of on-line training.

This research also highlighted 14 key dimensions of on-line software excellent that establishments ought to verify frequently(Svalina & Ristivojević, 2022). These dimensions consist of application purpose, goals, scholar profile, content material delivery, coaching techniques, tutoring, assessment practices, and the effectiveness of the virtual platform used for learning. A robust satisfactory warranty machine ought to contain normal evaluations of those factors to make certain that on-line applications hold excessive requirements of learning and student delight(Masoud ul Hassan Bukhari Scholar et al., 2021).

These findings underscore the importance of adopting a complete QA framework that addresses multiple components of on-line schooling (Taridi et al., 2024). By comparing no longer only the content material and delivery of courses but also the control of resources and help offerings, institutions can enhance the overall fine in their online programs. In light of the evolving nature of digital education, continuous refinement of QA structures is essential to evolve to new demanding situations and opportunities in online learning (Ershov & Chekmenyova, 2024; Svalina & Ristivojević, 2022).

METHODOLOGY:

This study explores the effectiveness of e-studying in distance schooling throughout challenging instances (Memon et al., 2019). The PPE Model (Planning, Process, and Evaluation) is used to deal with the numerous ranges of an online direction, which includes deciding on suitable kit, enforcing the agenda, tracking student participation, and integrating interactive learning to know sports. The implementation section ensures clean direction execution and meets learning effects. The evaluation phase assesses the effectiveness of the web course through collecting information on student participation, learning progress, and usual direction consequences as shown in underneath Figure 1. The statistics is analysed to determine if direction targets have been met and become aware of areas for development. This based approach guarantees great training is added no matter distance mastering challenges (Li et al., 2022).

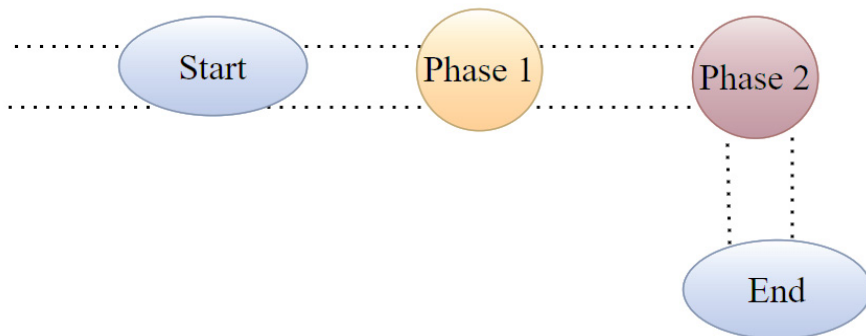


Figure 1 Research Methodology

The studies also aim to pick out demanding situations confronted by way of college students and educators in distance gaining knowledge of environments, in particular all through the COVID-19 pandemic (Falagara Sigala et al., 2022; Fang et al., 2023). Qualitative information collection techniques, which includes established interviews, open-ended surveys, and cognizance group discussions, are used to accumulate insights from undergraduate college students. The analysis helps identify recurring themes and challenges, such as access to technology, lack of motivation, online communication issues, and time management difficulties (Li et al., 2022). This analysis provides a deeper understanding of the constraints faced by students in distance education.

The research will propose strategies for improvement, such as improving online course design, enhancing student engagement, providing better technical support, and ensuring effective communication between students and teachers (Sodhar et al., 2019). The goal is to offer practical solutions that can enhance the quality of distance education during difficult periods, enabling students to overcome obstacles and continue learning effectively. Figure 2 shows the detailed information about phases: phase one depends on three steps such as: Planning, Process and Evaluation. Phase two also depend some steps those are: Data and discussions. Data include the information of (Collection, understanding and Preparation). Discussion takes in: (interviews, Learning and Satisfaction) detail description given below.

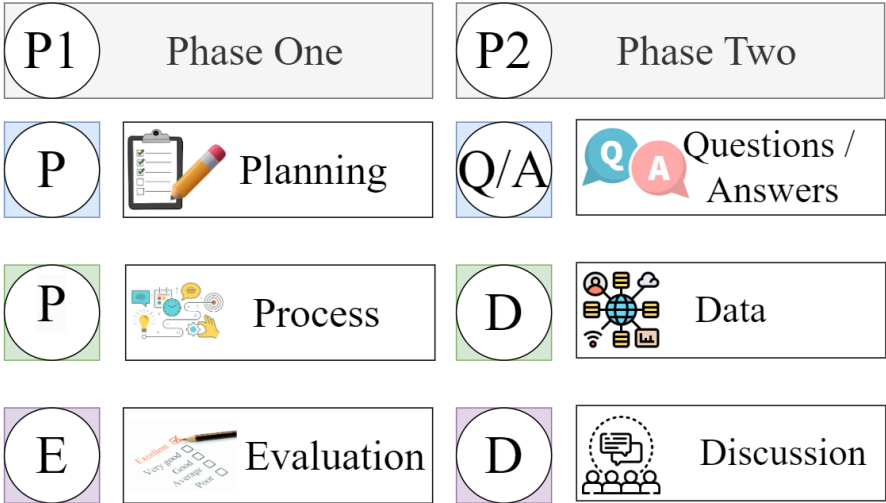


Figure 2: Detail of Phase One and Phase Two

1. Phase 1: PPE Model (Planning, Process, Evaluation)

In this research first phase depends on model of PPE includes Planning (Selection of tools), Process (E-Learning tools) and Evaluation (Overall Outcomes). It is a process of making decisions about what to do, how, when to do, and who to do. It also precedes all administration functions, but is closely linked to controlling. Planning is required for all organizations for taking the next step. Planning selection of tools to take online classes during Challenging Time (Karalis, 2020).

A set of steps performed to make a difference or achieve a certain result that occurs naturally such as: classes run on online, how much students

are present in class and how much understand. Evaluation is a process that critically explores the online classes (Karalis, 2020). It involves collecting and analysing the information about the activities, characteristics and the results of a program and also improves its effectiveness. Its purpose is to make judgments about an online class.

2. Phase 2: Qualitative Research (Data Gathering and Analysis)

This research study method is qualitative to focus on discussion and question answers with undergraduate students of university to understand issues during phased by challenging time. First step of second phase is about gather the data. In this research data is categorized into three categories such as: collections of data, understanding of data and preparation of data. Collections of data includes, google class room, Zoom, google Meet, WhatsApp group chats, and comments from social media pages. Understanding of data includes knowledge full data or Meta data. The needs that the data meets, its content and location.

Proposed Algorithm

1. PPE Model (Planning, Process, Evaluation) and Qualitative Research

Below table 1 presents a structured algorithmic approach to managing an online education process, breaking it down into phases. Each phase is defined with steps and comments explaining their purpose. This systematic approach ensures every aspect of the process is considered, addressing any issues systematically. This approach improves the general getting to know enjoy for each college students and educators by way of breaking down the procedure into phases and supplying clear commands for every step. Following are the Phases Proposed Algorithm for PPE Model.

1. Planning Phase
2. Process Phase
3. Evaluation Phase
4. Data Gathering Phase
5. Data Analysis Phase
6. Insights Phase
7. Final Recommendations Phase
8. Output Phase
9. End Phase

Table 1: Proposed Algorithm for PPE Model

Phases	Algorithm Description	Comments
Planning Phase	Step 0: Start Step 1: DEFINE Tools = {T1, T2, ..., Tn} Step 2: DEFINE Students = {S1, S2, ..., Sn} Step 3: DEFINE Schedule = {P1, P2, ..., Pm} Step 4: DEFINE Responsibilities = {R1, R2, ..., Rn} Step 5: SELECT T_selected FROM Tools Step 6: DEFINE P_defined = Schedule Step 7: ASSIGN Responsibilities TO Teachers, tudents	// Start // Set of online tools // Set of students // Planned schedule // Responsibilities of teachers and staff // Choose the tools for online classes // Set the class schedule // Assign tasks
Process Phase	Step: 8 FOR EACH student Si IN Students ATTENDANCE(Si) LEARNING_PROGRESS(Si) END FOR	// Track attendance of student Si // Track learning progress of student Si
Evaluation Phase	Step: 9 FOR EACH student Si IN Students EVALUATE(Attendance(Si), Learning Progress(Si), Feedback(Si)) END FOR	// Evaluate each student's performance
Data Gathering Phase	Step: 10 DEFINE Data = COLLECT_DATA(Students)	// Gather qualitative data (feedback, surveys, interviews)
Data Analysis Phase	Step: 11 DEFINE Issues = ANALYZE(Data)	// Analyze the collected data to identify common issues faced by students
Insights Phase	Step: 12 DEFINE Insights = DERIVE_INSIGHTS(Issues)	// Derive insights based on the issues found
Final Recommendations Phase	Step: 13 DEFINE Recommendations = GENERATE_RECOMMENDATIONS(Insights)	// Generate recommendations for improvement
Output Phase	Step: 15 OUTPUT Recommendations	// Display the recommendations for future improvements in online classes
End Phase	Step: 16 End	// End

Below table 2 gives a two-phase model for assessing the effectiveness of online schooling, utilising the PPE Model in Phase 1 and Qualitative Research in Phase 2. The version integrates structured making plans and actual-time

tracking with in-depth qualitative studies to assess the web learning revel in (Somabut et al., 2024). Phase 1 ensures systematic on-line magnificence setup, at the same time as Phase 2 focuses on gathering pupil insights to perceive problems and endorse upgrades. This complete evaluation addresses both operational and experiential challenges faced by students, ensuring a more effective on-line training machine. This study focused on below phases (Birenbaum, 2023).

- 1. Phase 1: PPE Model (Planning, Process, and Evaluation):
 - Planning
 - Process
 - Evaluation

- 2. Phase 2: Qualitative Research (Data Gathering and Analysis):
 - Data Gathering
 - Analysis of Data
 - Evaluation Report

Table 2. Detail Description of Phases

Steps	Description
Phase 1: PPE Model (Planning, Process, Evaluation)	
1. Planning Step	Input: Tools available for online classes, schedule, and stakeholders (teachers, students). Action: 1. Identify and select e-learning tools (e.g., platforms like Zoom, Google Classroom). 2. Define the scope and objectives of the online classes (e.g., curriculum, expected outcomes). 3. Determine the timeline for the classes (e.g., daily/weekly schedule). 4. Assign roles and responsibilities (e.g., who teaches, who monitors progress). Output: A set of planned e-learning tools, timeline, and responsibilities.
2. Process Step	Input: Selected tools and planned schedule. Action: ○ Start online classes as planned using the selected tools. ○ Track student participation (e.g., attendance, active involvement). ○ Monitor learning progress (e.g., quizzes, assignments, feedback from students). Output: Real-time data on student participation, learning outcomes, and progress.

Steps	Description
3. Evaluation Step	Input: Data collected during the online classes (attendance, participation, grades). Action: 1. Collect feedback from students about their experience with online classes (e.g., surveys, discussions). 2. Analyse participation rates, learning outcomes, and challenges faced by students. 3. Compare expected outcomes (planned in Phase 1) with actual results. Output: Evaluation report on the effectiveness of the online classes, including strengths and areas for improvement.
Phase 2: Qualitative Research (Data Gathering and Analysis)	
1. Data Gathering	Input: Data from student feedback, participation records, and learning outcomes. Action: 1. Conduct interviews or surveys with undergraduate students to gather qualitative data about their experiences during online classes. 2. Ask questions about challenges faced, tools used, and suggestions for improvement. 3. Collect responses and organize data for analysis. Output: Dataset containing qualitative insights from students.
2. Analysis of Data	Input: Qualitative data from students. Action: 1. Analyse the gathered data for recurring themes (e.g., issues with technology, lack of engagement, content difficulty). 2. Identify key issues that affected the effectiveness of online learning. 3. Summarize the results in a report with recommendations for future improvements. Output: Comprehensive analysis and insights on issues during challenging times in online education.
3. Evaluation Report	• A detailed report that includes: ○ Assessment of online learning tools, processes, and outcomes. ○ Feedback and insights gathered from students. ○ Recommendations for improving online classes in the future.
Summary of Phases	
Phase 1	Planning, Process, and Evaluation • Planning: Decide on tools, schedule, and roles. • Process: Implement and monitor online classes.
Phase 2	Data Gathering and Analysis • Gather qualitative data from students. • Analyse challenges and areas for improvement.

Mathematical Form of Phases:

The table 3 provides an established framework for analyzing the e-mastering process from making plans, implementation, and assessment (Pathar et al., 2020). It outlines key operations, variables, and actions associated with extraordinary levels of the online gaining knowledge of system. The look at pursuits to beautify online gaining knowledge of with the aid of tracking variables like attendance, mastering development, and feedback. The mathematical representations help formalize the evaluation, ensuring each segment is cautiously monitored and evaluated to make certain a top notch learning experience. The study focuses on the mathematical representations and their meaning in the context of this research.

Phase 1: PPE Model (Planning, Process, Evaluation)

Step 1: Planning

Equation: Select tools for the classes from the set of available tools T.

$$T_{\text{selected}} = \text{Choose } (T) \quad \text{eq (1)}$$

Equation: Set the schedule P_{defined} (e.g., when the classes will happen).

$$P_{\text{defined}} = \text{Define } (P) \quad \text{eq (2)}$$

Equation: Assign responsibilities (e.g., who will teach, who will monitor the students).

$$R_{\text{assigned}} = \text{Assign } (R) \quad \text{eq (3)}$$

Step 2: Process

Equation: Track the attendance A_i for each student S_i

$$A_i = \text{Attendance } (S_i) \text{ for all } S_i \in S \quad \text{eq (4)}$$

Equation: Measure the learning progress L_i for each student S_i

$$L_i = \text{Learning Progress } (S_i) \text{ for all } S_i \in S \quad \text{eq (5)}$$

Step 3: Evaluation

Equation: Evaluate the effectiveness based on attendance, learning progress, and student feedback.

$$E_{\text{student}} = \text{Evaluate } (A_i, L_i, \text{Feedback } (S_i)) \quad \text{eq (6)}$$

Phase 2: Qualitative Research (Data Gathering and Analysis)

Step 4: Data Gathering

Equation: Gather qualitative of data D from students' feedback, surveys, and interviews.

$$D = \text{CollectData } (S) \quad \text{eq (7)}$$

Step 5: Data Analysis

Equation: Analyse the qualitative of data D for common issues faced by students.

$$A_{\text{issues}} = \text{Analyse (D)} \qquad \text{eq (8)}$$

Equation: Derive insights I based on the analysis of student feedback.

$$I = \text{Insights}_{(\text{Aissues})} \qquad \text{eq (9)}$$

Equation: Generate recommendations R_{final} to improve online classes.

$$R_{\text{final}} = \text{Recommendations(I)} \qquad \text{eq (10)}$$

Table 3. Summary in Mathematical Equation:

Mathematical Terms:	
Planning	Select tools T_{selected} , define schedule P_{defined} , and assign responsibilities R_{assigned} .
Process	Track student attendance A_i and learning progress L_i .
Evaluation	Evaluate each student's outcome E_{student} .
Qualitative Research	Gather and analyse data D to identify common issues A_{issues} .
Final Insights	Derive insights I and generate recommendations R_{final} .

Survey Results on Online Learning Modes and Platform Preferences

The survey conducted with 80 undergraduate students from the Information Technology department at Shaheed Benazir Bhutto University (including first, second, and final-year students) revealed the following results. The results are presented tabular form in Table 4 and in graphical form in Figure 3 to Figure 5:

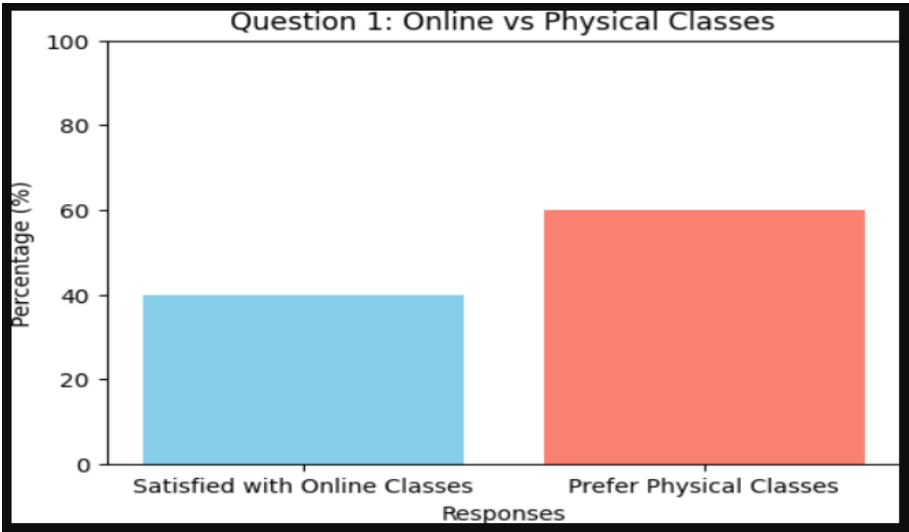


Figure 3: Survey results of Question 1

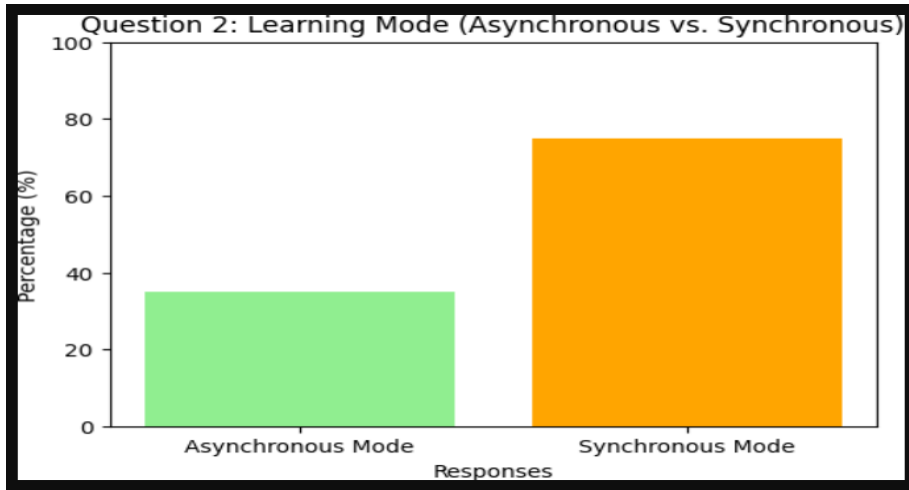


Figure 4: Survey results of Question 2

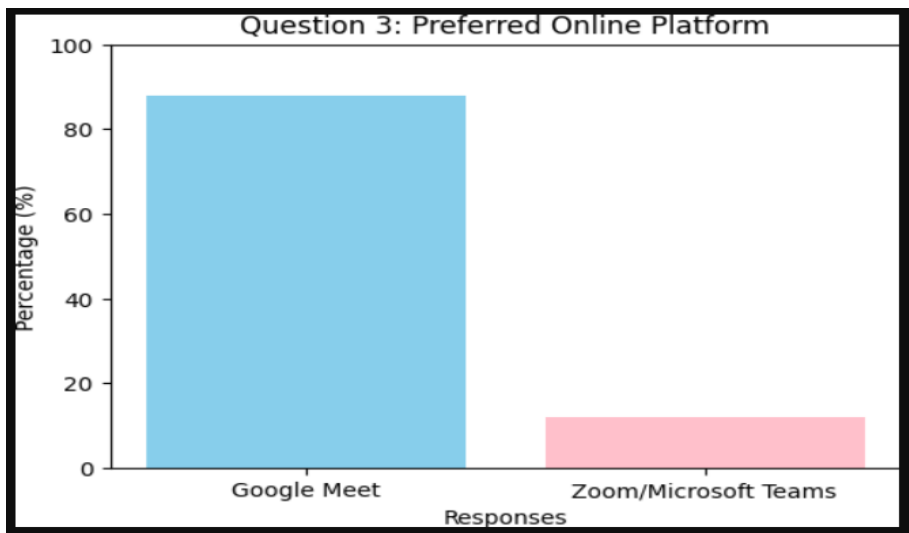


Figure 5: Survey results of Question 3

Question 1 asked students about their satisfaction with online classes versus their preference for physical classes. Forty percent (32 students) of the respondents expressed satisfaction with online learning, while sixty percent (48 students) preferred physical classes.

Question 2 explored students' preferences for online learning modes. Thirty-five percent (28 students) agreed with the asynchronous mode, whereas seventy-five percent (60 students) preferred the synchronous mode.

Note that students could have selected both options, leading to the total exceeding 100%.

Question 3 focused on the choice of online platforms for conducting classes. The majority, eighty-eight percent (70 students), preferred using Google Meet, while twelve percent (10 students) favoured Zoom and Microsoft Teams.

Categorized Challenges Faced by Learners in Online Education

Below table 5 categorizes the challenges faced by learners during online education into three distinct groups: Challenges Faced by Learners (CFL), Challenges Technical (CT), and Challenges with Online Tools (COT). These categories provide a comprehensive view of the difficulties that students encounter in a virtual learning environment, and understanding each category helps in developing strategies to overcome these challenges.

1. Challenges Faced by Learners (CFL)

Online learning presents several challenges for students, including completing assignments on time, lacking guidance, not being prepared for the class, and not managing home tasks and online classes. The lack of direct supervision and self-paced nature of online learning can lead to procrastination, missed deadlines, and lack of motivation (Meng et al., 2024). Online instructions frequently lack instant get admission to favoured steerage, making it difficult for college students to are seeking help and preclude their gaining knowledge of progress.

Additionally, many students might not be mentally or physically organized for on line training, that can impact their overall performance. The absence of a hard and fast habitual or structure could make it difficult for rookies to transition from bodily lecture rooms to online learning is to know environments efficaciously. Balancing personal life and educational existence turns into blurred when studying from home, main to distractions and difficulties in that specialize in assignments or lectures.

Time control is also a task in on line learning to know environments, as college students has extra flexibility but also more duties. Many conflict to allocate suitable time for studying, finishing assignments, and attending instructions. The lack of outside responsibility, inclusive of in-man or woman interactions with peers and instructors, can cause bad time management talents, negatively impacting instructional performance (Ibrahim et al., 2022).

2. Technical Challenges (CT)

Electricity troubles, unstable power supply, and lack of internet alerts are common issues in on-line learning to know environments. These issues can disrupt online classes, prevent college students from attending periods, and avoid their ability to finish assignments. In far flung or rural regions, risky net get entry to can lead to disruptions(Meinokat & Wagner, 2022) for the duration of on-line lessons, cloth get entry to, and neglected stay classes, growing a good-sized barrier to powerful mastering(Kantawala, 2021).

Online learning to know can also purpose inexperienced persons to warfare to realize content material due to platform obstacles or teaching methods that don't translate nicely to the digital environment. This can cause decreased studying outcomes.

Retention of statistics can be laid low with on-line learning to know, as students may additionally discover it harder to focus on and internalize content material. The absence of interactive, in-man or woman reviews could make it more difficult for novices to maintain understanding and don't forget key standards.

Technology also can be a barrier for students, as it can introduce distractions such as notifications from social media and on-line gaming, which could significantly impact the learning to know manner. Therefore, it's far essential for educators and freshmen to address those challenges to make sure effective online learning to know.

3. Challenges with Online Tools (COT)

Online training may be tough for students because of lack of knowledge and interest within the gear used, leading to frustration and disengagement. This loss of hobby can result in a negative learning enjoy, as college students may opt for more cushy or useful tools. Emotions also are difficult to understand due to the inability to perceive non-verbal cues, which might be crucial for effective verbal exchange. This can lead to a lack of empathy and miscommunication, affecting the overall studying revel in and student-trainer relationships.

Continuous recognition on favored line gear may be mentally onerous, leading to cognitive fatigue. Limited opportunities for breaks and hands-on sports can exacerbate this trouble. Prolonged use of online gear and excessive screen time can motive bodily fitness problems, which includes eye pressure,

headaches, returned ache, and standard fatigue. The sedentary nature of on-line gaining knowledge of, coupled with terrible ergonomics, can reason bodily pain, affecting college students’ capacity to learn effectively and leading to burnout.

The domestic surroundings regularly lack the shape and resources found in traditional classrooms, making it hard for students and instructors to preserve a based, engaging learning environment (Meinokat & Wagner, 2022). This loss of a devoted, professional learning area can lessen the great of the instructional experience for each student and educators.

RESULTS AND DISCUSSION

A study surveyed 80 undergraduate students from Shaheed Benazir Bhutto University, focusing on their satisfaction with online classes and preference for physical classes. The results revealed that 40% of the student’s expressed satisfaction with online classes, while 60% preferred physical classes. 35% of students agreed with asynchronous learning mode, while 75% preferred synchronous mode are presented in below Figure 6. Additionally, 88% preferred Google Meet as their preferred online platform.

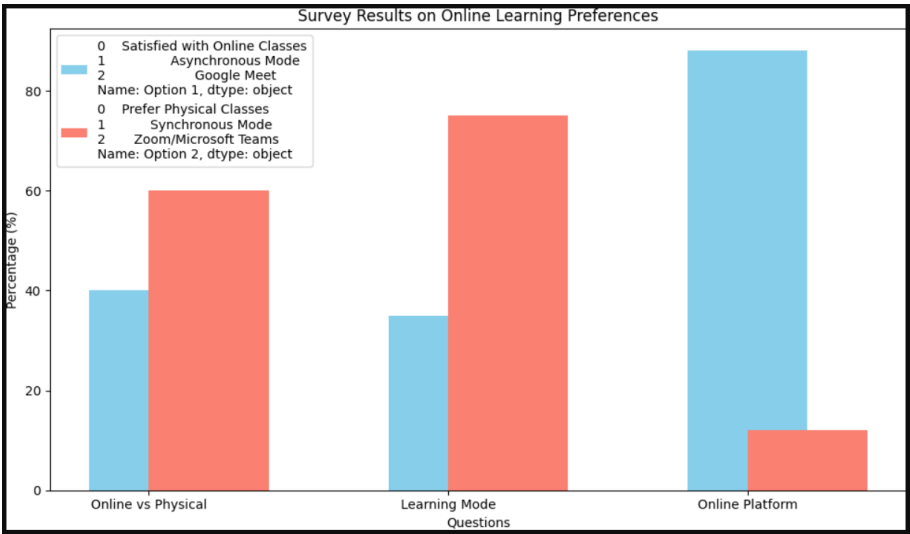


Figure 6: Survey results of online learning performance

The study highlights trends in class modality and platform usage in online learning. Distance and virtual education providers have access to advanced tools, but developing new educational tools from scratch is time-consuming

and resource-intensive. Best practices can help minimize the time required for such tasks.

Using pre-built solutions may be more efficient and cost-effective if existing tools meet the institution's specific needs. Conducting a thorough evaluation of available options ensures that the chosen solution aligns with the institution's goals and supports its educational objectives effectively.

Developing a custom device tailor-made particularly to a college's precise wishes may be an excellent desire, especially when the organization's task calls for a greater personalized approach. However, developing the sort of system requires careful attention to element and considerate planning to ensure it is purposeful and consumer-friendly. The primary intention is to ensure clean interaction with the device, decrease the learning to know curve, and enhance user delight.

In this study, 3 important challenges confronted by rookies during challenging times were recognized: Challenges Faced by using Learners, Technical Challenges, and Challenges with Online Tools. These demanding situations were analysed in depth via interviews and surveys, which additionally assessed student mastering and common delight. Understanding those limitations is key to figuring out areas for improvement inside the digital education device. By addressing those challenges, establishments can higher help students and school alike at some point of tough times, making sure that mastering maintains correctly regardless of external situations.

CONCLUSION AND FUTURE WORK

This paper offers a quick assessment of the key capabilities of Quality Assurance (QA) systems carried out within universities to evaluate and hold academic excellent. Quality guarantee in online coaching is a complex and worrying venture that calls for the total dedication and cooperation of both academic and administrative personnel to ensure the fulfilment of the QA machine. Effective QA mechanisms rely closely at the energetic engagement of all stakeholders worried in the instructional manner, together with faculty, students, and administrative employees. Upon reviewing the PSA (Planning, Selection, and Assessment) model inside the context of virtual schooling, the paper concludes that a one-length-suits-all technique may not be enough for addressing the numerous desires of a university. The PSA model, even as effective in many eventualities, has limitations that may not

fully seize the varied needs of various academic departments, disciplines, and coaching methods. As such, it's far clear that an unmarried QA version can't competently meet all the university's necessities for nice warranty in on line learning.

For future work, it's far cautioned that the elements of the PSA model be extended or tailored primarily based on the evolving needs of each lecturer and students. This may want to contain incorporating extra standards or adjusting the model to reflect new tendencies in on line training, generation, and coaching practices. By permitting flexibility and adaptableness within the QA framework, universities can better ensure the ongoing effectiveness in their on-line education programs even as meeting the specific needs of their educational community.

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STRATEGIC DRIVERS OF SUSTAINABLE ENVIRONMENTAL PERFORMANCE: THE ROLE OF CAPABILITIES, LEAN MANUFACTURING, AND GREEN SUPPLY CHAINS IN PAKISTAN'S MANUFACTURING SECTOR

Syed Imtiaz Ali

Faculty of Business Administration, Iqra University Karachi - Pakistan

Email: *Imtiazali93@gmail.com*

Dr. Minhaj Ikram

Faculty of Business Administration, Iqra University Karachi - Pakistan

Email: *minhajikram@gmail.com*

ABSTRACT

This study examines how firm capabilities influence Lean Manufacturing (LM) and Green Supply Chain Management Practices (GSCMP), and their collective influence on Sustainable Environmental Performance (SEP), especially in the face of operational disruptions. Grounded in Dynamic Capability (DC) theory, The study developed a conceptual framework, and it was analysed using Structural Equation Modelling based on responses from 162 supply chain experts in the manufacturing sector of Pakistan. The analysis indicate that organizational capabilities in technology, innovation, and relationship management significantly enhance the implementation of LM and GSCMP, both of which positively affect SEP. This study uniquely integrates DC theory with LM and GSCMP in a disruption context, offering insights into how internal capabilities drive sustainability and resilience in emerging economies. Firms should invest in dynamic capabilities to support sustainable practices and maintain performance during periods of uncertainty. Strengthening supply chain sustainability promotes environmental responsibility, community well-being, and industrial resilience

Keywords: *Strategic Capabilities, Green Supply Chain Management Practices, Lean Manufacturing, Sustainable Environmental Performance.*

INTRODUCTION

The deterioration of environmental resources has raised significant concerns globally, driving organizations to adopt more sustainable practices in response to both ethical responsibilities and business imperatives (Dubey et al., 2015; Lin & Chen, 2017). The notion of “green intellectual capital” has been established as a focal point, emphasising the strategic role of environmental consciousness within organizational knowledge and capabilities (Yong et al., 2019). While industrialization has spurred economic growth, it has also escalated the necessity for industries to balance economic development with the sustainability of the environment (Sosvilla-Rivero et al., 2018). In today’s market, consumers increasingly demand not only high-quality and cost-effective products but also environmentally responsible production practices (Garza-Reyes, 2015; Lobel et al., 2018). For organizations, especially in emerging economies like Pakistan, integrating sustainability into their operational strategies is now a critical requirement rather than a discretionary strategy for long-term competitiveness.

Pakistan’s industrial division, a vital player in the nation’s economy, is facing increasing pressure to reduce its carbon footprint. The sector’s current state highlights the urgent need for the integration of sustainable practices that enhance operational performance while mitigating environmental damage. In this context, Lean Manufacturing (LM) and Green Supply Chain Management Practices (GSCMP) have garnered significant attention for their potential to drive sustainability. LM focuses on eliminating inefficiencies such as waste, overproduction, and defects within manufacturing processes (Rasib & Musazali, 2020). On the other hand, GSCMP emphasizes the reduction of carbon footprints, such as waste and pollution, throughout the supply chain (Mohanty & Deshmukh, 1999). These two methodologies, when implemented together, offer the dual benefit of improving productivity while minimizing environmental harm, making them critical components of any sustainability strategy.

Despite their individual importance, the combined influence of LM and GSCMP on Sustainable Environmental Performance (SEP) in Pakistan’s manufacturing sector remains underexplored. Existing studies have investigated Lean practices and Green Manufacturing individually, but limited studies have measured how these practices, when coupled with organizational capabilities, affect sustainability outcomes in emerging market contexts like

Pakistan. Organizational capabilities—such as absorption capacity, innovation orientation, along supply chain integration play a significant role in enabling the successful execution of LM and GSCMP. These capabilities facilitate the adaptation of lean practices and green strategies by allowing firms to absorb external knowledge, innovate solutions, and integrate sustainable practices across their supply chains. However, little empirical research has been conducted on how these capabilities enable the implementation of both LM and GSCMP to enhance environmental performance in the manufacturing sector.

Furthermore, there is a noteworthy gap in understanding the relationship between LM, GSCMP, and organizational capabilities in Pakistan's unique industrial context. While research has explored LM's role in operational performance and sustainability in other countries (Mrugalska & Wyrwicka, 2017; Wagner et al., 2017), studies focusing on the integration of LM and GSCMP within Pakistan's manufacturing sector are scarce. This gap is particularly relevant as Pakistani firms face specific challenges in scaling lean practices across their supply chains. Research indicates that while lean practices can lead to efficiency gains, extending these practices throughout the supply chain often remains difficult, particularly in emerging markets (Tortorella et al., 2018). Additionally, the lack of comprehensive assessment tools for Lean Supply Chain Management (LSCM) complicates the effective implementation of these strategies (Moyano-Fuentes et al., 2019). These challenges imply that effectively integrating lean and green practices demands a strategic and coordinated approach, yet how these capabilities influence environmental outcomes remains insufficiently explored.

Innovation is another vital factor that intersects with both Lean and Green practices, contributing to enhanced operational efficiency and sustainability. Some studies have highlighted the complementary nature of lean and innovation, asserting that an innovative culture can drive lean efficiency by enabling firms to solve problems creatively and implement new technologies (Zeng et al., 2015; Kim et al., 2012). However, few researchers have focused on how innovation, within the context of LM and GSCMP, influences sustainability in Pakistan's manufacturing sector. Additionally, the importance of Big Data Analyses (BDA) to improve environmental outcomes through more informed decision-making has yet to be sufficiently explored in this context (Henao et al., 2019). The role of external factors, such as market

pressure, regulatory frameworks, and stakeholder activism, in moderating the association between LM, GSCMP, and sustainability performance also remains under-researched.

This research seeks to fill the gaps in existing knowledge by exploring the combined effects of LM and GSCMP, supported by organizational capabilities, on Sustainable Environmental Performance in Pakistan's manufacturing sector. It specifically aims to identify the key organizational capabilities that support the implementation of LM and GSCMP, exploring how these capabilities enable firms to enhance environmental outcomes.

The scope of the study extends across various manufacturing sectors in Pakistan, using both qualitative and quantitative data to assess the practices, challenges, and outcomes related to environmental sustainability. However, it does not focus on specific industries or companies, but rather provides a broad overview of trends across the sector.

LITERATURE REVIEW

1. Theoretical Background

Grounded in the principles of Dynamic Capabilities Theory (DCT) (Teece, 2012), this study highlights the critical role of environmental sustainability in shaping how organizations evolve. DCT emphasizes the need for firms to continuously adapt, integrate, and reshape both internal and external capabilities to remain effective in fast-changing environments (Teece et al., 1997). In the context of sustainability, this theoretical lens helps explain how businesses respond to ecological challenges by reconfiguring their resources and competencies. The conceptual framework developed in this study reflects this approach by positioning Technology Capability (TC), Innovation Capability (IC), and Relationship Management Capability (RMC) as core dynamic capabilities that support and drive sustainable organizational transformation.

Dynamic capabilities are not static resources but reconfigurable competencies that enable firms to proactively modify their operations and strategies in pursuit of competitive advantage (Polater, 2021). . In this model, TC captures the firm's capacity to deploy advanced technologies that support process optimization and reduce environmental footprints (Mubarik et al., 2021). IC represents the organization's ability to generate and apply innovative solutions that foster environmental improvements across the

supply chain (Jiang et al., 2018). RMC reflects the capacity to cultivate strategic relationships that enhance collaboration and coordination for the adoption of environmentally responsible practices (Huang & Li, 2015).

These capabilities influence operational mechanisms such as LM and GSCMP, which serve as mediators between internal strengths and environmental outcomes. LM promotes operational efficiency by minimizing waste and improving resource utilization, thereby contributing to environmental goals (Garza-Reyes et al., 2018). Whereas, GSCMP embeds sustainability into core supply chain functions, encouraging practices that reduce ecological impact across the value chain (Awan et al., 2022; Le & Ferasso, 2022). The integration of lean and green initiatives, when driven by strong dynamic capabilities, has been shown to contribute to environmental performance improvements (Chavez et al., 2020b; Belhadi et al., 2019; Chatterjee & Chaudhuri, 2022).

By conceptualizing TC, IC, and RMC as dynamic capabilities and linking them with LM and GSCMP, the model illustrates how organizations adapt internal strengths to shape sustainable operational outcomes (Ofori & Appiah-Nimo, 2021). This perspective is reinforced by literature focusing on the vital role of leadership and tactical alignment in translating capabilities into effective sustainability practices (Machingura et al., 2023; Hajmohammad et al., 2013; Chen et al., 2023). Therefore, the model provides a theoretical foundation rooted in DCT to explain the pathways through which firms enhance Sustainable Environmental Performance (SEP) by leveraging and reconfiguring internal capabilities in response to environmental challenges.

2. Hypotheses Development

2.1 Technology Capability (TC) with Lean Manufacturing (LM) and Green Supply Chain Management Practices (GSCMP)

Technology capability (TC) is essential for enabling LM and GSCMP. It facilitates cross-functional collaboration and external integration, critical for waste reduction and performance improvement (Hao et al., 2021; Siagiana & Tarigana, 2021). Lean Six Sigma (LSS), combining DMAIC with LM, improves environmental sustainability by waste reduction, efficient energy use, and controlled emissions (Cherrafi et al., 2016; Freitas et al., 2017). Technological advancements like IoT enhance real-time visibility, logistics efficiency, and inventory management, leading to improved GSCMP

outcomes (Haddud et al., 2017; Abdel-Basset et al., 2018). However, barriers such as lack of expertise and integration challenges persist (Lee & Lee, 2015). Despite this, stronger technological capabilities reduce uncertainty, improve communication, and support LM and GSCMP through faster, more accurate decision-making (Mofokeng & Chinomona, 2019). Thus, following hypotheses are proposed:

H1: Technology capability (TC) has a significant positive impact on lean manufacturing (LM).

H2: Technology capability (TC) has a significant positive impact on green supply chain management practices (GSCMP).

2.2. Innovation Capability (IC) with Lean Manufacturing (LM) and Green Supply Chain Management Practices (GSCMP)

IC, encompassing both technological and social innovation, is vital for building resilient and sustainable supply chains (Sarkis, 2020). The adoption of Industry 4.0 technologies like IoT, AI, blockchain, and cyber-physical systems—enables firms to address operational uncertainties and streamline processes (Kumar et al., 2020; Chatterjee et al., 2020). These innovations enhance responsiveness and transparency, particularly through data-driven tools like big data and integrated systems (Saber et al., 2019; DesJardine et al., 2019). Social innovations, including the circular and sharing economies, also play a critical part in promoting sustainability (Aigbogun et al., 2018). Techniques like industrial symbiosis and the usage of regional products align with circular economy principles while enhancing operational efficiency (Smart et al., 2017). Thus, IC enables the effective implementation of both LM and GSCMP. Therefore, following relations are hypothesized:

H3: Innovation capability (IC) has a significant positive impact on lean manufacturing (LM).

H4: Innovation capability (IC) has a significant positive impact on green supply chain management practices (GSCMP).

2.3. Relationship Management Capability (RMC) with Lean Manufacturing (LM) and Green Supply Chain Management Practices (GSCMP)

Relationship Management Capability (RMC) is the organization's capability to enhance effective communication, trust, and collaboration among supply chain stakeholders, particularly in dynamic environments (Paulraj et al.,

2008). RMC promotes the development of new capabilities and joint initiatives that enhance overall supply chain performance (Kale et al., 2000). It also enables knowledge sharing and coordination among partners, which is essential for implementing lean manufacturing and green practices (Park et al., 2015; Wu et al., 2014). Trust, commitment, and relationship immersion—core components of RMC—support strategy alignment and collaborative decision-making (Zacharia et al., 2011; Wittmann et al., 2009). These factors help organizations streamline operations, reduce waste, and pursue sustainability goals effectively. In the context of Pakistan's manufacturing industry, RMC can significantly influence the successful adoption of LM and GSCMP. Therefore, following relations are hypothesized:

H5: Relationship management capability (RMC) has a significant positive impact on lean manufacturing (LM).

H6: Relationship management capability (RMC) has a significant positive impact on green supply chain management practices (GSCMP).

2.4. Lean Manufacturing (LM) with Sustainable Environmental Performance (SEP)

LM enhances quality, reduces waste, and boosts productivity through methods like Just in Time (JIT) along with Total Quality Management (TQM) and Total Productive Maintenance (TPM). Maware and Adetunji (2019) found LM improved operational performance in Zimbabwe by promoting employee engagement. Pampanelli et al. (2014) emphasized LM's focus on delivery efficiency, cost reduction and quality enhancements. Farias et al. (2019) and Baumer-Cardoso et al. (2020) noted LM improved resource use, increased efficiency and lowered energy usage. These benefits also support environmental sustainability (Aslam & Siddiqui, 2023). In Pakistan's manufacturing sector, LM is expected to yield similar outcomes. Therefore, it is hypothesized that:

H7: Lean manufacturing (LM) has a significant positive impact on sustainable environmental performance (SEP).

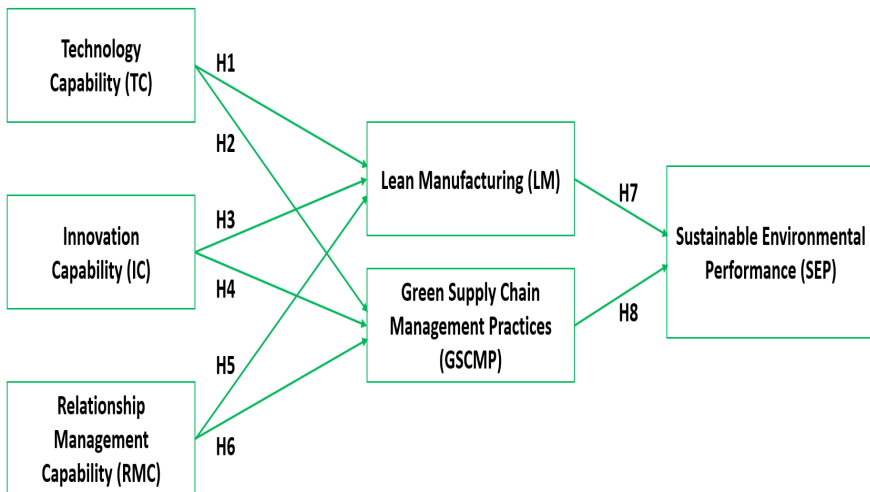
2.5. Green Supply Chain Management Practices (GSCMP) with Sustainable Environmental Performance (SEP)

Supply management has shifted from a tactical to a strategic function, especially in advancing GSCMP (Krause et al., 2009; Vachon & Klassen, 2006). Collaboration with suppliers enables knowledge exchange and fosters

innovation, encouraging the adoption of green technologies (Bowen et al., 2001; Klassen & Vachon, 2003). These practices reduce environmental harm and enhance sustainability. Close engagement with suppliers allows firms to implement impactful environmental innovations by leveraging external expertise (Florida, 1996; Geffen & Rothenberg, 2000). In Pakistan's manufacturing industry, GSCMP is critical to improving environmental performance under increasing regulatory and societal pressure. Therefore, it is hypothesised:

H8: Green supply chain management practices (GSCMP) have a significant positive impact on sustainable environmental performance (SEP).

Figure (1): Conceptual Framework



RESEARCH METHODOLOGY

The two most widely used research techniques worldwide are qualitative research and quantitative research. It has been decided to use a quantitative research methodology for this investigation (Bernard, 2013; Neuman, 2007). This method makes it easier to create and use statistical models, which makes it possible to get statistical conclusions through data analysis. The thoughts and assumptions put forward in the study are tested using statistical techniques. To explore and analyse the interactions between numerous elements, the quantitative methodology is used in the current study. Using the Smart PLS 4.0 programme, the collected data is analysed in order to gain insightful knowledge and reach relevant conclusions.

1. Research Design

The research adopts an explanatory objective, aiming to develop an in-depth understanding of the constructs and their interrelationships. This approach, commonly aligned with quantitative methods, facilitates analysis and interpretation of complex phenomena (Blessing & Chakrabarti, 2009; Cooper & Schindler, 2006; Sekaran & Bougie, 2019). While not offering definitive conclusions, it provides valuable insights into causal mechanisms and contextual dynamics (Kothari, 2004; Kumar & Phrommathed, 2005).

2. Population, Sampling and Sampling Technique

According to Sekaran and Bougie (2019), a population includes all relevant individuals or items for a study. This research targeted top, middle, and lower-level supply chain professionals in Pakistan's manufacturing sector. Using Daniel Soper's power analysis calculator (Soper, 2020), the minimum required sample size was estimated to be 161, based on statistical power and significance (Faul et al., 2007). A non-probability purposive sampling technique was applied to efficiently select relevant respondents across sectors, ensuring context-specific insights (Sekaran & Bougie, 2019; Neuman, 2013; Jager et al., 2017).

3. Instrumentation and Data Collection

Data screening using IBM SPSS 22 identified and removed missing values and outliers, resulting in a final sample size of 146, slightly below the recommended 161 (Bernard, 2013; Soper, n.d.). PLS-SEM was employed for hypothesis testing using Smart PLS 4.0, due to its suitability for small samples and widespread use in research (Ikram & Javed, 2023).

DATA ANALYSIS AND RESULTS

Data screening was done via SPSS, followed by analysis using SmartPLS 4.0, employing a two-step approach (Anderson & Gerbing, 1982) for model assessment. SEM was used to evaluate latent variables and test hypotheses, offering advantages over traditional techniques by accounting for measurement error (Hair et al., 2012; Byrne, 2010).

1. Demographic Analysis

An in-depth analysis of the demographic profiling of the respondents is presented in this section. It includes information about the age, last degree, work experience and industry classification of the respondents in frequency table, where statistics (N = 146).

Table 1: Demographic Profile

	Demographics	Frequency	Percent
Age	Less than 25 years	37.00	12.70
	25 – 29 years	49.00	33.56
	30 – 34 years	58.00	39.73
	35 – 39 years	35.00	23.97
	40 – 44 years	4.00	2.74
	45 – 49 years	0.00	0.00
	50 – 54 years	0.00	0.00
	55 years and above 55 years	0.00	0.00
Last Degree	Bachelors	72.00	49.32
	Master	70.00	47.95
	Other	4.00	2.74
Work Experience	Less than 5 years	49.00	33.56
	Between 5 -10 years	58.00	39.73
	Between 11 – 15 years	35.00	23.97
	Above 15 years	4.00	2.74
Industry Classification	Petroleum / Chemical	61.00	41.78
	Energy and Power	9.00	6.16
	Textile	24.00	16.44
	Food Products / Beverages	18.00	12.33
	Pharmaceutical	19.00	13.01
	Automotive	1.00	0.68
	Others	14.00	9.59

2. Construct Reliability and Validity

Outer loadings were initially examined to evaluate the contribution of each indicator to its respective construct. All outer loadings exceeded the threshold of 0.7, confirming that indicators strongly reflect their underlying constructs (Fornell & Larcker, 1981; Hamid et al., 2017). Following this, construct validity was assessed using Smart PLS 4.0. Discriminant validity was ensured as indicators loaded highest on their respective constructs (Chin, 1998; Grégoire & Fisher, 2006, as cited in Hair et al., 2012). Convergent validity was also confirmed, with all Composite Reliability (CR) values exceeding 0.7. Whereas, the Average Variance Extracted (AVE) values are above 0.5, in accordance with the criteria set by Fornell and Larcker (1981).

Table 2: Construct Reliability and Validity

Constructs	Items		Cronbach's alpha	Composite reliability	AVE
Green Supply Chain Management Practices	GSCMP1	0.843	0.881	0.914	0.680
	GSCMP2	0.771			
	GSCMP3	0.881			
	GSCMP4	0.828			
	GSCMP5	0.794			
Innovation Capability	IC1	0.816	0.772	0.851	0.589
	IC2	0.750			
	IC4	0.710			
	IC5	0.790			
	LM1	0.751			
Lean Manufacturing	LM3	0.864	0.881	0.910	0.628
	LM4	0.784			
	LM5	0.745			
	LM6	0.746			
	LM7	0.854			
Relationship Management Capability	RMC1	0.777	0.815	0.879	0.646
	RMC2	0.842			
	RMC4	0.855			
	RMC5	0.734			
	SEP2	0.813			
Sustainable Environmental Performance	SEP3	0.844	0.818	0.878	0.644
	SEP4	0.768			
	SEP5	0.783			
	TC1	0.808			
	TC2	0.851			
Technology Capability	TC3	0.726	0.823	0.883	0.654
	TC4	0.843			

3. Discriminant Validity

Discriminant validity confirms that each latent variable in a model measures a distinct concept (Michael, 2014; Hair et al., 2021). This study assesses it using the Fornell-Larcker criterion, which requires the square root of AVE to exceed inter-variable correlations (Fornell & Larcker, 1981), and the HTMT ratio, which confirms validity when values remain below 1.0 (Hair et al., 2021).

Table 6: Correlations of Discriminate Validity (Fornell and Lacker Criterion)

	GSCMP	IC	LM	RMC	SEP	TC
GSCMP	0.824					
IC	0.631	0.767				
LM	0.748	0.647	0.792			
RMC	0.590	0.584	0.671	0.803		
SEP	0.744	0.524	0.658	0.524	0.802	
TC	0.391	0.379	0.442	0.368	0.307	0.809

Fornell and Larcker (1981) although, are not necessarily regarded as reliable indicators of discriminant validity, according to Henseler et al. (2015) proposed unique method of ensuring DV (discriminant validity) of data, recognized as the relationships' Heterotrait and Monotrait ratio. (HTMT). If HTMT value is less than 0.85, the discriminant validity of the test is established (Henseler et al., 2015). Table 7 displays the HTMT results, and because every value is below 0.90, discriminant validity is confirmed.

Table 7: Heterotrait-Monotrait Ratio (HTMT) Results

	GSCMP	IC	LM	RMC	SEP	TC
GSCMP						
IC	0.739					
LM	0.838	0.745				
RMC	0.690	0.726	0.777			
SEP	0.838	0.617	0.767	0.629		
TC	0.448	0.468	0.501	0.451	0.364	

4. Predictive Power of Construct

Predictive relevance should be assessed after validation calculations when a model's quality is revealed. The significance of the R-squared is larger than 10%, and predictive relevance evaluates the projected strength of the construct (Hair et al., 2021). The analyses shown in the following table are larger than 0 and complies with Henseler et al. (2009) requirement that the Q2 value be larger than 0, demonstrating the model's predictive relevance.

Table 8: Predictive Power of Construct (Relevance of the Model)

Construct	R-square	Q ² predict
GSCMP	0.486	0.452
LM	0.570	0.531
SEP	0.577	0.325

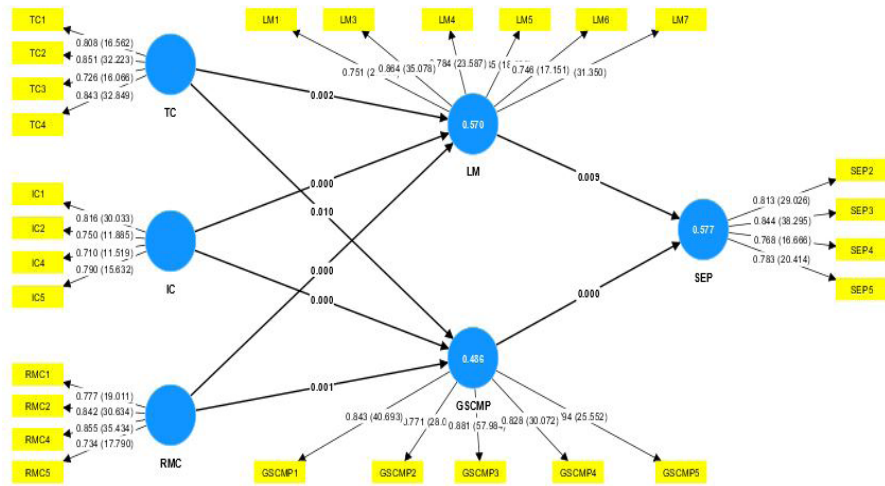
5. Path Coefficient

Following the bootstrapping technique, the path analysis of first and second order reveals the significant outcomes between dependent and independent variables. In results we found that, GSCMP with SEP (β 0.000, $p < 0.05$), IC with GSCMP (β 0.000, $p < 0.05$), IC with LM (β 0.000, $p < 0.05$), LM with SEP (β 0.009, $p < 0.05$), RMC with GSCMP (β 0.001, $p < 0.05$), RMC with LM (β 0.000, $p < 0.05$), TC with GSCMP (β 0.010, $p < 0.05$), TC with LM (β 0.002, $p < 0.05$) are supported hypothesis, which means H1, H2, H3, H4, H5, H6, H7 and H8 all are accepted and has significant effect.

Table 9: Hypothesis Testing

Hypothesis	Loading	Standard deviation (STDEV)	T statistics (O/STDEV)	P values	Decision
GSCMP -> SEP	0.572	0.094	6.090	0.000	Accepted
IC -> GSCMP	0.403	0.100	4.018	0.000	Accepted
IC -> LM	0.347	0.096	3.601	0.000	Accepted
LM -> SEP	0.231	0.097	2.387	0.009	Accepted
RMC -> GSCMP	0.309	0.094	3.279	0.001	Accepted
RMC -> LM	0.409	0.091	4.502	0.000	Accepted
TC -> GSCMP	0.125	0.054	2.310	0.010	Accepted
TC -> LM	0.160	0.057	2.822	0.002	Accepted

Figure (1) Path Coefficient



CONCLUSION AND IMPLICATIONS

1. Conclusion

The current study analysed how internal organizational capabilities TC, IC, and RMC, influence SEP through LM and GSCMP. Drawing upon the Dynamic Capabilities Theory (DCT), the research conceptualized and empirically validated a framework that captures how firms adapt, integrate, and reconfigure their competencies to meet environmental challenges. The results confirm that all hypothesized relationships were statistically significant, emphasizing that both lean and green practices serve as effective tools through which dynamic capabilities contribute to sustainability. The study thus reaffirms the role of operational excellence and capability integration in enhancing environmental sustainability and performance, particularly in the context of resource-constrained emerging markets.

2. Theoretical Contribution

This research contributes to the knowledge body by applying and extending the Dynamic Capabilities Theory within the domains of operations and environmental management. While DCT has traditionally been applied to explain innovation and market adaptation, this study demonstrates its relevance to sustainability-oriented transformation. Specifically, the analyses of the study show that IC and RMC meaningfully influence both LM and GSCMP, reflecting DCT's core propositions that firms must reconfigure

knowledge and relational resources to respond to evolving environmental demands. The confirmation of TC's moderate but significant effects also reinforces the theory's view that physical and technological infrastructure, though necessary, must be complemented by strategic innovation and collaboration to yield transformative outcomes.

Moreover, the study adds value by showing that LM and GSCMP are not only influenced by dynamic capabilities but also serve as operational bridges through which these capabilities drive SEP. The validated model offers a comprehensive theoretical lens through which the integration of capabilities and practices can be understood as a pathway to sustainable value creation. By anchoring the relationships within a DCT framework, this research enriches the theory's explanatory power in sustainability and supply chain contexts.

3. Managerial Recommendations

Results of this study offers several patical insights for managers aiming to enhance their firms' sustainable environmental performance. First and foremost, organisations should set priorities for the development of innovation capability, as it plays a pivotal role in driving both LM and GSCMP. Managers are encouraged to foster a culture of eco-innovation by investing in research and development, encouraging cross-functional collaboration, and incentivizing creative problem-solving aimed at sustainability. Equally important is the strengthening of relationship management capability. Building and nurturing strategic relationships with supply chain partners can significantly enhance the coordination and implementation of green practices. Effective collaboration facilitates knowledge sharing, trust, and mutual commitment, all of which are essential for environmental initiatives that span organizational boundaries.

Furthermore, while technology capability alone may not lead to immediate sustainability gains, it remains a critical enabler when aligned with broader strategic objectives. Managers should ensure that investments in technology—such as automation, digital tracking, or environmental monitoring tools—are strategically integrated into both green and lean initiatives to amplify their impact. The integration of lean and green practices should be approached holistically, rather than as isolated programs. A synchronized strategy that reduces waste while embedding environmental standards can create operational synergies, which leads to improvements in performance and sustainability.

Finally, leadership plays a decisive role in the successful alignment of capabilities with environmental goals. Managers and executives must demonstrate a clear commitment to sustainability and act as change agents who guide the organization through the necessary cultural and strategic transformations. Leadership should ensure that sustainability is embedded not only in operational practices but also in the vision, values, and long-term strategy of the firm. Through strategic alignment and capability development, managers can position their organizations to respond proactively to environmental challenges and achieve sustainable competitive advantage.

4. Limitations and Future Research Recommendations

The study yields important findings; however, it is subject to certain limitations. Its cross-sectional design restricts causal inference; future research could adopt a longitudinal approach to track changes over time. Data were collected from firms in a specific emerging market, which may limit generalizability. Comparative studies across regions or industries could enhance applicability. Moreover, only three capabilities were considered, while others—such as absorptive capacity, strategic flexibility, or organizational learning—may also impact sustainability. Future work should explore these and assess how external factors like regulation, market pressure, or stakeholder activism moderate the capability–performance relationship across varied contexts.

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PSYCHOLOGICAL WELLBEING AND EMPOWERMENT AS PREDICTORS OF EMPLOYEE PERFORMANCE: THE MEDIATING ROLE OF WORK ENGAGEMENT

Wajeeha Moin

Independent Researcher. wajeehamoin15@gmail.com

Dr. Munaza Bibi

*Corresponding Author, Bahria University, Karachi Campus.
munazabibi.bukc@bahria.edu.pk*

Dr. Rafique Ahmed Khan

Professor, Bahria University, Islamabad Campus. rak.buic@bahria.edu.pk

ABSTRACT

This study examines the psychological wellbeing (PWB) and psychological empowerment (PE) as predictors of employee performance (EP) along with the mediating role of work engagement (WE) using conservation of resources (COR) theory. A quantitative approach was used. A survey method was used for data collection from 388 healthcare professionals working in Karachi, Pakistan through purposive sampling. Data was examined using Smart PLS. According to the results, PE has a positive impact on PWB. Moreover, PWB and PE notably impact WE. However, in the context of healthcare organizations, PE has a negative impact on EP. On the other hand, PWB and WE have a positive impact on EP. Our study adds to the current literature by examining the abovementioned factors from the lens of COR theory in the context of healthcare organizations. This study offers insights for healthcare managers to encourage and support employees by involving them in strategic decisions. As a result, employees feel empowered, mentally satisfied, and engaged to handle stressful situations and henceforth reflect in better performance.

Keywords: *COR Theory, Employee Performance, Psychological Empowerment, Psychological Well-Being, Work Engagement*

INTRODUCTION

For a healthcare organization, the performance of an individual plays a

critical role in delivering quality services. On the adjacent side, employees are focused on prioritizing the provision of decent work and mental health in the first place which might be reflected in their performance (Capone et al., 2022) healthcare workers have been under high pressures, putting them at risk of developing adverse outcomes. The present study aims to investigate the psychological and organizational factors that contributed to physicians' well-being during the pandemic. A total of 78 Italian physicians participated in the study. They completed a self-report questionnaire measuring efficacy beliefs, orientation towards patient engagement, job satisfaction, non-technical skills, organizational support, sense of belonging to the hospital, job satisfaction, and mental well-being. Physicians' sense of belonging to their hospital, efficacy beliefs about their organizations and communication with patients, as well as non-technical skills related to communication and risk awareness were positively associated with job satisfaction. In addition, the latter and sense of belonging to own hospital were positively associated with mental well-being. These findings may guide policymakers and healthcare organizations managers to consider the potential psychosocial factors related to physicians' well-being and the required preventive measures that can help in enhancing their human and organizational resources to cope with stressful situations such as the COVID-19 pandemic.”,”container-title”:”International Journal of Environmental Research and Public Health”,”DOI”:”10.3390/ijerph19063734”,”ISSN”:”1660-4601”,”issue”:”6”,”language”:”en”,”license”:”http://creativecommons.org/licenses/by/3.0/”,”note”:”number: 6\npublisher: Multidisciplinary Digital Publishing Institute”,”page”:”3734”,”source”:”www.mdpi.com”,”title”:”Mental Well-Being and Job Satisfaction of Hospital Physicians during COVID-19: Relationships with Efficacy Beliefs, Organizational Support, and Organizational Non-Technical Skills”,”title-short”:”Mental Well-Being and Job Satisfaction of Hospital Physicians during COVID-19”,”volume”:”19”,”author”:[{“family”:”Capone”,”given”:”Vincenza”},{“family”:”Borrelli”,”given”:”Roberta”},{“family”:”Marino”,”given”:”Leda”},{“family”:”Schettino”,”given”:”Giovanni”}],”issued”:[{“date-parts”:[["2022",1]]}],”schema”:”https://github.com/citation-style-language/schema/raw/master/csl-citation.json”} . To harness employee performance (EP), an organization must employ top-down and bottom-up approaches in order to give ownership to employees by involving them in the decision-making process leading to better psychological wellbeing (PWB) and performance (Aubouin-Bonnaventure et

al., 2023) to retain them in their job and, in fine, to ensure the sustainability of the organisation. However, studies have demonstrated that high performance work systems (HPWS). Moreover, due to involvement in the decision-making process, employees feel more empowered and thus it will be reflected in their performance with sound PWB (Liu et al., 2022).

Furthermore, psychological empowerment (PE) is viewed as a job resource that can influence PWB positively or negatively. However, few studies found that empowerment can be a potential factor influencing employees' wellbeing (X. Liu & Ren, 2022; Marin-Garcia & Bonavia, 2021). Moreover, work engagement (WE) is an intermediary aspect between PE, PWB, and EP. As per Kundi et al. (2021) PWB can influence individual performance in the presence of a fully engaged organizational environment and strong affective commitment. Likewise, when psychological stress levels are low, employees feel more empowered due to the given autonomy. As a result, they will be more engaged. Henceforth, better performance might be displayed (Shimazu et al., 2018; Tisu et al., 2020).

In addition, one of the myriad factors that can affect EP is PWB. Though a plethora of studies have been undertaken to inspect the influence of wellbeing on outcomes at work (Karapinar et al., 2020; Rurkkhum, 2023). Nevertheless, limited evidence exists related to PWB and performance outcomes (Obrenovic et al., 2020; Yan et al., 2020). Referring to COR theory, employees conserve resources effectively when they feel more empowered (Zhou and Chen, 2021) and engaged in their professions (Anwar et al., 2022; Hobfoll, 1989a), resulting in better PWB (Tisu et al., 2020) and performance. On the other side, individuals can experience stress due to a loss of resources (Merino et al., 2021). COR theory has gained importance in management research as well as business practices, though its nuances still need to be examined in healthcare organizations. Subsequently, this study has attempted to examine the link between the aspects mentioned earlier to fill the gap in the literature.

LITERATURE REVIEW

Conservation of Resource Theory (COR)

The COR theory specifies that individuals always endeavor to access as well as reserve resources (Hobfoll, 1989b) such as physical and psychological resources (Allen et al., 2016; Gip et al., 2022). Conserving

both resources can help deal with stressful situations. Our study proposes that in stressful situations, PWB and PE are crucial resources that can influence performance. Besides, this assumption is supported by the COR theory, employees use resources to perform well under pressure (Fawehinmi et al., 2022). Moreover, in the literature, we found that this theory links to work engagement and performance outcomes (Kim et al., 2019), PWB (Tisu et al., 2020), and PE (Zhou and Chen, 2021). However, job and personal resources have been examined respectively in prior studies. Therefore, to fill this gap, the influence of these resources on EP is examined in this study.

Psychological Empowerment and Employee Performance

EP refers to how individuals acquire, preserve, and cultivate the essential resources to complete their jobs and defend against resource depletion (Akhtar et al., 2021). Thus, a PE working environment is an important resource that has a huge impact on work-related outcomes (Akkoç et al., 2022; Weziak-Bialowolska et al., 2023). Consequently, PE is assumed to be an essential resource at work for autonomy and self-determination (Alawi et al., 2023; Tripathi et al., 2020), and job performance (Ochoa Pacheco et al., 2023). Hence, employees feel empowered when they have autonomy in resource utilization (Zhai et al., 2023) and a positive cognitive state (Amor et al., 2021). As a result, better performance is displayed (Siyal et al., 2023).

Accordingly, PE is an inherent enthusiasm that manifests as a sense of control over one's personal and professional resources (Zhou & Chen, 2021). PE serves as a job resource that helps employees to complete their tasks by preserving the psychological safety, autonomy and performance (Iqbal et al., 2020). As per the prior study results, performance is affected by PE (J. Juyumaya, 2022). Moreover, positive effects on EP can be seen when the individuals are empowered psychologically (Saleem & Ashiq, 2020). Contrary to this, EP can be negatively influenced if employees do not feel psychologically empowered or have power in the workplace. This occurs when there is ambiguity in task allocation. Thus, employees feel less empowered and therefore it might be reflected in their performance (Llorente-Alonso et al., 2023). Henceforth, the subsequent hypothesis was framed:

H1: PE influences EP.

Psychological Empowerment and Psychological Wellbeing

PWB represents the subjective experiences that reflect in individual growth and satisfaction with their job (Aubouin-Bonnaventure et al., 2023; Guest,

2017)to retain them in their job and, in fine, to ensure the sustainability of the organisation. However, studies have demonstrated that high performance work systems (HPWS. Likewise, wellbeing can be determined through PE which includes work autonomy, meaningfulness, cognitive orientation, and strong determination as key components (Gong et al., 2020; Harbridge et al., 2023). Thus, grounded on the COR theory under positive organizational management employees feel empowered (job resource) and are inclined to have better PWB (personal resource) as well as health (K. Iqbal et al., 2022). Accordingly, Abbasi et al. (2021) argued that wellbeing depends on how much the individual feels empowered to perform efficiently by acquiring, sharing, and applying knowledge. Thus, PE as a job resource motivates the individual to perform as a result, their PWB is improved.

In our study, PWB is viewed as a personal resource; when an individual works under a stressful situation can perform better using personal characteristics (Ford, 2009)an ounce of prevention is worth a pound of cure. This is very true in relation to posttraumatic stress disorder (PTSD along with applying resource and conservation strategies to deal with challenges (Hou & Tao, 2023). Similarly, Liu et al. (2022) elaborated that when an employee feels more psychologically empowered feel a lower level of stress leading towards better health and wellbeing. This point is further explicated by Maan et al. (2020) that PE is linked to lower levels of stress. With control over potential stressors and activities, well-being can be ensured. As a result, with the increase in PE it leads to an increase in wellbeing. Henceforth, the subsequent hypothesis was framed for assessment:

H2: PE influences PWB.

Psychological Empowerment and Work Engagement

PE is a subjective understanding of one's authority and power (Soleimani et al., 2022)ROE, Sales growth, ROA. Hence, PE employees can have positive feelings in terms of happiness, satisfaction, and enthusiasm, which helps them to be fully engaged at work. According to Amor et al. (2021), WE is based on vigor, dedication, and absorption. These factors can be determined by PE. However, without PE some employees are unable to perform which results in low WE. Furthermore, Gong et al. (2020) specifies that if employees are not feeling empowered at work can lead to affecting WE adversely as compared to those with a higher level of PE. In addition, PE directly affects WE (Alotaibi et al., 2020). In this study, PE is viewed as an individual job

resource (Lei et al., 2021) more and more service firms emphasize front-line employees' role of creating excellent customer experience by displaying positive emotions during the service interactions. However, the underlying mechanisms for the relationship between transformational leadership and front-line employees' emotional labor remain unclear. Drawing upon the conservation of resources (COR, which helps in improving productivity and engagement level (DiMaria et al., 2020). Hence, the subsequent hypothesis was framed:

H3: PE influences WE.

Psychological Wellbeing and Employee Performance

EP refers to the employee's effectiveness in performing assigned duties (Malik & Sattar, 2022). Employee perform well when their PWB is protected and they feel contented (Di Fabio, 2017). Being content is characteristic of high PWB (Anwar et al., 2022). This means that employees with higher levels of PWB have a better capacity to understand and use resources to handle challenging situations (Obrenovic et al., 2020). Therefore, the tenets of COR theory connect to the individual PWB as it helps to reduce stress about unpleasant things and avoid those circumstances that can cause burnout and dissatisfaction through conserving the desired resources (K. Iqbal et al., 2022). Likewise, Luna-Arocas and Danvila-del-Valle (2021) found that increased positive feelings can affect wellbeing and thus it will have a direct and significant influence on EP. According to Raja et al. (2020), employees who score high on PWB prioritize efforts, commitment, honesty, and loyalty to perform effectively. In addition, studies found that PWB directly influences EP (Alotaibi et al., 2020; Obrenovic et al., 2020). Consequently, the resulting hypothesis was framed:

H4: PWB influences EP.

Psychological Wellbeing and Work Engagement

Wellbeing is a crucial aspect of employee engagement. According to Ambad et al. (2021), employees can meet organizational demands when the management provides an engaging environment which helps in maintaining PWB. On the other side of the veil, Stansfeld and Candy (2006) also emphasized that pressure to achieve a higher level of performance is a potential stressor that can negatively influence the PWB. Personal resources such as PWB are imperative predictors of WE (Aggarwal et al., 2020; Amor et al., 2021). Wellbeing includes both personality and health promoting aspects that are

necessary for WE. Thus, PWB as a personal resource helps in augmenting WE as a job resource in stressful conditions (Huber et al., 2020). Greenier et al. (2021) found that PWB and emotional regulation can be important predictors of WE. Tesi et al. (2019) specified that engaged employees tend to play a role in improving organizational performance particularly when their PWB is protected. However, with disrupted PWB employees are unable to focus on work completely; as a result, the WE may be disturbed. Koon and Ho (2021) suggested an increase in PWB can lead to enhanced WE as a result. Henceforth, the succeeding hypothesis was framed:

H5: PWB influences WE.

Work Engagement and Employee Performance

As per Puspitasari and Darwin (2021) and Al Badi et al. (2023), WE refers to a state of fulfillment at the psychological level with one's job. Thus, with an upsurge in WE, EP also increases. Accordingly, Bouckennooghe et al. (2022) also confirmed that WE and job performance (JP) links are curvilinear, with the positive effect of WE diminishing after a certain level. Wang and Chen (2020) found that the performance of frontline employees is also improved by WE. The findings also found that line staff WE and JP were affected by customer and coworker incivility, with CI having a stronger effect. Referring to the COR theory (Hobfoll, 2011), when demands and requirements at work match the resources required by an individual to perform, as a result, engagement and performance will be enhanced. However, when the requirement exceeds the resources will tend to affect WE, and then employees fail to perform (Yao et al., 2022). Hence, more engaged employees can have better performance outcomes as compared to non-engaged employees. This implies that WE is linked to EP (Minh Ha & Luan, 2022). The subsequent hypothesis was projected while the research framework is illustrated in Figure 1.

H6: WE influence EP.

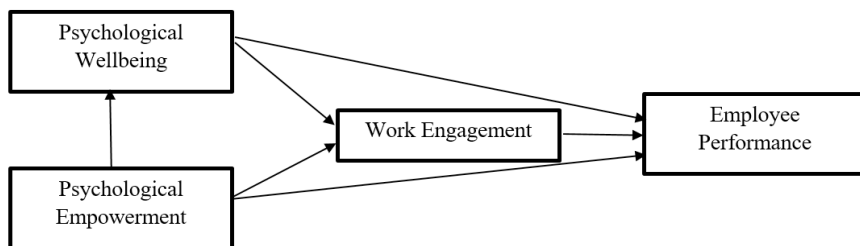


Figure 1: Research Framework

METHODOLOGY

The quantitative (deductive) approach was used. There are around 175,000 doctors registered to serve, according to reports (Thelwell, 2020). The healthcare professionals working in Karachi, Sindh are > 14000 as per the data available on the Health Department website. So, the target population was the healthcare employees working in public sector hospitals in Karachi, Pakistan. The reason for selecting this sector is of concern for practitioners and researchers nowadays (Melnick et al., 2023). Besides, 600 questionnaires were disseminated using online platforms. However, only 388 were received in an appropriate form. A sample size between 30 to 500 is seen as appropriate for analysis (Sekaran, 2003). For the gathering of data, a purposive sampling technique was employed. This sampling technique may be used in both quantitative and qualitative research as per Tongco (2007).

The survey method was used based on the Likert scale. To measure the psychological well-being scales were taken from Rahi (2022) and Bodhi et al. (2022), the psychological empowerment scale was taken from Rahi (2022), the work engagement scale was taken from Teng et al. (2021) and employee performance was assessed through the Mulianga et al. (2022) scale.

Smart PLS was used to assess factor loadings, validity, reliability, and path analysis to get the results (Hair et al., 2011). The reason for using PLS-SEM as it employs a variance-based method that overcomes limitations linked to CB-SEM by providing effective solutions and it is the most commonly used software in the social sciences discipline (Legate et al., 2023)often referred to as SEM, is a well-established, covariance-based multivariate method used in Human Resource Development (HRD).

RESULTS

Table 1 shows the respondents’ profiles of the 388 subjects.

Table 1: Respondents’ profile (n=388)

Variables	Categories	Frequency	Percent
Gender	Male	277	71.4
	Female	111	28.6
Age	20-30	137	35.3
	31-40	66	17.0
	41-50	103	26.5
	>50	82	21.1

Work experience	2-3 years	94	24.2
	4 to 5 years	33	8.5
	6 to 8 years	73	18.8
	More than 10 years	188	48.5
Job position	Permanent	282	72.7
	Contractual	106	27.3

Internal consistency of the constructs is shown in Table 2, all constructs have acceptable values; thus, convergent validity has been attained as the alpha coefficient was greater than 0.70 (Hair et al., 2019), the composite reliability (CR) was greater than 0.80, and the average variance extracted (AVE) was greater than 0.50 for significant convergence between indicators and constructs. Besides, the factor loading of all items was > 0.70 as per the Black et al. (2010) and Joseph et al. (2010) recommendations. However, a few items were removed with low factor loadings that were less than 0.40 as per the recommendation of Arifin and Yusoff (2016) evidence to support its use among medical students is inadequate. This study aims to provide further construct validity evidence for the USMEQ-i among medical students through confirmatory factor analysis (CFA). In addition, the reliability of the research instrument was indicated through Cronbach's alpha (CA) values in Table 2. Based on the analysis of data the alpha value of each variable was greater than 0.80 as per the criteria specified by George and Mallery (2003). Figure 2 shows the measurement model.

Table 2: Outer loadings, Cronbach alpha, and convergent validity

Items	Loadings	CA	CR	AVE
EP_1	0.793	0.905	0.930	0.726
EP_2	0.884			
EP_3	0.788			
EP_4	0.876			
EP_5	0.912			
EP_6	0.421			
EP_7	0.391			
EP_8	0.322			
PWB_1	0.770	0.875	0.915	0.730
PWB_2	0.910			
PWB_3	0.854			

PWB_4	0.877			
PWB_5	0.213			
PWB_6	0.245			
PE_1	0.336	0.816	0.891	0.732
PE_2	0.822			
PE_3	0.843			
PE_4	0.899			
WE_1	0.134	0.929	0.950	0.826
WE_2	0.840			
WE_3	0.956			
WE_4	0.911			
WE_5	0.925			
WE_6	0.253			
WE_7	0.329			
WE_8	0.333			

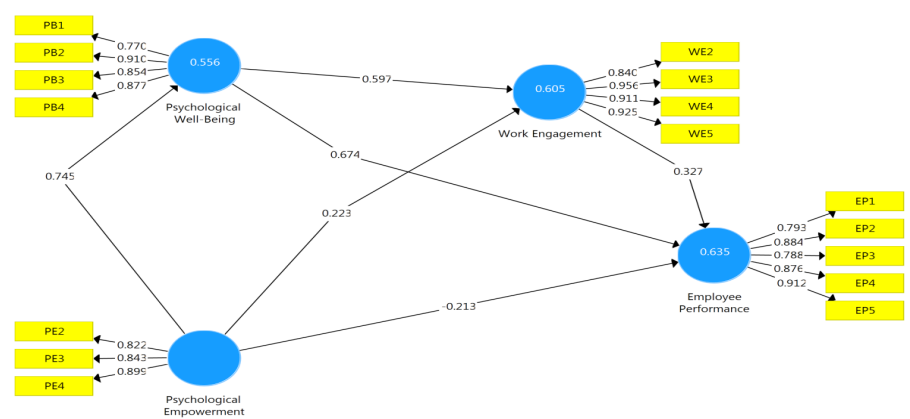


Figure 2: Measurement Model

Discriminant validity

The outcomes of the HTMT ratio for discriminant validity are shown in Table 3. The HTMT ratio for latent constructs should not exceed or must be less than an upper limit of 0.90 for an acceptable degree of divergence from other latent constructs that are theoretically unrelated, according to (Henseler et al., 2015, 2016). The highest HTMT ratio is 0.879 between PE and PWB; as a result, discriminant validity using the HTMT ratio has been attained.

Table 3: Heterotrait-monotrait ratio (HTMT)

	EP	PE	PWB	WE
Employee Performance				
Psychological Empowerment	0.595			
Psychological Well-Being	0.854	0.879		
Work Engagement	0.745	0.764	0.846	

Path analysis

The outcome of path analysis for hypothesis testing is shown in Table 4.

Table 4: Path analysis

Hypotheses Testing	Beta	S. D.	t-Stats	95% CI		Prob.
				LLCI	ULCI	
PE → EP	-0.213	0.036	5.969	-0.160	-0.172	0.000
PE → PWB	0.745	0.022	33.584	0.715	0.771	0.000
PE → WE	0.223	0.077	2.905	0.123	0.319	0.002
PWB → EP	0.674	0.045	14.969	0.615	0.727	0.000
PWB → WE	0.597	0.082	7.321	0.493	0.702	0.000
WE → EP	0.327	0.045	7.257	0.270	0.383	0.000

As per Table 4 results, PE ($\beta = -0.213$) has a negative impact on EP while PE ($\beta = 0.745$) has a noteworthy influence on PWB, and PE ($\beta = 0.223$) has a significant and positive influence on WE. Moreover, PWB ($\beta = 0.674$) has a positive and noteworthy influence on EP while PWB ($\beta = 0.597$) has a significantly positive influence on WE. Finally, WE ($\beta = 0.327$) has a significant influence on EP. The structural model is shown in Figure 3.

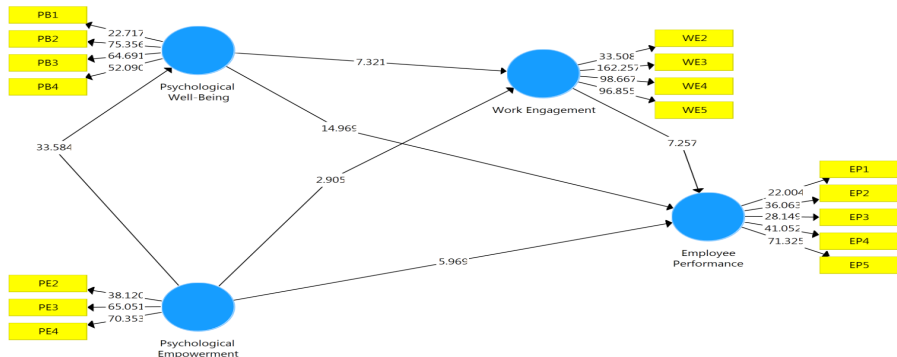


Figure 3: Structural Model

DISCUSSION

Our study has met the following objectives: first, from a theoretical milieu, our study adds to the COR theory in the context of healthcare organizations in developing countries like Pakistan. As per the result, PE has a negative impact on EP. This usually happens when there is uncertainty in terms of task performance in a healthcare organization. Results are in accord with the Llorente-Alonso et al. (2023) cognitive and attitudinal process that helps individuals feel effective, competent and authorized to carry out tasks. Over the last twenty years, research into PE has reported strong evidence reaffirming its role as a motivational factor in organizational psychology. In this study, the aim is to systematically review, analyze and quantify correlational empirical research focusing on empowerment, as understood by the theory developed by Spreitzer et al. (1995a, b) stance that employees feel less empowered when there is ambiguity in performing routine and non-routine tasks which in turn affects their performance adversely. So, the unavailability of resources and less autonomy in the presence of stressors might affect performance negatively. As PE in the healthcare context signifies the level to which professionals have the authority to make choices. The fallouts are not in line with the studies of Iqbal et al. (2020); Saleem and Ashiq (2020); and Shah et al. (2019).

Contrary to this, PE has a significant impact on PWB. This means the more empowered the healthcare employees, the better the PWB they have. Moreover, the results are in line with the studies of Abbasi et al. (2021) and Maan et al. (2020). This means involvement in the decision-making process can give a sense of positive feeling; the greater the feeling of empowerment the better the PWB. Thus, grounded on the COR theory results are in accord with the study of Iqbal et al. (2022). On the other hand, PE also has a significant impact on WE. PE seems to be a significant resource for healthcare employees which helps in triggering WE. The results are in support of prior arguments presented by researchers like Aggarwal et al. (2020); Amor et al. (2021) and Ahmad and Gao (2018).

Besides, PWB has a positive influence on EP. This means that the better PWB of healthcare employees results in better EP. Therefore, the evidence supports the COR theory that PWB helps in the conservation of resources (Iqbal et al., 2022) by taking less stress and avoiding circumstances that can cause burnout. Results are in line with the elaboration of Raja et al. (2020)

and Alotaibi et al. (2020). Moreover, PWB has a positive impact on WE. Therefore, healthcare employees with good PWB are more engaged with their work. These results are supported by Tesi et al. (2019). Moreover, the COR in stressful environments can help to create an environment for sustaining both PWB and EP (Halbesleben et al., 2014), which allows the employees to be more robust and engaged in managing the organizational operations.

Lastly, WE influence EP. Therefore, when WE rise as a result of EP increases. Henceforth, the positive and satisfied cognitive state of employees is linked to having a high WE leads to better EP in healthcare organizations. Results are in line with the studies of Grobelna (2019); Puspitasari and Darwin (2021) and Al Badi et al. (2023). Moreover, WE is linked to EP (Minh Ha and Luan, 2022; Yao et al., 2022). Thus, the results are in support of our study.

CONCLUSION

It is concluded that EP is greatly influenced by personal and job resources. COR theory execution in our study enriches the existing literature regarding the mechanism behind work-related outcomes through the lens of job resources which are WE and PE, whereas personal resources that are PWB play a role in anticipating EP. Our study mainly contributes to empirically indicating that job resources and personal resources affect EP in healthcare organizations. As per the study results, the dynamics of the workplace are changing; managers in healthcare organizations need to encourage and motivate healthcare professionals via the execution of practices by involving them in strategic decision-making processes. As a result, they feel empowered, mentally satisfied, and engaged. Managers must provide mentoring and counseling sessions to resolve the issues and empower employees to engage in different activities. Accordingly, the counseling session will help them to completely focus on work or be thoroughly engaged in work, which will be reflected in their performance as well.

Limitations and Directions for Future Research

The scope of our study is limited to healthcare employees only. In addition, future researchers may examine this model in other sectors to further broaden the horizon. Moreover, in our study PWB, PE, and WE were used as resources. Researchers may examine incorporating other job or personal resources like emotional intelligence (Alotaibi et al., 2020) work arrangement, and technological use (Juyumaya & Torres, 2020) into the study framework.

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STRATEGIC HR COMMUNICATION AND INTERNAL MARKETING: UNLOCKING EMPLOYEE BUY-IN THROUGH PERCEIVED VALUE AND TRUST

Dr. Sofia Bano

*Assistant Professor, Karachi Institute of Economics and Technology, KIET
sofia.bano@kiet.edu.pk*

Dr. Syeda Quratulain Kazmi

*Associate professor, Karachi Institute of Economics and Technology, KIET
quratulain.kazmi@kiet.edu.pk*

ABSTRACT

This study explores how internal marketing strategies and leadership communication influence employees' perceived value of HR initiatives and their subsequent buy-in, with employee trust in management examined as a key moderating factor. Grounded in Social Exchange Theory, Leader-Member Exchange Theory, and Perceived Organizational Support Theory, the research develops and empirically tests a conceptual model using Partial Least Squares Structural Equation Modeling (PLS-SEM) on data collected from employees in mid- to large-sized organizations. The findings reveal that employee trust significantly enhances employee buy-in and moderates the impact of leadership communication. Perceived value partially mediates the relationship between strategic communication efforts and buy-in. Contrary to expectations, internal marketing strategies showed a negative effect on perceived value, suggesting a misalignment between messaging and employee expectations. The study underscores the critical importance of authentic communication, trust-building, and personalized internal marketing in enhancing employee engagement with HR initiatives. Practical implications and recommendations for improving strategic HR communication are discussed.

Keywords: *Employee Buy-In, Internal Marketing, Leadership Communication, Perceived Value, Trust in Management, HR Strategy, PLS-SEM*

INTRODUCTION

The Human Resource (HR) initiatives are important in developing organizational culture, engaging workers in the company, and achieving strategic change. Nevertheless, the effectiveness of these initiatives mainly comprises the degree to which the employees believe these initiatives are worthwhile and devote themselves to their adoption, which is widely defined as employee buy-in (Choi, 2020). It is also true that most organizations are unable to promote a true commitment among their workforces despite their good efforts to implement the HR programs due to poor internal marketing and poor communication strategy by management (Kelley & Alderman, 2023). With organizational complexity increasing and the demands of workforce changing rapidly, it is more important than ever to know what drives employee buy-in.

Based on Social Exchange Theory (Blau, 1964) and Leader-Member Exchange (LMX) Theory (Graen & Uhl-Bien, 1995), this study examines the extent to which marketing approach and leadership communication affect the perception of HR initiatives and employee buy-in as a result. Additionally, it studies moderating effect of employee trust in management- a type of psychological factor that can enhance or weaken the pathway between the perceived value and behavioral commitment (Dirks & Ferrin, 2002).

Problem Statement

Despite the level of investment in Human Resource (HR) programs, organizations around the world work to promote employee participation, organizational transition, and cultural adaptation, many organizations face serious challenges when it comes to meaningful employee buy-in (Choi, 2020).

The major question is that employees do not find the value in such initiatives, which can often be achieved because of poor internal marketing strategies and communication issues on the part of the leadership (Kelley & Alderman, 2023). According to the research, HR programs provide even with the best design, may not work because the employees have no interest in them, do not trust them, or do not think that they align with their personal and professional objectives (Lim & Haider, 2023). Moreover, the fact that people do not trust the administrators may further undermine the results of the HR activities, as the correlation between the perceived value and the actual commitment is undermined (Dirks & Ferrin, 2002; Kamran et al., 2023).

In light of the complexity of the current modern working environment, such as digital transformation and the new hybrid working environments, knowledge of how to strategically and positively impact employee attitudes and trust becomes more important than ever. The current study aims to fill those gaps by targeting the role of internal marketing strategies and the role of communication sent by leadership to influence the perceived value of HR initiatives, as well as how trust in the management mitigates the effect of the pathway of employee buy-in.

Research Gaps

Many previous studies exist on the importance of leadership communication and internal marketing and their influence on employee perceptions (Men & Bowen, 2017; Kelley & Alderman, 2023), but few studies have integrated this into the same framework and explained how it leads to employee buy-in of HR efforts. Existing literature tends to address the topics of HR marketing and leadership communication separately, not paying attention to the way the two factors influence the perceived value, which is an essential prerequisite to behavioral commitment (Choi, 2020; Lim & Haider, 2023). Also, although the value of trust in management is known (Dirks & Ferrin, 2002; Kamran et al., 2023), there are scarce empirical studies that explore trust in its moderating role when examining the relationship between perceived value and buy-in in the context of strategic HR initiatives. This research fills these research gaps by presenting and empirically validating an integrative model that incorporates mediation (perceived value) and moderation (trust in management) in order to explain the concept of employee buy-in in more detail.

Research Objectives

- **RO1:** To examine the impact of marketing strategies on the perceived value of HR initiatives.
- **RO2:** To analyze how leadership communication influences the perceived value of HR initiatives.
- **RO3:** To assess the relationship between perceived value of HR initiatives and employee buy-in.
- **RO4:** To investigate the moderating role of employee trust in management on the relationship between perceived value and employee buy-in.
- **RO5:** To propose an integrative model that links marketing, communication, perceived value, trust, and buy-in.

Research Questions

- **RQ1:** To what extent do marketing strategies influence employees' perceived value of HR initiatives?
- **RQ2:** How does leadership communication impact the perceived value of HR initiatives among employees?
- **RQ3:** What is the relationship between the perceived value of HR initiatives and employee buy-in?
- **RQ4:** Does employee trust in management moderate the relationship between perceived value and employee buy-in?
- **RQ5:** How does an integrative model comprising marketing strategies, leadership communication, perceived value, trust in management, and employee buy-in explain employee engagement with HR initiatives?

Significance of the Study

This study makes significant contributions to both theory and practice in several ways. Theoretically, it extends Social Exchange Theory (Blau, 1964) and Leader-Member Exchange Theory (Graen & Uhl-Bien, 1995) by integrating internal marketing and leadership communication as key organizational inputs that shape employee perceptions and behaviors. Practically, it offers actionable insights for HR professionals and organizational leaders by identifying strategies that enhance the perceived value of HR initiatives, ultimately increasing employee engagement and commitment. By demonstrating how trust in management moderates this process, the research provides a nuanced understanding of the psychological conditions necessary for successful HR implementation, particularly in rapidly evolving organizational environments.

Limitations

This study also has limitations, although it has offered contributions. First, a cross-sectional design restricts the possibility of drawing causal inferences concerning the correlations between variables. More powerful evidence would be enjoyed in terms of his longitudinal data, which gives a serious indication of changes in perceptions and behavior. Second, common method bias due to using self-reported survey data may be created, although there are attempts to include validated scales and the assurance of anonymity. Third, the study sample is narrowed to the employees working in medium or large-sized organizations, thus reducing the level of generalizability of the study between the smaller organizations or even particular industry.

Finally, there is a failure to explicitly consider the role played by cultural or regional considerations, which could have some effect on the functioning of trust, communications, and perceived value across individual organizational contexts.

LITERATURE REVIEW

1. Theoretical Foundations: Social Exchange, LMX, POS, and Transformational Leadership

The literature on organizational behavior and human resource management (HRM) is deeply enriched by foundational theories that explain how employees perceive, interpret, and react to HR strategies. Chief among these is **Social Exchange Theory (SET)**, which provides a comprehensive framework for understanding workplace relationships. According to Blau (1964), the norm of reciprocity runs social interactions, including those that occur in the organizational environment. Once they recognize organizational activity (including HR actions) as supportive and beneficial, the employees develop a sense of obligation to give it back by engaging in positive behaviors, including engagement, cooperation, and loyalty. Cropanzano and Mitchell (2005) ran this argument further by pointing out that it is through SET that helps in explaining why employees exhibit discretionary behaviors whenever they feel appreciated and recognized.

Set beside SET is the Leader-Member Exchange (LMX) Theory that focuses on the one-on-one relationships between members of top and bottom management. The high-quality relations as described by Graen and Uhl-Bien (1995) rely on trust, respect, and obligation. Such relationships are vital in the implementation of HRs since one tends to feel a psychological safety and belonging, which goes a long way in making that worker trust organizational initiatives and acquire them. When employees have high-LMX relationships, they are more likely to view efforts of the organization as applicable and valid in that they are done through trusted supervisor messages and supported by these supervisors.

Similarly, **Perceived Organizational Support (POS)** theory, introduced by Eisenberger et al. (1986), focuses on how employees assess the extent to which the organization values their contributions and cares about their well-being. POS influences employee attitudes and behaviors by strengthening their emotional attachment to the organization. When HR initiatives are

framed and communicated as genuine investments in employees' careers and quality of work life, employees are more likely to view them as credible and worthwhile (Rhoades & Eisenberger, 2002). This perception can significantly enhance their buy-in and proactive participation.

Moreover, **Transformational Leadership Theory** adds an important motivational and inspirational dimension to this discussion. Bass (1985) argues that transformational leaders influence followers by articulating a compelling vision, demonstrating commitment, and attending to individual needs. In the HR context, transformational leaders act as internal champions of change, helping employees make sense of new policies, models, or systems through inspiration and alignment with shared values (Tourish, 2014). These leaders not only communicate HR initiatives but also frame them in a way that connects with employees' intrinsic motivations, thereby enhancing their emotional commitment and psychological ownership.

Together, these four theories form a cohesive framework to understand the mechanisms through which HR strategies are received and internalized by employees. They collectively explain how perceptions of fairness, support, communication quality, and leadership style influence employee trust and engagement—key drivers of HR initiative success.

2. Internal Marketing Strategies for HR Initiatives

Internal marketing applies traditional marketing principles—segmentation, targeting, positioning, and branding—to the internal environment of an organization. The goal is to ensure that employees, as internal customers, understand, appreciate, and support organizational initiatives (Ahmed & Rafiq, 2003). This approach is particularly critical for HR initiatives, which often suffer from low engagement or resistance due to poor communication, lack of personalization, or misalignment with employee expectations.

The digital era has dramatically changed the aspect of internal marketing. McLean & Company (2025) has pointed out that aligning internal branding and communication has become a priority area so far an organization is undertaking HR transformation. Visual storytelling, video messaging, interactive websites, and personalized content have ousted generic e-mails or police memos. According to Heartcount (2025), it was found that companies that embraced the use of AI-based listening technology and employee

sentiment analysis tools had higher rates of customization of their messages about different segments of their workforce, which saw higher levels of uptake and satisfaction of the initiatives.

According to research conducted by Kelley and Alderman (2023), they discovered that HR campaign activities were more effective when they were branded and held in line with core values of the organization, which gave a boost of participation in such a campaign of more than 35%. Such enhancement could not be explained solely by the beauty of marketing materials since employees felt that such efforts were authentic, deliberate, and positive. The authors discovered that internal marketing produced the sense of continuity and meaning, and the initiatives looked more reliable and actual in this way.

On the same note, Men and Yue (2019) have detailed the influence of emotionally involving communication inside. Their analysis showed that organizational climate was positioned in a more positive direction due to the use of storytelling, employee testimonies, and visual campaigns. When employees believed that the organization had the time and interest to make the undertaking relatable and comprehensible, then it was easier to accept the change and welcome it.

According to the Staffbase (2025) study, multi-channel internal campaigns, and in particular the combination of digital tools, social media, and in-person engagements, lead to a clearer definition of the initiatives and a higher rate of participation. These results support the notion that internal marketing has to extend beyond the process of dissemination; it has to establish focus and significance, particularly in hybrid and multicultural workspaces.

3. Leadership Communication and Strategic HR Messaging

Leadership communication plays a central role in translating strategic HR intent into operational understanding. It is not just about transmitting information but also about shaping perception, building trust, and encouraging behavioral change. Effective communication encompasses clarity, consistency, emotional resonance, frequency, and timing (Men & Bowen, 2017).

Eva et al. (2024) found that transparent communication from leadership significantly boosts employee morale, especially during organizational change. Their findings suggest that employees interpret HR policies not

only based on content but also on who delivers the message and how it is delivered. For example, when leaders openly explain the rationale behind changes, acknowledge employee concerns, and actively listen, they foster an environment of mutual respect and collaboration.

Ramadhan (2024) further categorized leadership communication styles and found that empathetic and participative communication were most positively associated with employee trust and commitment. This is especially important in the implementation of new HR systems or policies, where initial skepticism can derail engagement. Communication must be two-way; employees want to feel that their feedback matters and that their experiences are acknowledged.

Men and Stacks (2014), in a meta-analysis of leadership communication studies, confirmed its role as a strong antecedent of employee trust and engagement. The study emphasized that communication is not a one-time event but an ongoing process that requires planning and reflection. Khera et al. (2024) observed this during HR digital transitions, noting that leader visibility—through town halls, team meetings, or internal social platforms—was crucial to maintaining momentum and trust.

However, not all leadership communication is positive. Tourish (2014) warns of the “dark side” of transformational leadership, where excessive optimism or charisma can lead to over-promising and under-delivering. This misalignment creates disillusionment, which erodes trust. Therefore, authenticity and ethical communication must be foundational, especially when rolling out initiatives that demand employee commitment and behavioral change.

4. Perceived Value of HR Initiatives

The concept of **perceived value** is multidimensional, encompassing an employee’s judgment about the usefulness, relevance, fairness, and credibility of a particular HR program. It reflects not only rational assessment (e.g., “Is this benefit my career?”) but also emotional and relational considerations (Lim & Haider, 2023).

According to Lim and Haider (2023), HR initiatives are more likely to gain traction when employees perceive them as aligned with their personal and professional goals. Their study on flexible work arrangements found that uptake increased significantly when policies were communicated in a way that emphasized employee well-being and choice. Even in organizations

with low baseline trust, initiatives that were seen as meaningful led to higher engagement.

Eisenberger et al. (1986) previously noted that perceived value is closely tied to perceived organizational support. Employees interpret well-structured and inclusive HR programs as signs that the organization cares, thereby reinforcing commitment and citizenship behaviors.

Fairness and transparency also shape perceived value. Diebig et al. (2022) emphasized that when HR practices are seen as equitable, consistently applied, and open to feedback, employees are more willing to participate. This perceived fairness is especially critical in areas such as performance management, diversity programs, or reskilling initiatives, where subjective interpretations can influence employee response.

5. Trust among Employees the Management

Trust in management is a mental concept on the basis of which employees interpret the outputs of the management activity. It comprises images of effectiveness, honesty, justice, and goodis (Mayer et al., 1995). Trust enables openness, risk-taking, and cooperation, which is a key aspect in dealing with organizational change.

Dirks and Ferrin (2002) discovered that trust plays the role of a precursor as well as a moderator of organizational behavior. It enhances the association between leadership message and the attitude of employees and has the capability of walling up against organizational cynicism. Take the case of HR initiatives, which might be very good, but they can fail when it comes to employee trust in the person providing them.

Kamran et al. (2023) claimed that trust is a determinative element when it comes to strategic HRM implementation. In their research, they found that employees whom there was a high trust in the top leadership had a better tendency to see HR as empowering and not controlling measures. The impact of the internal marketing activities was also enhanced by trust, implying that there is a positive relationship between credibility and the reception/engagement of messages.

Whitener et al. (1998) also added that trust is achieved by constant messages, equitable procedures, and a manifestation of caring about the welfare of the employees. This is practically possible by engaging the

employees in the planning stage of HR initiatives and asking their opinion, and adding transparency of the problems and constraints.

6. Employee Buy-In the Goal

Employee buy-in is one further level of psychological involvement, where employees not only conform to the requests of HR but also promote and actively endorse HR requests. It also contains the aspects of ownership, loyalty, and discretionary effort (Choi, 2020).

Choi (2020) underlined that before buy-in can take place, the employees have to believe that the values of the organization and their values align. This accord depends on how HR initiatives are packaged, whether one can trust the messengers (leaders), and whether one considers the effort genuine or not.

According to Diebig et al. (2022), the prerequisites of transparency and fairness in the HR programs are paramount to promoting buy-in because the employees are expected to be more willing to invest in it when they are aware of the rationale used during program development, voice their concerns, and have confidence in the aims. The findings of Khera et al. (2024) confirmed the aforementioned work and revealed that in the case of HR digitization undertakings, strong leadership communication and perceived value resulted in a considerably elevated level of initiative-supportive behaviors. Buy-in is contagious, as well. Confidence in the HR initiatives when placed on early adopters induces a culture of embracing and joint commitment. Nonetheless, such a contagion effect can be effective only under the circumstances that employees can witness obvious positive outcomes and defined support of the leaders.

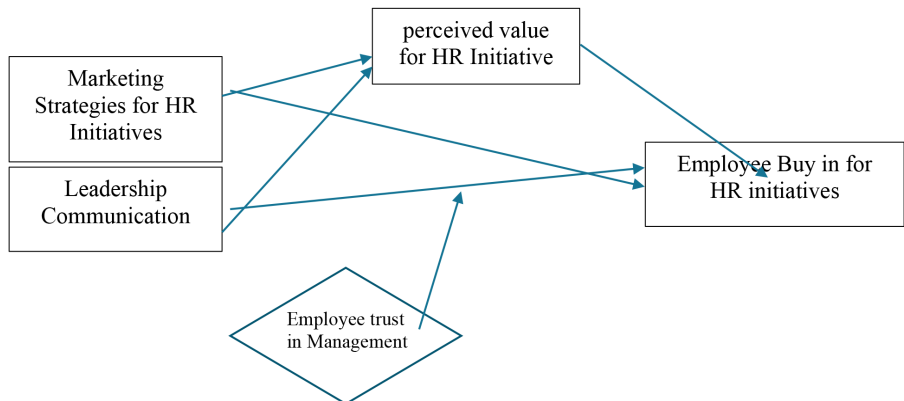


Figure 1. Conceptual Framework

Figure 1. Conceptual Framework: The relationship between marketing strategies, leadership communication, perceived value, trust, and employee buy-in.

Table 1. Summary of Hypotheses

Hypothesis	Description
H1	Marketing strategies for HR initiatives positively impact on Employee Buy-In for HR Initiatives.
H2	Marketing strategies for HR initiatives have a positive effect on the Employee Buy-in for HR initiatives, mediated by the perceived value of HR initiatives.
H3	Leadership communication positively influences the Employee Buy-in for HR initiatives
H4	Leadership communication positively influences the Employee Buy-in for HR initiatives, mediated by the perceived value for HR initiatives.
H5	Trust in management moderates the relationship between Leadership communication and employee buy-in initiatives.

METHODOLOGY

Research Design

This study adopts a quantitative research approach grounded in the philosophy of positivism and uses a cross-sectional survey methodology. The research aims to statistically test the conceptual framework derived from prior theory and literature.

Sample and Population

The target population comprises employees from mid-sized to large organisations across various sectors, including technology, healthcare, finance, and education. A stratified random sampling technique is being employed to ensure representativeness across job levels and departments. The minimum sample size is estimated at 300 respondents to achieve generalizability.

Data Collection

Data is being collected via an online questionnaire distributed through email and organizational HR networks. The survey includes validated scales from existing literature to measure all constructs:

Constructs

Marketing strategies	Kelley & Alderman, 2023
Leadership Communication	Men & Stacks, 2014
Perceived Value	Eisenberger et al., 1986
Employee Trust in Management	Dirks & Ferrin, 2002
Employee Buy-In	Choi, 2020

Measurement Scale

All variables are measured using 5-point Likert scales (1 = Strongly Disagree, 5 = Strongly Agree). Scale reliability is to be tested using Cronbach's alpha, and factor analysis is to be used to assess construct validity.

Data Analysis

We analyzed the data using Partial Least Squares Structural Equation Modeling (PLS-SEM) in Smart PLS. This helped us test both direct and moderated relationships in our model. We examined model fit, path coefficients, and interaction effects. Moderation was tested through interaction terms and multi-group analysis.

Ethical Considerations

Participation is voluntary, with informed consent obtained prior to the survey. Anonymity and confidentiality are maintained, and data is stored securely in accordance with institutional guidelines.

RESULTS

Table 1: Descriptive Analysis

	Original sample (O)	Sample mean (M)	Standard deviation (STDEV)	Cronbach's alpha	Composite reliability (rho_a)	Composite reliability (rho_c)	Average variance extracted (AVE)
Employee trust	0.53	0.537	0.068	0.75	0.87	0.846	0.531
Employee Buy In	-0.126	-0.123	0.044	0.88	0.885	0.905	0.543
Leadership communication	0.046	0.051	0.057	0.864	0.878	0.892	0.511
Marketing strategies	-0.101	-0.101	0.064	0.75	0.841	0.884	0.4651
PV	-0.491	-0.503	0.086	0.726	0.875	0.83	0.503

1. Measurement Model Findings:

All constructs showed acceptable reliability, with Cronbach's alpha and composite reliability (rho_C) values exceeding the threshold of 0.70. Convergent validity is established for most constructs with AVE values above 0.50, except for Marketing Strategies (AVE = 0.465), indicating slightly weak validity that may require further refinement.

2. Structural Model Findings:

Employee Trust → Employee Buy-In: A strong and positive relationship ($\beta = 0.530$), suggesting that trust in management significantly enhances employee buy-in. Perceived Value → Employee Buy-In: A strong negative relationship

($\beta = -0.491$), indicating that higher perceived value of HR initiatives unexpectedly correlates with lower employee buy-in. This result suggests a possible disconnect or underlying issue in how value is perceived and acted upon. Marketing Strategies $\rightarrow$ Perceived Value: A weak negative effect ($\beta = -0.101$), showing that current marketing strategies may not be effectively enhancing the perceived value of HR initiatives. Leadership Communication $\rightarrow$ Perceived Value: A very weak positive effect ($\beta = 0.046$), indicating minimal influence of leadership communication on perceived value.

Table 2: Outer Loadings

	Employee trust	Employee Buy-In	Leadership communication	Marketing strategies	PV	Employee trust x Leadership communication
EMPBUY1		0.685				
EMPBUY2		0.767				
EMPBUY3		0.631				
EMPBUY4		0.776				
EMPBUY5		0.73				
EMPBUY6		0.756				
EMPBUY7		0.757				
EMPBUY8		0.783				
ET1	0.555					
ET2	0.715					
ET3	0.609					
ET4	0.761					
ET5	0.876					
ET6	0.853					
ET7	0.793					
LDSC2			0.787			
LDSC3			0.706			
LDSC4			0.712			
LDSC5			0.689			
LDSC6			0.662			
LDSC7			0.608			
LDSC8			0.79			
LSDC 1			0.77			
MKS St 1				0.727		
MKS2				0.642		
MKS3				0.705		
MKS4				0.777		
MKS5				0.809		
MKS6				0.638		
MKS7				0.569		
MKS8				0.546		

PV					0.596	
PV2					0.745	
PV3					0.852	
PV4					0.812	
PV5					-0.652	
PV6					0.794	
PV7					0.763	
PV8					0.709	
Employee trust x Leadership communication						1

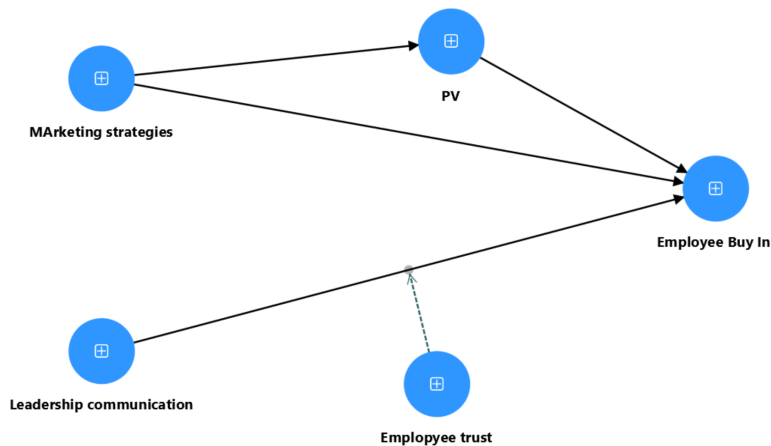


Figure 2: Structural Model

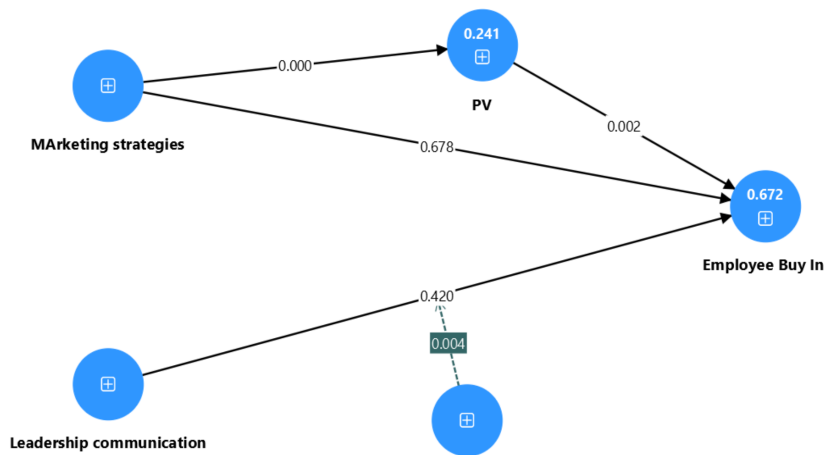


Table 3: Discriminant validity

Table 3: Discriminant validity

Fornell Larcker

	Employee trust	Employee Buy-In	Leadership communication	Marketing strategies	PV
Employee trust	0.789				
Employee Buy-In	0.787	0.737			
Leadership communication	0.446	0.423	0.715		
Marketing strategies	0.403	0.36	0.485	0.671	
PV	0.728	0.701	0.481	0.491	0.71

Discriminant validity is assessed using the Fornell-Larcker criterion. Most constructs met the required condition, where the square root of AVE exceeded their inter-construct correlations. However, two exceptions were noted: The correlation between **Employee Trust and Employee Buy-In** (0.787) is higher than the AVE square root of Employee Buy-In (0.737). Similarly, **Employee Trust and Perceived Value** showed a correlation (0.728) slightly above the AVE square root of Perceived Value (0.710). These results suggest overall discriminant validity remains acceptable.

Table 4: HTMT

	Employee trust	Employee Buy-In
Employee trust		
Employee Buy-In	0.892	
Leadership communication	0.504	0.47
Marketing strategies	0.451	0.386
PV	0.866	0.792
Employee trust x Leadership communication	0.452	0.493

Discriminant validity is further assessed using the Heterotrait-Monotrait Ratio (HTMT). **Most** HTMT values were below the recommended threshold of 0.90, supporting acceptable discriminant validity across the model. The value between Employee Trust and Employee Buy-In (HTMT = 0.892) is close to the threshold, indicating some conceptual similarity but still within acceptable limits. All other construct pairs demonstrated strong discriminant validity, with HTMT values well below the cutoff.

Table 5: R²

	R-square	R-square adjusted
Employee Buy-In	0.672	0.661
PV	0.241	0.236
PV	0.241	0.236

The coefficient of determination (R^2) is used to assess the model's explanatory power. The results show that the model explains 67.2% of the variance in Employee Buy-In, **indicating** a substantial level of predictive power (Hair et al., 2021). Conversely, the model explains 24.1% of the variance in Perceived Value, suggesting a weak to moderate level of explanatory strength. These findings imply that while the model effectively predicts employee buy-in, additional variables may be needed to better explain perceived value.

Table 6: Model Fit

	Saturated model	Estimated model
SRMR	0.113	0.147
d_ ULS	10.006	16.902
d_ G	2.86	3.155
Chi-square	2013.769	2076.902
NFI	0.541	0.527

Model fit is assessed using standard indices for PLS-SEM. The Standardised Root Mean Square Residual (SRMR) values were 0.113 (saturated model) and 0.147 (estimated model), both exceeding the acceptable threshold of 0.08 (Hu & Bentler, 1999), indicating a poor model fit. Similarly, the Normed Fit Index (NFI) values of 0.541 and 0.527 were substantially below the recommended cutoff of 0.90, further confirming a lack of model fit.

Table 7: Hypotheses Testing

	Original sample (O)	Sample mean (M)	Standard deviation (STDEV)	T statistics ((O/STDEV))	P values
Employee trust -> Employee Buy In	0.53	0.537	0.068	7.805	0
Employee trust x Leadership communication -> Employee Buy In	-0.126	-0.123	0.044	2.85	0.004
Leadership communication -> Employee Buy In	0.046	0.051	0.057	0.807	0.42
Marketing strategies -> Employee Buy In	0.024	0.025	0.059	0.415	0.678
Marketing strategies -> PV	-0.491	-0.503	0.086	5.715	0
PV -> Employee Buy In	0.255	0.251	0.082	3.106	0.002

The structural model is evaluated using bootstrapping to assess the significance of the hypothesised relationships. Table X presents the path coefficients, t-values, and p-values.

The results indicate that Employee Trust has a strong and significant

positive effect on Employee Buy-In ($\beta = 0.530$, $p < 0.001$), supporting its central role in enhancing employee engagement. Additionally, the interaction between Employee Trust and Leadership Communication is also significant ($\beta = -0.126$, $p = 0.004$), indicating a moderating effect — however, the negative sign suggests that high leadership communication may reduce the effect of trust under certain conditions, which warrants further exploration. Leadership Communication and Marketing Strategies did not have significant direct effects on Employee Buy-In ($p = 0.420$ and 0.678 , respectively), suggesting their influence may be indirect or mediated by other constructs. On the other hand, Marketing Strategies showed a significant negative effect on Perceived Value ($\beta = -0.491$, $p < 0.001$), an unexpected finding indicating that current strategies may be poorly aligned with employee expectations. Finally, Perceived Value positively and significantly influences Employee Buy-In ($\beta = 0.255$, $p = 0.002$), confirming its role as a partial mediator.

CONCLUSION /DISCUSSION

Employee Buy-In = Employee Trust

Recent findings substantiate the positive and significant correlations between employee trust and buy-in. As an example, Al Khajeh et al. (2021) pointed out that employee trust is one of the significant factors increasing emotional commitment and organizational identification, as they are the precursors to employee buy-in. Likewise, the study examined by Tan and Rasdi (2022) supported the idea that trusting environments are related to the alignment of employees with the organizational vision and a better acceptance of change. This strengthens the notion that trust is one of the mechanisms that enable internalization of organizational goals by employees.

Leadership Communication x Employee Trust = Employee Buy-In

The negative and significant moderating role that leader communication played on the relationship between trust and buy-in relationship compared to some of the previous studies that indicated the existence of synergistic relationships. In particular, the authors of a study conducted by Ramadhani and Prasetyo (2023) argue that leadership communication reinforced the positive relationship between trust and employee commitment and job satisfaction by enhancing confidence in leadership because of transparent communication.

Nevertheless, another point of view is presented by Zhang et al. (2021),

who warn that both overly structured and excessive communication can, in some cases, erode the concept of organic trust by sounding manipulative or fake, especially in the context of a culture where the value of autonomy is appreciated. So, a negative moderation in our study may be a situation-specific or culture-specific.

Leadership Communication leads to Employee Buy-In

The insignificance of the relationship between leadership communication and buy-in is in a way, unexpected since communication is commonly regarded as one of the driving forces behind employee engagement. It is not that we have no precedents, however, to this finding. Similar findings were published by Khalid and Alias (2020) in the situations when communication was perceived by the employees as being top-down and out of touch with the job. Moreover, according to Mubeen et al. (2021), without being interactive and personalized, communication does not correlate with a greater commitment and alignment.

All these results indicate that the quality and believability of communication are critical issues, and not just its presence or the rate of occurrences.

Marketing Strategies Employee Buy-In

The failure to notice a meaningful connection between the marketing strategies and the employee buy-in fits the conclusion of Ali et al. (2020), who discovered that outside marketing campaigns produce little internal effect unless an external campaign is combined with internal branding. Workers tend to be less receptive to efforts that have no personal and/or cultural meaning and are related to widely applicable corporate marketing stories.

Conversely, Nasrullah and Awan (2023) discovered that an approach to internal marketing that incorporates employee recognition and internal communication has a strong impact on employee alignment and employee buy-in. The variations of outcomes point towards the fact that the nature and framing of the marketing strategies affect their outcome.

Marketing Strategies Perceived Value (PV)

The product marketing and perceived value have a negative relationship; otherwise, there is a traditional assumption of marketing having a positive perception. According to Shahbaz et al. (2024), however, the sole-purpose or forceful marketing strategy may diminish credibility and trust to achieve

reduced perceived value, particularly among internal stakeholders who observe the gap in the operation.

Likewise, Rahman and Iqbal (2022) state that misalignment between marketing messages and real workplace practices may lead to decreased levels of perceived value because employees might view the brand as false.

Perceived Value = Buy-In by employees

Lastly, strong correlation between Perceived Value and Employee Buy-In is comparable to the results of Hanif et al. (2023), whose research showed that more employees tend to buy into initiatives that the employees see as making positive contributions to both customer and organization. Also, the importance of perceived value was demonstrated because Wang and Lee (2021) revealed that it mediates the connection between internal branding and organizational citizenship behavior.

FUTURE RESEARCH AGENDA

Longitudinal designs should be put into consideration in future research to evaluate how trust, perceived value, and buy-in changes in future. That may be due to industry-specific patterns, which may become evident once studies involving the specific industry is conducted, especially in areas where there is a considerable dissimilarity in employee trust and a style of communication (e.g., public vs. privately held). Also, in future, the importance of cultural aspects related to how leadership and HR messages are perceived should be investigated, particularly in multinational enterprises.

Additional grinding of the reasons of the negative association between marketing strategies and the perceived value could be given by qualitative study, i.e., interviews or focus groups. Another opportunity via which researchers could improve model explanatory power was to use other, rather than perceived organizational justice, mediators (e.g., psychological safety) or moderators (e.g. organizational culture, generational differences).

Finally, potential future studies ought to consider the effects of an up-and-coming technology, such as AI-based HR software, on the efficiency of communication, trust relationships, and the willingness of employees to take initiatives in a workplace that has undergone a digital transformation.

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