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Kashmir Economic Review
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KASHMIR ECONOMIC REVIEW

Volume 31, Issue 1 **June 2022**

ISSN (Print): 1011-081X **ISSN (Online): 2706-9516**

Articles

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www.ker.org.pk

Kashmir Economic Review
ISSN(P): 1011-081X, ISSN(E): 2706-9516
http://www.ker.org.pk

Kashmir Economic Review (KER) is published biannually by Kashmir Institute of Economics in the spring and autumn since 1984. The Editorial Board is responsible for the final selection of the content of the journal and reserves the right to reject any material deemed inappropriate for publication. Articles presented in the journal do not represent the views of the University of Azad Jammu & Kashmir. Responsibility for the opinions expressed and the accuracy of facts published in articles and reviews rests solely with the author(s).

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Kashmir Economic Review
ISSN(P): 1011-081X, ISSN(E): 2706-9516
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ISSN(P): 1011-081X, ISSN(E): 2706-9516
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http://www.ker.org.pk

Trade Liberalization Policy Effect on Inequality and Poverty: A Developing Economy Case in Point

ABSTRACT

This study has employed Social Accounting Matrix (SAM) 2010-11 for the economy of Pakistan designed by Dorosh et al. (2015) to analyze the effects of trade liberalization on income inequality and poverty. Two experiments have been conducted to investigate the effects using the Computable General Equilibrium (CGE) Model. By applying a restricted trade policy (50% tariff) and free trade policy (0% tariff), the results have been concluded, which depicts that overall, the trade liberalization policy has positive effects on the economy of Pakistan. Exports, Household income, Consumption, and GDP have increasing trends. The simulations have a minor effect on income inequality. Poverty reduction has also been noticed. Consumption of a few commodities has declining trends. Fluctuations in savings, decrease in investment, and increase in imports are the defects of the trade liberalization policy. In the case of developing countries like Pakistan, this policy strongly affects the achieving reduction in income inequality as well as reducing poverty along with desired capital formation and remittances from abroad for economic growth in the long run.

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Keywords
Social Accounting Matrix (SAM), Computable General Equilibrium (CGE) Model, Trade Liberalization, Tariff

JEL Classification
C68, D63, E16, E21

Please cite this article as:
Moeen ud Din, G., Naqvi, H. A., Khan, M. A., Abbas, K. (2022). Trade liberalization policy effect on inequality and poverty: A developing economy case in point. *Kashmir Economic Review*, 31(1), 1-13.

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Author's contribution to the article: 1- Conceived and designed the analysis, 2- Reviewed and compiled the literature, 3- Collected the data, 4- Contributed data or analysis tools, 5- Performed the analysis, 6- Wrote the paper, 7- Financial support for the conduct of the study, 8-Other

1. INTRODUCTION

A common concern of most countries is whether trade with other countries should be restricted or free. How is a country's economy affected if liberalized foreign trade policies are used? In 1980, World Bank (W.B.) and International Monetary Fund (IMF) introduced a structural adjustment program. Many developing countries adopted this program. Open trade policies were the target of this program. Countries facing high debt-to-GDP ratios and large deficits in their current accounts used restricted fiscal policy to handle the situation. These countries also used currency devaluation strategies and trade openness policies as key policy factors to overcome these issues. Manufacturing industries are saved from competition to enhance import substitution, protection of the infant industry, and long-term welfare.

The general Agreement on Tariff and Trade (GATT) was established in 1947 based on three basic principles; all countries will be equally treated, non-tariff barriers on trade will be abolished and the disputes among nations will be resolved within the framework of GATT. The objectives of the GATT were to enhance the living standard of people, ensure the full employment level, increase real income and effective demand, optimum utilization of resources, and enhance world trade. However, it is pertinent to mention that GATT partially achieved these objectives and failed as a whole. This is the point from where the World Trade Organization (WTO) idea came forward. The distribution of power at the international level was the primary motto while creating WTO. It was a structural change when the GATT was shifted into WTO. Thus, the objectives of WTO were free world trade, full employment, and sustainable economic growth.

Pakistan has a large population. More than 225 million people are living there. That is why poverty is a complicated issue in this developing country. Moreover, disruption of economic policies, uncertain political circumstances, natural calamities, international economic ups and downs, and often cut off in Public Sector Development Programs have enhanced poverty. Frequent increases in indirect taxes and the use of privatization policy have also positive effects on inflation, further increasing poverty. COVID-19 is a new phenomenon decreasing economic activities at the world level and hence booming poverty. According to Asian Development Bank, the reforms initiated in 1990 increased poverty in Pakistan further. While making economic planning policies, those policies are used to enhance economic growth, but growth policy has increased poverty and income inequality. Moreover, poverty in rural areas is double that in urban areas (Akmal, 1994).

A Manila-based bank study reveals that wealth in Asia is increasing while income inequalities are also increasing. Asian Development Bank (ADP) has given two suggestions to overcome the issue of disparity in incomes. Firstly, targeted social expenditure policies should be adopted by the government. Secondly, the size of subsidies should be limited along with a broader tax base policy. Poverty and inequality reduction in developing countries including Pakistan through trade liberalization is a prime debate by the policymakers, academicians, and world organizations for achieving economic development and improving growth rate issues since the 1980s. The present study contributes the solution to reduce the gap between haves and have-nots by employing computable general equilibrium modeling on the most recent available social accounting matrix of the Pakistan economy.

2. LITERATURE SURVEY

Wang and Zhai (1998) published a paper that deliberates on the effects of government tax replacement policies and trade liberalization on the distribution of income in China. For analysis, the Computed General Equilibrium (CGE) model was used. The analysis results show that income inequality can be decreased by using tools of trade liberalization. The study also depicts that the economy's efficiency also increases. To what extent trade liberalization enhances the economy's efficiency depends on the government tax policies that it uses to balance the budget. If the government reduces tariffs, the government's revenues will decrease

significantly. So, the alternate sources of revenue are to be searched by the government. Otherwise, economic efficiency is affected. The study also reveals that poor people gain more than rich people in rural and urban areas by using trade liberalization policies.

In another study, Hosoe (2001) analyzed the trade policies of Jordan and their effects on its economy. A computed General Equilibrium (CGE) model was used. The study observed the effects of the Jordan Free Trade Agreement with the European Union and the Uruguay Round on its economy. The study found that implementing the Uruguay Round, there will be positive effects on the welfare of the people of Jordan. The implementation of the Free Trade Agreement with the European Union will also bring improvement to the economy. It was observed that the non-metal sector of Jordan would shrink due to liberalization. The study explored that Jordan's chemical and agriculture sectors would get expand. Moreover, Uruguay Round would cause an expansion in exports and imports of the country. Diversification of imports would get improved due to Free Trade Agreement. The Free Trade Agreement will also bring sectoral output changes to the whole economy, leaving behind the mining and textile sectors.

Similarly, Diao et al. (2003) conducted a study examining the impacts of WTO access on regional agricultural income in China. Using the social accounting matrix (SAM), the Computed General Equilibrium Model (CGE) was used for analysis. The study revealed that welfare would improve due to liberalization. But there will be an enhancement in inequality in income. Openness will affect the agriculture sector reversely. Farmers will get benefits if all kind of trade is liberalized. Income inequality between urban and rural areas would further increase. Moreover, those farmers who belong to rural and less developed areas of China will suffer even more. The government will have to keep a close eye on its policies to escape from the reverse effects of openness. The study also depicts that liberalization enhances the income of the non-farm sectors more than the farm sector. Farmers would focus more on cash crops, and non-farm sectors would generate more employment opportunities. It is more likely that those farmers who live in backward rural areas would come to traditional subsistence farming again.

Harrison et al. (2003) investigated the relationship between income inequality, poverty, and openness in Turkey during the same period. The Computable General Equilibrium (CGE) model for the small open economy was used to analyze the relationship. The study depicts that trade liberalization has positive effects as far as welfare in aggregate is concerned, but the most low-income group of the economy would lose. Income inequality and poverty would further deepen. Two approaches were used to overcome the issues. Firstly, those who lose due to openness policies might be supported financially. The second way to handle the situation was to equalize the benefits of trade openness, foreign trade policy reforms to a limited extent might be used. In both cases, the occurrence of efficiency costs seems a must. To minimize the efficiency cost, the minimum cost combination may be used by policymakers. The study also explored that the findings mentioned above are conditional and subject to the availability of relevant data and models.

Further, Naude and Coetzee (2004) studied inequality and globalization in South Africa. To evaluate the causes and status of inequality in income, the Computed General Equilibrium (CGE) model was used. Different independent variables such as government, investors, households, exporters, importers, and industries are included in the study. To an astonishing level, this study has similar results to a survey conducted on firm and household levels in South Africa. The due place has been given to different economic shocks that can affect economic activities. The paper concluded that if tariffs are cut, and import competition is raised, economic growth increases. Lower wage rates are not accepted by labor which reveals that labor is expensive. So, to lower the cost, capital would be substituted with labor, an expensive factor. This will result in low employment opportunities. It means real wages would be high, increasing demand and consumption levels. However, the study shows a significant increase in exports, ultimately booming employment opportunities, and consumption.

Bardhan (2006) investigated a causal relationship between rural poverty and globalization. CGE model and GATP (Global Trade Analysis Project) model were used for analysis. The study explored how trade openness affects the living standard of people in less developing countries. The paper also investigated how international trade and long-term capital flows. Rural poor people face many problems due to openness. At the same time, trade openness creates many opportunities and facilities for poor people. Depending on the political and economic conditions of a country, the share of the poor people is determined by the policies of trade openness. So, sorting out the net impacts of openness is a complicated issue. The study reveals that developing countries cannot resolve their economic problems by using anti-openness trade policies. However, this opening up the economy for the rest of the world should be supported by suitable and coordinated economic policies to reap the real benefits of openness.

For the economy of China, Hertel and Zhai (2006) conducted a study showing the relationship between rural-urban inequality and trade liberalization. A household-disaggregated Computed General Equilibrium (CGE) was used to analyze the relationship. Factor market reforms and their impact on the distribution of income and urban-rural inequality were observed. Under the free trade regime, how do factor and product markets work together? Reforms in the rental market increased off-form mobility, and reforms in rural land caused a sharp decline in income inequality in urban-rural areas. Factor market reforms and trade openness increase the economy's efficiency, hence causing a reduction in income inequality. The study also depicted that labor moved out of the agriculture sector towards the manufacturing and services sectors due to trade openness. But finally, income inequality remained unchanged despite these changes.

In another analysis, Atolia (2007) conducted a study on Latin America to investigate the relationship between increasing wage inequality and trade openness. The General equilibrium CGE model (3×3×3) was used for analysis purposes. The study says that trade openness's long- and short-run effects differ regarding wage inequality. HOS theory says that wage inequality declines in the long run. Due to two reasons, wage inequality can rise in the short run. One reason for wage inequality is the ups and downs in the import sector. The second reason is a change in the capital-skill ratio in production. Fluctuations in the import and other sectors of the economy in the short run cause temporary capital formation. Real wages of skilled labor would increase. In the long run, the fundamentals of HOS theory would prevail over the short-run effects. It is pertinent to mention that the short-run effects of trade openness do not match with the HOS model.

Similarly, Acharya and Cohen (2008) conducted a study on Nepal to check the relationship between household welfare and trade openness. A computed General Equilibrium (CGE) model was used for analysis. This CGE model is different from the neo-classical CGE model. This model used exports and imports elasticity coefficients, inducted income distribution, and household groups. The study noted that a high growth rate would be yielded if exports and imports openness are integrated. However, this policy does not support the poor income class of the economy. If a flexible exchange rate system is adopted, it will result in more reverse effects on income distribution than a fixed exchange rate system. The study also concluded that the gradual implementation of openness policies has better economic results than the fast implementation of liberalization policies. The study also suggests that exchange rate openness and trade openness should not be implemented simultaneously. Only then the productive and efficient economic results can be produced.

Khan (2008) conducted a study to check the effects of trade openness policies in agriculture and non-agriculture sectors in South Asia. A macroeconomic computable general equilibrium (CGE), a compact, and dualistic model was used to check the effects of trade liberalization on poverty reduction. The model is framed on the pattern to adjust largely populated economies having large urban and rural low-income groups at the same time in South Asia. CES production function and the Harris-Todaro migration model were used as a tool for the macroeconomic model. The study explored that by having enough information about the labor market and households, the dualistic model can check a few impacts of liberalization on

reducing poverty. The study showed that trade openness reduces poverty at the macro and micro levels. But for this purpose, integrated policies should be adopted. On the other hand, the study says that trade openness reduces poverty to a minimal level.

In the same year, Rutherford and Tarr (2008) conducted a study in Russia to check the impacts of trade openness on household productivity. To investigate the effects of trade openness on income distribution and poverty Computed General Equilibrium (CGE) model was employed. The study included a survey of Russian-based 55,098 household agents. Foreign Direct Investment (FDI) was also included in the service sector. For the validity of the results, Dixit Stiglitz's endogenous productivity effects were also checked to examine the imperfect competitive goods and services markets. Along with the use of a suitable model, it is necessary to diversify the households to see the factual impacts of trade openness. In a medium period, all the households will benefit from the study's trade openness. Endogenous productivity level and Free flow of FDI affect the household gain distribution as well.

For Argentina, Cicowiez et al. (2010) investigated the effects of trade liberalization on poverty and income inequality. World Bank's LINKAGE model, Computed General Equilibrium (CGE) model, and Micro Simulation were used to check the impacts of trade openness on poverty and income inequality. Taxes were the special focus of the study. Argentina exercised export taxes on its agricultural exports in different periods, predominantly with an agricultural export base. The study explored that poverty and income inequality would decline in Argentina if coordinated openness policies were adopted in foreign trade. The study also depicted that the same kinds of results would occur in all sectors of the economy, including the industrial sector. The study also concluded that if openness policies are adopted only in the agriculture sector, there will be no effect on poverty and income inequality. Such a policy may worsen the present status even.

On the same lines, Raihan (2010) conducted a study in Bangladesh to check the effects of trade openness on welfare and poverty. For analysis purposes Computed General Equilibrium (CGE) model coupled with the household consumption survey data was used. In particular, the study was interested in investigating the impacts of openness on poverty and macroeconomic welfare. Two different poverty lines were used for urban and rural households. These poverty lines were based on rural and urban Consumer Price Indices. The study explored that the long-run impacts of removing tariffs differed from those in the short run. In the short run, openness would increase poverty, thus declining welfare. However, long-run results are quite different. In the long run, poverty would decline hence enhancing welfare gains. Resources would be allocated efficiently, and different sectors of the economy would expand. Long-run impacts of openness would prevail over the short-term impacts, thus increasing welfare and reducing income inequality.

Again, Acharya et al. (2012) investigated the impacts of trade openness on income inequalities in Nepal. To analyze the facts Computable General Equilibrium (CGE) model was used. The behavior of exports and imports was checked under different exchange rate systems separately applying liberalization policies. It was found that trade openness became a cause of reallocating commercial services to agriculture and industry sources. The study also concluded that inequality between low-skilled labor and high-skilled labor wages increased. Moreover, the increase in the wages of skilled labor in the industrial sector was greater than in the other sectors. After the reallocation of resources to the industrial sector using openness policies, classical trade theory seems to fail the study concluded. The study also explored that rich households enjoy more benefits from trade openness than poor ones. However, if a fixed exchange rate is adopted, then the lowest income group of society gets more benefits. The study suggests that trade openness may be used to overcome poverty dynamically.

Ojha et al. (2013) studied income inequality, innovation, and growth. For analysis purposes Computed General Equilibrium (CGE) model was used. The study investigated the three components of economic growth. Physical capital, human capital, and technological progress are included among these three

determinants. The study concluded that when physical capital is formatted, as a result, economic activities grow, and income inequality decreases. But in the long run, the economic growth rate decreases, and income inequalities increase. The study also concluded that technological growth is fundamental for sustainable growth with an increase in physical and human capital. The study reveals that the long-run and medium-term expansionary physical capital investment policies are the opposite. If a human and physical capital formation is not accompanied by technological investment, economic growth may occur, but income inequalities worsen.

Recently, Utilizing the CGE method, Moeen-ud-Din et al. (2020) investigated the impact of income tax on the macroeconomic variables of Pakistan. It concluded the favorable impact of an increase in income tax on Consumption, GDP, investment, the welfare of all households, imports, and exports. In another study, the same authors examined the effect of free trade on the same indicators using the CGE model in a small open economy and concluded positive effects. Moeen-ud-Din et al. (2021a) investigated the effect of reducing the sales tax on Pakistan's economy, poverty, inequality, and welfare and found positive results in the study. Similarly, Moeen-ud-Din et al. (2021b) analyzed the impact of exports on Pakistan's economy by employing the same modeling technique and concluded positive comments on all the macro indicators, including an improvement in welfare and a reduction in poverty as well as inequality.

3. DATA AND METHODOLOGY

To evaluate the impacts of trade openness on different sectors of the economy, we used Computable General Equilibrium (CGE) approach. There are two reasons to select this modeling. Firstly, the whole of the economy is affected by trade openness. Capturing all the relevant effects of trade liberalization on different sectors of the economy, the use of the CGE model is effectively helpful. Secondly, using the CGE model in Pakistan for the study will be a comprehensive contribution to recommending a policy for reducing income inequalities and poverty.

For analyzing different policies in Pakistan, the CGE model has been used in a few studies. Naqvi (1998) constructed a CGE model using SAM for 1983-84. Siddiqui and Iqbal (1999) developed the first CGE model in Pakistan. The household sector was aggregated in this model. Afterward, Siddique and Iqbal extended the model by the disaggregating household sector. By aggregating the household sector CGE model was developed by Naqvi et al. (2010). So far, work on the CGE model has not got its due concentration in Pakistan. However, gradually in Pakistan, the work on CGE Models increased. Siddiqui and Iqbal (2001) formulated a CGE model to investigate the effects of a decline in tariffs on the distribution of income. This model was based on SAM for the years 1989-90. To investigate the effects of depreciation on the exchange rate, Dutch Disease Vos applied the CGE model in Pakistan.

3.1. Data Sources

Data has been borrowed from SAM 2010-11 for Pakistan prepared by Dorosh et al. (2015) for this study. Before the commencement of the study, it is the most updated SAM. Lofgren et al. (2002) and Naqvi et al. (2010) pattern CGE model formulated for Pakistan. As the CGE model is based on the framework of mathematical equations, the behavior of economic agents has been specified mathematically. Optimized behavior of economic agents is assumed by neoclassical. The producers maximize profit, and consumers optimize utility. These assumptions work as the base for the equational framework. The behavior of major economic agents has been specified in mathematical functional form. Among these agents, government, consumers, factors of production, producers, and the rest of the world are included.

Dorosh et al. (2015) developed SAM 2010-11 was organized by IFPRI for Pakistan. This most recent SAM consists of 64 activities, 63 commodities, 12 factors of production and 16 types of households, and 17 other

accounts. This SAM has portrayed a semi-input-output multiplier model. Data analysis and its implications vary as per the requirement of the study.

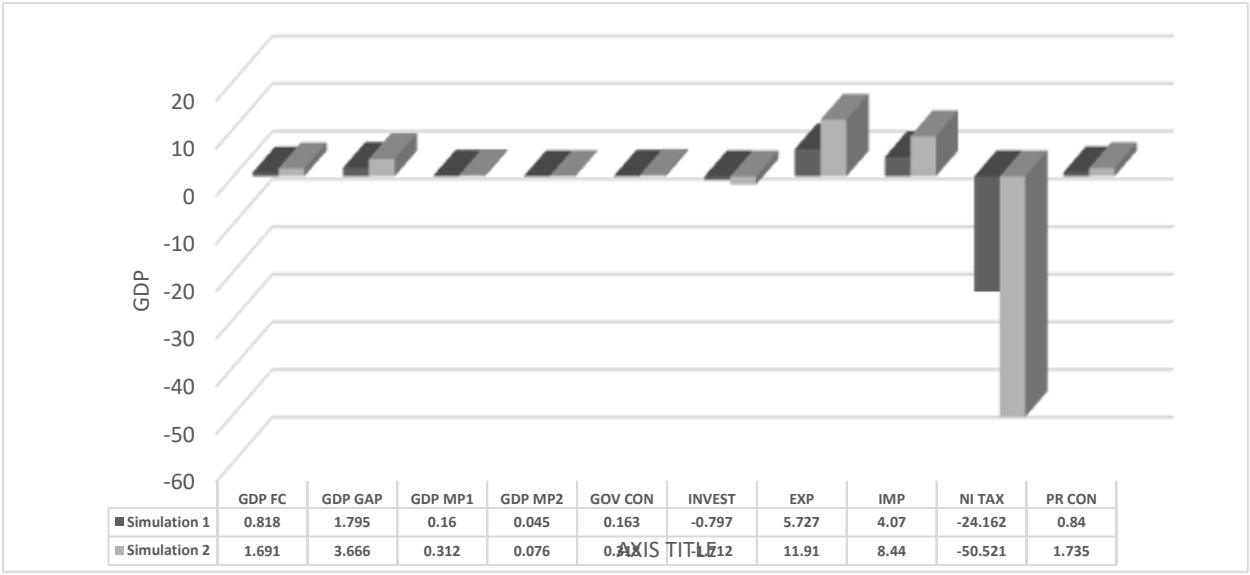
A Social Accounting Matrix (SAM) is divided into Micro- and Macro-SAM. Micro-SAM shows a detailed description of sectors and institutions, while Macro-SAM shows aggregate data. Macro-SAM shows the overall picture of the economy without going into detail about commodities, households, factors, activities, and other accounts.

4. INTERPRETATIONS OF RESULTS

4.1. Macro Level

If a 50% tariff is imposed, the GDP of Pakistan at a fixed cost shows an increase of 0.818%. However, if the trade is completely liberalized, GDP increases by 1.691%. At a 50% tariff, government consumption is 0.163%, while at zero tariffs, government consumption jumps to 0.318%. It reflects a more than double increase. At zero tariff, though there is an increase in GDP, investment has a declining trend. At a 50% tariff, investment has declined by 0.797%, while at zero, investment has declined to 1.712%. The study reveals that fully liberalized trade is beneficial for Pakistan. If tariff exports of Pakistan restrict trade are showing an increase of 5.727% while in fully free trade exports jump to 11.910% showing more than double increase. However, imports are affected reversely by trade openness. In regional trade, imports show a deficit of 184.79%, while the free trade deficit increases to 383.169%.

The study noted that government revenues decline if free trade policies are adopted. If a 50% tariff is imposed on trade, tax collection at the national level declined by 24.162%. If tariffs are decreased to zero, tax income revenue declines to 50.521% showing a drastic decrease. There is a need to increase tax revenues through alternate sources in this situation. The study also reveals that by adopting free trade policies, the budget deficit will increase (see Figure 1).



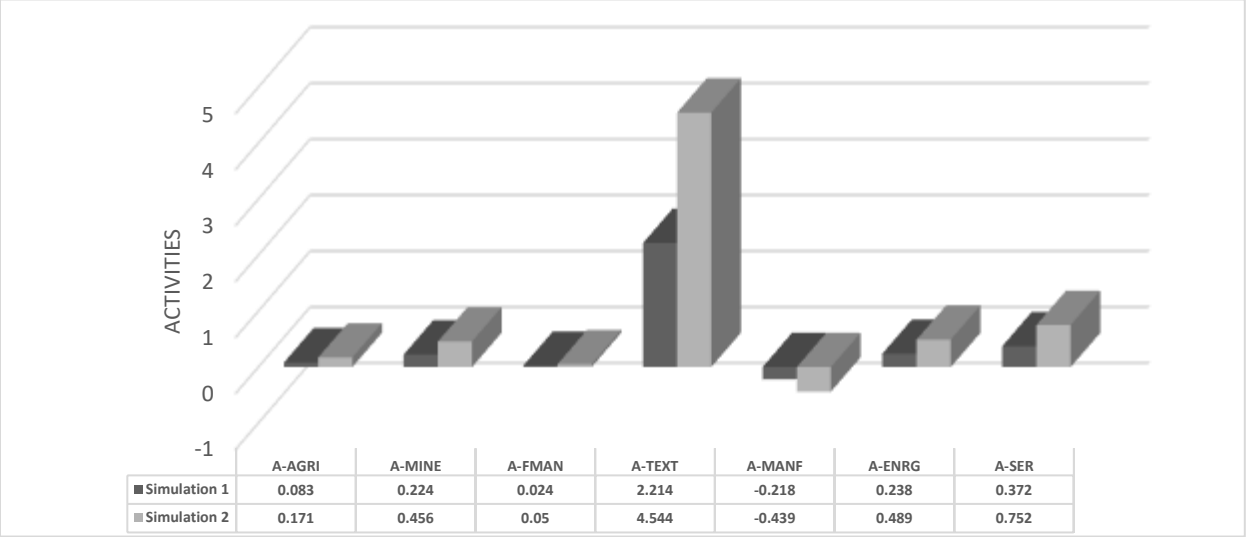
	GDP FC	GDP GAP	GDP MP1	GDP MP2	GOV CON	INVEST	EXP	IMP	NI TAX	PR CON
Simulation 1	0.818	1.795	0.16	0.045	0.163	-0.797	5.727	4.07	-24.162	0.84
Simulation 2	1.691	3.666	0.312	0.076	0.318	-1.712	11.91	8.44	-50.521	1.735

Figure 1: Nominal GDP Data (National Income Accounts) [*Source: SAM for Pakistan by Dorosh et al. 2015*]

4.2. Domestic Output

In free trade, domestic output increases, the study shows. Initially, C-AGRI (agricultural commodities) shows a growth of 0.083%, which increases to 0.171% if the trade is liberalized with the rest of the world. However, it is a minor growth in C-AGRI. If a 50% tariff is imposed, the C-Mine (mining commodities)

sector growth rate is 0.224%, increasing to 0.456% at zero tariffs. Openness policies enhance C-FMAN (food manufacturing) sector by approximately double. The C-Text (textile commodities) sector also reflects more than double growth during the free trade regime. By removing tariffs from trade, C-MANF (manufactured commodities) sector becomes worsened. At 50% tariffs, the C-MANF sector declines by 0.218%, while this decline increases to double if the trade is fully liberalized. However, C- ENRG (engineering commodities) sector shows visible growth from 0.238% to 0.489%. C-SER (services) growth rate increases from 0.372% to 0.752% if tariffs are fully removed (see Figure 2).



	A-AGRI	A-MINE	A-FMAN	A-TEXT	A-MANF	A-ENRG	A-SER
Simulation 1	0.083	0.224	0.024	2.214	-0.218	0.238	0.372
Simulation 2	0.171	0.456	0.05	4.544	-0.439	0.489	0.752

Figure 2: Level of Activities [*Source: SAM for Pakistan by Dorosh et al. 2015*]

The study reveals that except C-MANF sector, all other sectors grow in open trade. During free trade, the sale of different products in the C-AGRI sector and C-FMAN sector has a trend of decline, whiles sale in the C-MANF sector has relatively improved. The study depicts those prices of different commodities have a trend of increase in open trade, reflecting an increase in the general price level. The study also noted that prices of the C-MANF sector have a trend of decline. It means that a decline in the growth rate of the C-MANF sector is attached to a decline in prices.

4.3. Income of Household

Open trade increases the income of all the households belonging to different sectors of the economy. Except for H-MF, H-NFQ1, and H-UQ2, the prices of all other household products have increased. Notably, free trade increases the income of all households whether the prices of their products have increased or decreased.

4.4. Consumption and Savings

The study shows that the consumption of households has increased along with an increase in MPS. A visible boost (4 times) in the savings of HMF was observed. In regional trade, savings of H-SF had a negative growth which changed into growth in free trade, showing a growth of 3.79%. However, at a 50% reduction of import tariff, savings of H-NFQ1 were growing at 1.183%, which changed into negative growth of 2.012% in free trade. There was a declining trend in savings of H-NFOTH and H-UQ1 households during the free trade regime. The study reveals that these are the most suffered households in the open trade regime.

MPS of H-UQ2 households, which was 8.426% during restricted trade, declined to a negative growth rate of 2.16%. Savings of H-UOTH have negative growth trends both in restricted and free trade. The study noted visible ups and downs in the savings of different households in open trade. Except for C-ENRG.H-MF, C-ENRG.H-SF, C-ENRG.H-OF, C-ENRG.H-AGW, and C-ENRG.H-UOTH, consumption of all other commodities increased during open trade.

4.5. Welfare of the Households

The study noted that all kinds of households enjoy welfare in free trade. At zero tariff, the utility of all households increases. Relatively more welfare was derived by H-MF, H-NFOTH, H-NFQ1, and H-UOTH. Due to negative CPI (Consumer Price Index), H-MF, H- NFQ1, and H-UOTH derived more utility. Compensation Variation (CV) also confirms the results that the welfare of the whole economy becomes better in free trade (see Figure 3 and Figure 4).

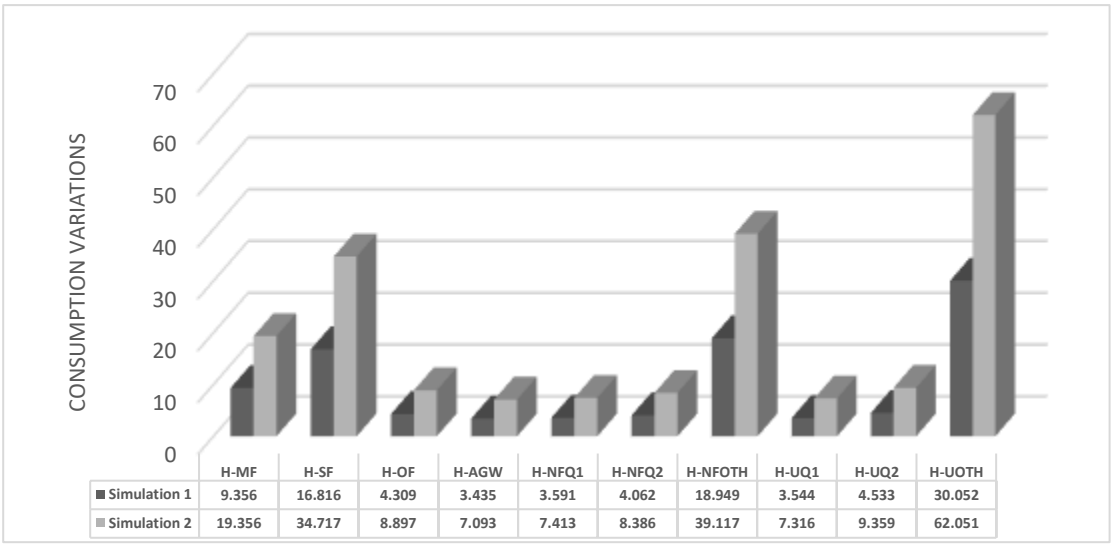


Figure 3: Consumption Variation of Households [*Source: SAM for Pakistan by Dorosh et al. 2015*]

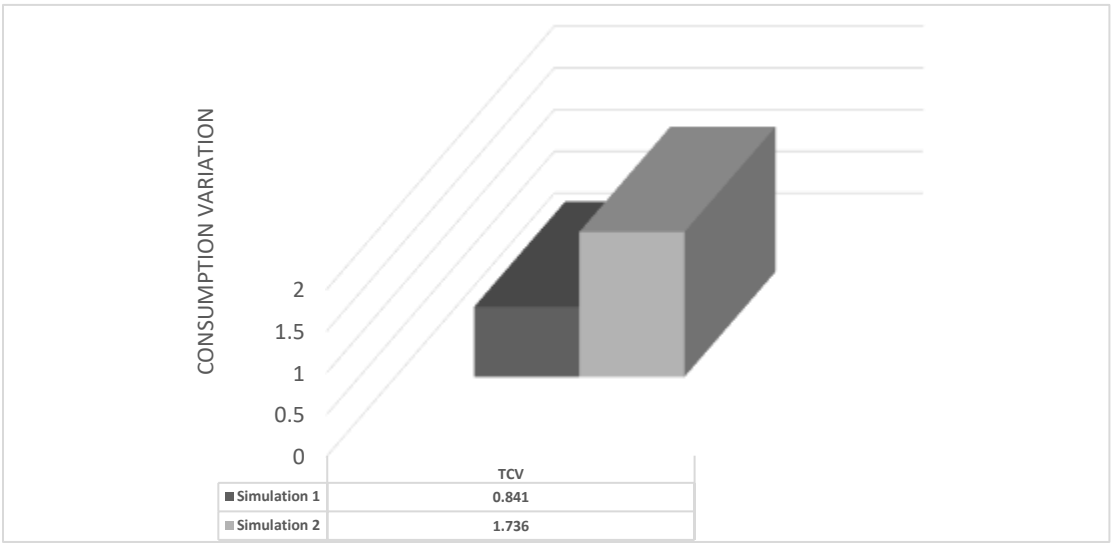


Figure 4: Economy-Wide Consumption Variation [*Source: SAM for Pakistan by Dorosh et al. 2015*]

Moreover, Theil-L and Hoover's index also show improvement in the welfare of people. However, the Theil-T index indicates that trade liberalization does not affect welfare. The study has observed poverty by relative measures. It means that poverty has been measured by consumption, income, and welfare indices. Improvement in consumption, income, and welfare indicates that poverty decreases in free trade.

4.6. Balance of Trade

Exports of all commodities indicate a visible increase in the free trade regime. Imports of all commodities have also increased trend. The study reveals that imports of the C-MINE sector showed a remarkable increase in free trade, negatively in regional trade. An increase in exports and imports shows growth in consumption and the economy. However, the C-ENRG sector shows undetermined results. A constant rate increase in the prices of exports has been observed while the prices of imports have variations. The prices of C- AGRI, C-MANF, C-FMAN, and C-SER sectors have a visible declining trend. Prices of C-MINE and C-TEXT sectors have an increasing trend. Comparatively, the prices of exports have increased at a constant rate while the prices of some of the imports have decreased while the prices of some of the imports have an increasing trend. So, it is concluded that trade liberalization improves BOT (see Figure 5, Figure 6).

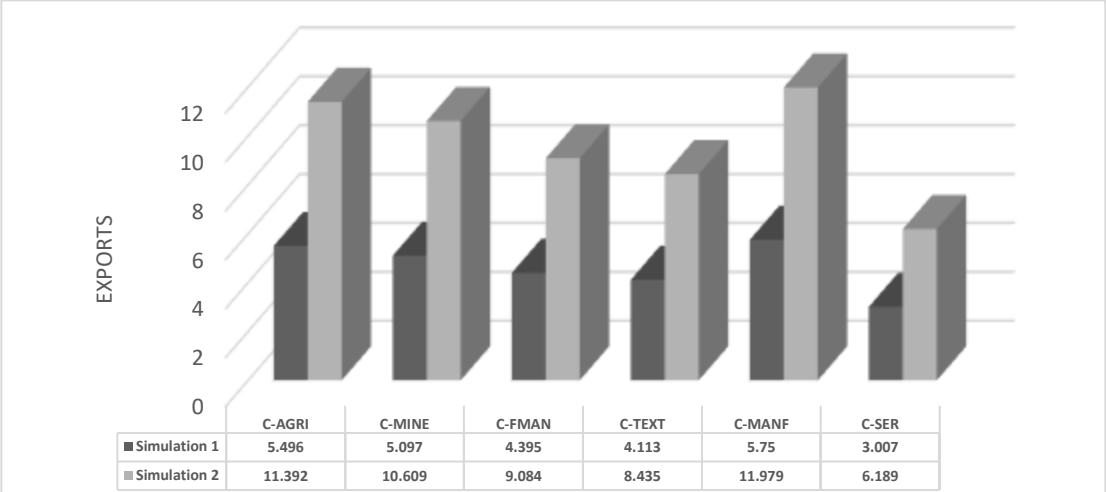


Figure 5: Quantity of Exports of Commodities [*Source: SAM for Pakistan by Dorosh et al. 2015*]

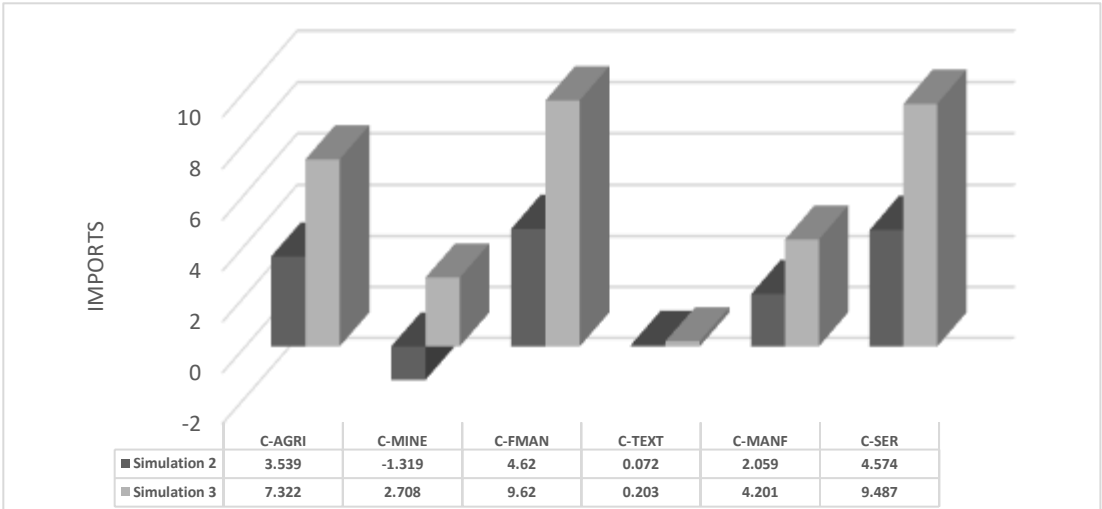


Figure 6: Quantity of Imports of Commodities [*Source: SAM for Pakistan by Dorosh et al. 2015*]

4.7. Income Inequality

If a 50% tariff is imposed, all the indexes, including Hoover, Theil- L, Theil-S, and Theil-T indexes, indicate income inequality remains unchanged. At zero-tariff, Theil-T, Theil-S, and Theil-L indexes show a slight decrease in income inequality. On the other hand, the Hoover index indicates that a fully liberalized economy, even, does not affect income inequality (see Figure 7).

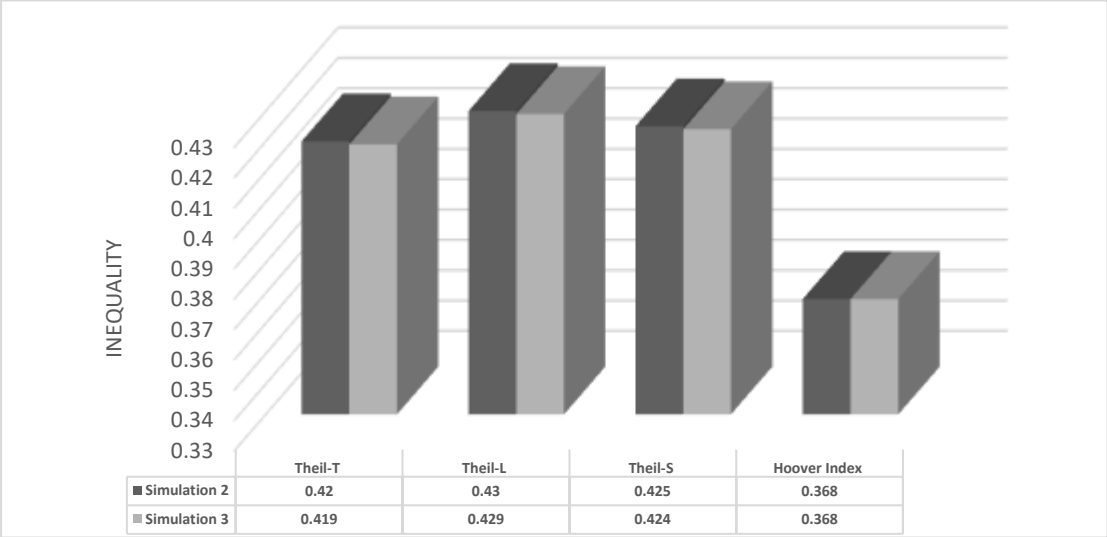


Figure 7: Indices of Inequality [*Source: SAM for Pakistan by Dorosh et al. 2015*]

5. CONCLUSION

SAM 2010-11 has been used in this study. SAM 2010-11 consists of seven goods, seven activities, ten kinds of households, three factors of production, and four kinds of institutions (ROW, government, saving and investment, and stock of capital). The study depicts that liberalized economy would enhance government consumption, exports, and the GDP of Pakistan. Except for the C-ENRG sector, the domestic output of all sectors would increase. Trade liberalization also enhances the income of all households, except for C-ENRG, H-MF, C-ENRG.H-SF, C-ENRG.H-OF, C-ENRG.H-AGW, C-ENRG, and H-UOTH, consumption of all commodities increases. Trade liberalization also enhances the welfare and utility of the people. Improvement in BOT has also been noted. According to some indexes used in the study, trade liberalization also decreases income inequality. The study concludes that the economy of Pakistan would get improved by trade liberalization. The study also noted some negative impacts of trade openness. The study also noted a reduction in investment and fluctuations in savings during trade openness. Effects on BOP are also reversing due to an increase in imports. The budget deficit will also increase due to a reduction in government revenues.

The deficit of the balance of payments (BOP) can be overcome by increasing exports, as the study reveals. In the case of Pakistan income of the households will increase, indicating that employment opportunities will increase if free trade policies are adopted. Trade liberalization will increase welfare and decrease income inequality in Pakistan. As our study investigates these two issues, these are very important results. Poverty would decline as welfare increases through trade liberalization. Poverty is a major issue in the economy of Pakistan. Poverty reduction will certainly decrease other social evils existing in the society of Pakistan. The gap between the rich and poor classes will reduce by decreasing income inequality in Pakistan.

The study concludes that trade openness has advantages and disadvantages for Pakistan's economy. Investment decreases due to the liberalization of trade. The budget deficit increases due to a fall in government revenues. The BOP deficit will also increase due to an increase in imports. Savings will remain prey to fluctuations. Due to all these issues economy will remain unstable, the study concludes. The literature coated indicates the significance of trade liberalization in affecting inequality and poverty. Using the most available recent social accounting matrix and applying computable general equilibrium techniques for the economy of Pakistan the results indicate positive influences on various macroeconomic indicators including the case in point, which leads the economy to grow by lowering the income inequality among different types of the households as well as the general poverty.

6. POLICY RECOMMENDATIONS

Based on the analysis, the study suggests that the gradual implementation of trade openness policies should be adopted rather than one jump adoption. This will be helpful to deal with the problems arising from openness policies. Trade openness enhances imports. To overcome the increasing deficit in the balance of payment (BOP), alternate tools to cut imports should be adopted. Applicable interest rate policies and a better atmosphere for external and eternal investors should be implemented to overcome the shortfall in investment due to trade openness. For the economy's stability, ups and downs in savings should be covered through appropriate measures. As trade openness reduces government revenues, alternate tools to increase taxation should be adopted to cover the budget deficit. Pre-planning for the implementation of openness policies is necessary to avoid the disadvantages of trade openness. The trade liberalization policy in developing economies like Pakistan would create the buying ability of the agriculture as well as industrial inputs which results in increased economic activities, employment opportunities, incomes, savings, investment, and all other macroeconomic variables leading to further multi-time increases towards sustainable economic development and growth.

Acknowledgment

We would like to express our sincere gratitude to the editorial board of Kashmir Economic Review and the reviewers of our article for their insightful comments and valuable feedback. Their careful attention and critical evaluation of our work have greatly improved the quality and clarity of our research. We are especially grateful for the time and effort they have devoted to providing constructive feedback, which has helped us to refine our arguments and ideas. Their expertise and dedication to Trade Liberalization Policy are truly admirable, and we feel privileged to have benefited from their guidance. We also appreciate the professionalism and efficiency of the editorial team, who have made the publication process smooth and enjoyable. Thank you once again for your invaluable support and assistance.

Funding Source:

This work was not supported by any specific funding, and the author(s) declare no conflicts of interest related to this research.

Conflict of Interests:

We believe that transparency and honesty are fundamental principles in scientific research, and we are committed to upholding these principles in our work. Therefore, we declare that no competing interests exist that could affect the impartiality and validity of our research findings.

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Kashmir Economic Review
ISSN(P): 1011-081X, ISSN(E): 2706-9516
http://www.ker.org.pk

Power of Social Media: Journey of Females Towards Entrepreneurship

ABSTRACT

Treading on a business venture as an entrepreneur is a daunting task in a developing economy like Pakistan, especially if you do not belong to the globally dominant gender in the markets. Social media is encouraging people to try their luck with entrepreneurship as self-employed, be it a micro-entrepreneur or a partnership having limited investment. The study aims to explore the nature of home-based female-owned online businesses and to identify areas where the government can play a role in facilitating and encouraging online female entrepreneurs. The study employed a qualitative research design, in the locale of the capital, Islamabad. Structured interviews were conducted with 18 female entrepreneurs running home-based online businesses. Thematic analysis was used to reach the results. Social media is effectively playing its role in transforming the lives of females since Covid-19 hit the world. Such type of business requires the least level of education and investment, creating ease of doing business by providing a free-of-cost platform to become an entrepreneur without requiring to leave the house for the sake of business. Moreover, half of the sample resented the negative impact of government decisions on their business operations and identified the need for an online fraud filing portal and other facilitations.

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Keywords
Entrepreneurial System, Female Entrepreneurs, Home-based Business, Online Business, Social Media

JEL Classification
L26, L86, M21

Please cite this article as:
Abdullah, S., Khalid, M., Khan, T.N., & Ali, M. (2022). Power of social media: Journey of females towards entrepreneurship. *Kashmir Economic Review*, 31(1), 14-24.

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Author's contribution in the article: 1- Conceived and designed the analysis, 2- Reviewed and compiled the literature, 3- Collected the data, 4- Contributed data or analysis tools, 5- Performed the analysis, 6- Wrote the paper, 7- Financial support for the conduct of the study, 8-Other

1. INTRODUCTION

Throughout the world, entrepreneurship is regarded as a significant driver of economic growth and development (Meyer, 2019). According to Ireland et al. (2001), entrepreneurship is defined as a "context-dependent social process through which individuals and teams create wealth by bringing together unique packages of resources to exploit marketplace opportunities." Moreover, female-owned businesses are supposed to be a rapidly growing entrepreneurial sector, as they provide an opportunity to create wealth, and economic and social progress through innovation, competition, and employment of untapped human capital (Goltz, 2020).

Pakistan is the fifth most populace country in the world has 48.5% females in its total population. Being an agrarian country, the majority of the females in rural areas of Pakistan are involved in farming activities. Out of the only 13.5 million (20 percent) women taking part in Pakistan's labor force, seven million women working in agriculture fall under the category of assisting family workers and remain unrecognized and unpaid (UNDP, 2021)[1]. Increased participation of females in the workforce can be a driver of economic growth. It results in improved productivity at the national level, increased household incomes, improved purchasing power, increased spending on goods and services, and an overall rise in living standards. On a broader scale, a higher number of workers irrespective of gender would increase economic output, yet gender disparity affects productivity in more meaningful ways. An increase in labor productivity is not only achieved by adding more labor, encouraging women in the labor force brings new skillsets, proficiency, and knowledge (Kabeer, 2021).

As part of the country's agenda to achieve Sustainable Development by the year 2030, 'Leave No One Behind' as the second Sustainable Development Goal (SDG), we have a clear opportunity path in front of us – invest in women as drivers of Pakistan's economic growth. In the year 2020, as the pandemic hit the world, lockdowns were imposed for longer periods to ensure social distancing to curb the spread of disease. The situation negatively impacted the job market. One after another crisis, Pakistan's economy has been through many unfortunate events including massive floods, taking one-third of the country's total population. Hence, there is a need for an employment source that gives individuals an option to work remotely and maintain a decent source of income Nawaz et al. (2019).

In these circumstances, social media is an important tool, especially for female entrepreneurs for several reasons. Above all, it is an affordable platform for wider connectivity. Some social media platforms provide women an opportunity to organically reach their target audience and make new clients or customers with no expensive ad campaigns. Globally, females have started to recognize their true potential. In addition, social media allows female entrepreneurs to reach other women who are building businesses. Since the internet has facilitated entrepreneurship for millions of women worldwide, a wave of women-owned businesses is witnessed globally (Ayers, 2022).

Considering the rapid transformation from a traditional to a contemporary female entrepreneurial system through the emergence of social media, it is important to explore the nature of such businesses in Pakistan. Women, being a major proportion of the total population have the potential to bring a positive change in their own lives, families, and society. Muhammad et al. (2021) focused on women's home-based businesses in the informal economy of Pakistan. The study stated that such businesses remain a neglected segment of women entrepreneurs, assumed to be economically insignificant. Moreover, Muhammad et al. (2020) mentioned that such businesses are termed "invisible."Anzak and Sultana (2020) conducted a study in Pakistan regarding the economic and social empowerment of women in the era of digital literacy. However,

[1] See UNDP Report titled "Womenomics**:** Women powering the economy of Pakistan." Available at: https://www.undp.org/pakistan/publications/womenomics-women-powering-economy-pakistan

the study lacked in-depth knowledge about the working of online businesses. Female-owned home-based online business is an emerging work trend and there is no previous study available on how the government of Pakistan can encourage and facilitate them. The findings of the study would aid in exploring the areas where those women are facing challenges so that such an entrepreneurial system can be encouraged. The study would encourage females to learn and get their skills cashed by running online business from the ease of their homes.

Keeping in view the emerging trend of online home-based businesses run by females, the present study tends to explore the nature of such businesses. Therefore, the objectives of the study are to explore the journey including prerequisites and challenges faced by females while becoming an entrepreneur of home-based online business, and to highlight potential areas where the government can play a role in facilitating and encouraging online home-based female entrepreneurs.

2. LITERATURE SURVEY

In Pakistan, the business environment for females shows the complex interplay of several factors, which can broadly come under two main categories. The first one consists of elements related to society, culture, traditions, and religion. It has been developed for centuries, anchored in the patriarchal arrangement, and reflects the lower status of females. The second one comes from the first category, consisting of constitutional structures, policy papers, regulatory systems, and institutional mechanisms. This category is contemporary rather than traditional, making it cosmetically unbiased. The traditional settings cause difficulties for females as they are fundamentally discriminatory and they impede the equity-based composition of contemporary institutions and their fair functioning, as contemporary institutions are developed from traditional ones (Goheer, 2003).

Despite the existence of cultural and institutional constraints, women in developing nations are struggling to start their businesses to fulfill domestic needs (Jennings & Brush, 2013). Adding to this, social media has provided people with a digital marketplace to sell and buy goods and services without involving any third party. It has eventually altered the way of doing business. This type of "social commerce" became popular in developing countries, facilitating the economic development of female entrepreneurs amidst diverse patriarchal institutional impediments (Camacho & Barrios, 2022).

The gender gap in technology adoption has diminished over the years (Rainer Jr et al., 2016) and women have begun to use technology in an entrepreneurial way (Crittenden et al., 2019; Andrade & Doolin, 2016). During the outbreak of covid-19 pandemic in 2020, when the whole world went on a break from physical social interactions, researchers began to explore the role of social media. Goel and Gupta (2020) found that social media became central to the speedy dissemination of scientific information as well as for monitoring and controlling pandemic.

Pakistan has been one of the worst affected countries by covid-19, with the economic disorder triggered by the pandemic intensifying an already existing crisis. By the third week of March, the Asian Development Bank had substantially revised its estimations with the loss of employment in the range of 1.2 million to 3.2 million jobs (Park et al., 2020). However, the adoption of technology has played a crucial role in business endurance during the covid-19 catastrophe notably with small businesses (Abed, 2021).

In a traditional setup in many developing countries, the success of female entrepreneurship is linked to or adjudicated by the financial contribution to household expenses (Coy et al., 2007). Promoting a workable environment for female entrepreneurial culture in the country would boost family income. The findings of the study and policy repercussions link to Sustainable Development Goal (SDGs) 5 of Gender Equality and SDG 8 associated with decent work and economic growth (Ge et al., 2022). Moreover, (Yaqoob, 2022)

confirmed that female entrepreneurs improve their value by becoming independent and financially stable for society and helping to alleviate poverty.

Anzak and Sultana (2020) highlighted the case of a "successful" entrepreneur, Ms. Nadia, who runs an online marketplace for women in Pakistan named "Sheops." She facilitates numerous female entrepreneurs by giving them access to a comfortable digital platform to offer their goods and services to a large number of female customers. The CEO runs the Facebook group by herself and provides home-based female-owned businesses to reach the target audience with no financial constraints. Considering the existence of hesitation from the opposite gender in our society, she helps to encourage female entrepreneurs by being surrounded by the same gender.

Challenges:

Consumer trust issues were identified as a challenge (Bappy, 2018) for online businesses in Bangladesh. As there is no personal interface involved between the buyer and seller online, it requires a long time to develop trust. According to (Chui et al., 2015) in McKinsey Quarterly, digitization is intensifying core beliefs of competition among industries as it has lowered the cost of stepping into the markets. Lai et al. (2010) concluded that the attributes of innovation have a positive relationship with the need for success among female entrepreneurs in Malaysia. It indicates that innovation is the key to overcoming challenges in online businesses.

Furthermore, Ramadani et al. (2015) discovered that the majority of the female entrepreneurs in Kosovo run micro-businesses; are well-qualified; mainly work in the trade sector, and are good at financial management through obtaining finance is a challenge for them.

Research gaps and contribution of this study:

Despite the growing number of studies on entrepreneurship in Pakistan, there is a lack of research specifically focused on online female entrepreneurs, who represent a unique and underrepresented group in the Pakistani entrepreneurial landscape. While there is some anecdotal evidence suggesting that online platforms have provided new opportunities for women to start and grow businesses in Pakistan, little is known about the challenges and opportunities that these women face, their motivations for becoming online entrepreneurs, and the strategies they use to succeed in a male-dominated society.

Addressing these gaps would not only contribute to the literature on entrepreneurship and gender in Pakistan but also provide insights into how to support and promote the growth of online female entrepreneurship in other developing countries.

3. METHODOLOGY

Similar to the methodology adopted by Yunis et al. (2018) in the study regarding "enablers and hurdles of female entrepreneurship in Khyber Pakhtunkhawa province, present study employed a qualitative research design, in the locale of the capital, Islamabad. Such a methodology is adopted at the initial phase, performed to find answers to questions like; what, why, and how. These responses are known as "grounded" because they are grounded in the descriptions or interpretations given by the participants. Moreover, thematic analysis was being done as it is a strong yet flexible method for the analysis of qualitative data, involving the detailed reading of the data set (like a transcription of interviews) and classifying patterns in meaning to form themes. It is an adequate approach for analysis that is intended to grasp experiences and opinions within a data set. The analysis was done using a six-step process: data familiarization, generation of initial codes, seeking suitable themes, reviewing themes, describing, and naming themes, and making the report.

Thematic analysis is a qualitative data analysis method that involves reading through a data set (such as transcripts from in-depth interviews or focus groups), and identifying patterns in meaning across the data to derive themes.

Structured interviews were conducted with the female entrepreneurs running home-based online businesses from Islamabad. Online businesses are those which are entirely run through the internet. An interview guide was prepared, consisting of questions covering a variety of domains such as demographic information, economic dynamics, expectations from the government, and general discussion about their experiences including challenges and constraints as female entrepreneurs in the market. The guide also included a consent form for collecting the information regarding their businesses solely for research and to ensure that research ethics are taken care of.

After transcribing interviews and getting familiar with the responses, initial codes were generated which were then grouped under suitable themes. Afterward, themes were reviewed in depth and treated for repetition. Lastly, results were drawn after completing the six-step process for thematic analysis. In constructing the sample, 18 female entrepreneurs running businesses online from the ease of their homes in Islamabad were interviewed. A convenience sampling technique was used as the majority of the targeted females were reluctant to give interviews either due to privacy concerns or lack of time.

4. ANALYSIS OF DATA

Social media is effectively playing its role in transforming the lives of females by providing them a platform to become an entrepreneur especially after Covid-19 hit the country in 2020. With the help of interviews being conducted with home-based female entrepreneurs in Islamabad, Instagram, and Facebook were found to be the most frequently used social media platforms for running online businesses as all 18 said to be using Instagram while, 11 of them chose Facebook and Instagram.

A study was conducted in Kosovo by Ramadani et al. (2015) which discovered that the majority of female entrepreneurs run micro-businesses. Likewise, all the female entrepreneurs in the sample were found to be running micro-businesses being 'micro-entrepreneurs'. This type of entrepreneur is the founder of a micro business having two important features: minimal investment and less than ten employees. In the sample, 39% of females said that they have either outsourced someone for social media marketing or temporarily hire a few workers in case of a bigger order.

The sample was questioned about their source and amount of initial investment in the business. For source, 83.3% of entrepreneurs started businesses with their savings, while 16.7% of females got the initial investment either from their husbands or parents. The least investment amount told was Rs300 for starting a knitting and crochet business from home. Female entrepreneurs running cooking/ baking businesses stated initial investments in the range of Rs10,000 to Rs200,000.

The sample consisted of 33.3% female entrepreneurs aged between 15-29 years, 27.8% aged 30-44 years, and 38.9% aged between 45 to 59 years. The majority of the sample was of married females totaling 11, unmarried 6, while 1 was divorced. As far as sectors of businesses are concerned, 72% of the females are running manufacturing businesses, while 23% of those in manufacturing are also involved either in the distribution or services sector.

Regarding their level of education, it varied from Matric to a Masters's degree. 38.9% of females stated their maximum education to be Masters. Importantly, 38.9% of females also told that they have done certain courses/diplomas related to their business. The majority of the women had done chef courses from well-known hotels in Pakistan and abroad. Moreover, the study found that YouTube is a free source of online

learning, especially for females and they are utilizing it in their businesses. These results reflect that online businesses require the education level to be at least Matric, although it is not possible to get a good job with this education in the job market. Also, YouTube has made free-of-cost learning possible without stepping out of homes. Similarly, Noguera et al. (2015) concluded that informal factors like the encouragement of entrepreneurial careers and female networks play a more critical role in female entrepreneurship than formal factors such as education and differences in income level.

50% of the females in the total sample are running food related (including platters, bakery items, and different cuisines) home-based businesses and all of them said that they face a "very high" level of competition. Lai et al. (2010) concluded that innovation is positively correlated with the desire for achievement among female entrepreneurs in Malaysia. Similarly, females in this study shared that they added innovation in their items and operations to stand out in the highly competitive market such as better packaging, more food variety, different recipes, better quality ingredients, and preparing food samples before order confirmation. Out of 9 females running food businesses, 3 reported to be registered sellers on FoodPanda, Other 50% of the online businesses consisted of arts & crafts, henna applications, photography, online health services, knitting, and selling organic beauty products.

Covid-19 being the driver of online businesses

Upon inquiring about the year in which they started their businesses, 56% of females responded 2020 was the year. Moreover, two motivations were found to exist behind starting their businesses: financial need and passion. 60% of the females who stepped into the world of online businesses in the year 2020 shared 'financial need' as their motivation for taking the initiative, while 40% of those stated 'passion' as their motivating factor. One female running a home-based food business said, "my motivation was that I had to support my family when my husband got unemployed in 2020, so I had to overcome the financial crisis at home, as I was left with no other choice but to utilize my skills in the best of the ways and it was the need of the hour."

It is pertinent to mention that 2020 was the year when Covid-19 hit Pakistan and all activities involving social interaction including economic and educational practices came to a halt, and the lockdown was announced. During the outbreak of covid-19, poverty and unemployment surged combined with other socio-economic challenges in Pakistan. According to Blustein et al. (2020), redundancies in all types of jobs were made globally. All the women who started online businesses in the year 2020 (i.e., 56%) mentioned Covid-19 to be a factor pushing them to become an entrepreneur either because their husbands lost their jobs, or they were free at home and wanted to get their skills cashed.

From the financial need to financial independence

Financial independence was recognized as a "personal characteristic" of female entrepreneurs in the Khyber Pakhtunkhwa province of Pakistan in a study conducted by (Yunis et al., 2018). The finding is consistent with the result obtained in this study as no matter what was the motivation, 100% of the sample claimed to be financially independent. The concept of financial independence was explained to them as their ability to pay for their own needs.

Moreover, Ge et al. (2022) conducted a study in the Faisalabad district and concluded that enabling an entrepreneurial environment among females in Pakistan would increase family income. Similarly, 61% of females said that they now contribute to household expenses from their income in the range of 5% to 100%.

'Online' is the key

The study found that online businesses have widely spread in all domains the micro-entrepreneurs can feasibly run the business by just getting familiarized with the technology and its handling. Chart 1 is derived

as an outcome of the interviews being conducted, showing a channel of business operations facilitated by online means throughout.

Chart 1: Online business operations

Source: Authors' findings.

Nowadays, social media is among the 'best possibilities available' to a seller to reach its potential customers. Li et al. (2022) found that social media positively impacts the growth and performance of the business. From making a business account on social media platforms like Facebook and Instagram to receiving payment for sales and delivering the goods, all steps are facilitated through online services. It was observed that after creating the account, social media marketing is frequently done through bloggers. They promote businesses on their profiles with huge numbers of followers by trying the goods or services and sharing reviews about them. Online marketing also provides opportunities for females by maintaining a space for affordable and home-based marketing via the internet (Haque & Sharmin, 2016).

Moving ahead, a study conducted by Bauerová (2021) concluded that consumer behavior has changed and online grocery stores are emerging after the outbreak of coronavirus. Notably, only 22% of female entrepreneurs said that they have to step out of their homes frequently for business purposes. Henna application, photography, gift packaging using fresh flowers, and a fresh food platter seller said that they have to step out of their homes often for the sake of business. 55.5% of females said that they rarely need to go out as all the required supplies are delivered to their doorstep. Of the total sample, 16.7% of females said that they visit markets once a month to buy raw materials. Lastly, 5.8% said that they never have to step out of their homes for business purposes as they are involved in providing online services.

As reported by the female entrepreneurs, online delivery services like Careem, Uber, and Bykea are frequently used by them. They just require booking a ride online and handover the items to the address of the buyer.

Payment system

Internet banking can facilitate users to perform transactions from their account anytime and anywhere on their cell phones or devices. Nugroho et al. (2019) found that female entrepreneurs had a sound understanding of using internet banking services in comparison to male entrepreneurs. Similarly, internet/online banking services in Pakistan have largely impacted female entrepreneurs positively. All 18 females said that they use online payment methods via bank, EasyPaisa, and JazzCash. However, 13 females perform their online transactions from personal accounts, while 5 females have maintained separate bank accounts for the business. Moreover, 6 females said that they offer online as well as cash-on-delivery payment methods.

Major challenges faced by online businesses

The analyses performed by Ramadani et al. (2015) showed that women face challenges in establishing their businesses with every move they make. Be it a seller or a buyer, 'trust' remains a problem as the customer may not receive the product as shown or the seller may get blocked by the customer without paying for the good or service availed. Patokorpi and Kimppa, (2006) found that developing online trust could be

described as a successful combination of four basic features: reputation, technology, expertise, and relationship.

In this study, trust issues were greatly highlighted by the female entrepreneurs as it is quite difficult for them to develop trust among customers and trust them also for not being fraudsters. Moreover, other major challenges were found to be pricing, marketing, competition, unavailability of supplies, power shortages, and permission for leaving home for providing photography and henna application services.

Upon querying the ways through which the trust got developed from both sides, the majority of the women emphasized their 'communication skills to be the key factor in developing healthy relationships with the customers and ultimately winning the trust. Females also underscored the importance of reviews publicly posted by the consumers and sharing pictures of their work with the consumers for establishing trust. However, the trust of the seller is still a challenge faced by them and 55% of the females shared their experiences of facing scams and frauds in online business.

Effects of Inflation

Although inflation has remained a global phenomenon for the last couple of months, it has brought harsher consequences in a developing country like Pakistan. For the business community or the households, inflation has hit all of them hard. Effects of recent inflation were identified by the sample from the supply as well as the demand side. Rising costs at the sellers' end and lesser orders due to the loss of purchasing power of the rupee at the buyers' end have been identified as the harsh effects of inflation. 55.6% of the females highlighted rising costs and fewer orders as the effects of inflation on their businesses.

While questioning further, the cost of raw materials/ supplies and increased delivery cost due to surged fuel prices were the main components of an overall rise in costs. Females running food/baking businesses pointed out the imposition of tax on imported goods and rising electricity charges as dominant reasons for the rise in costs.

Role of Government

50% of the sample said that the government is playing a negative role in their business operations of inflation, complexities in business license procedures, and import restrictions. During discussions with the targeted entrepreneurs, five areas were highlighted by them where the government can play its role to facilitate female-run online businesses. Summary Table 1 shows the areas of intervention identified by the female entrepreneurs.

Table 1: Potential areas of government intervention

Areas of government intervention	Percentage (%)
Online fraud filing portal	66.7
Registration	44.4
Trainings	44.4
Providing platforms	33.3
Micro-loans	27.8
Not needed	11.1

Source: Authors' findings.

The majority of the females chose more than one area where they expect government intervention to play a role. As females shared fraud and scam incidents as their worst experiences, 66.7% of females emphasized the need of establishing an online portal for filing frauds in online businesses. Moreover, 44.4% of the sample resented the long cumbersome process of registering a business. Being micro-entrepreneurs, they are unable to fulfill the majority of the requirements to get their business registered.

Some of the female entrepreneurs in the sample were degree holders in entrepreneurship and related programs. 44.4% of the female entrepreneurs were of the view that entrepreneurial courses should be made compulsory at college and university levels. Skill-learning programs were also highlighted to make the females skilled enough to get them cashed by becoming micro-entrepreneurs.

Furthermore, 33.3% of females underscored the need of providing a platform to connect to the international market, especially in the case of arts and crafts businesses. This would assist in expanding those businesses as they do have long-term expansion plans. Importantly, 27.8% of female entrepreneurs pointed out the need for micro-loans on easy conditions for the better startup of online businesses and helping in expansion. It was also found that 11.1% of females shared their apprehension about imposing taxes by the government if online businesses become part of the formal economy.

5. CONCLUSION

In the last couple of years, social media has started to play a vital role in various domains including female entrepreneurial activities, especially during the pandemic. It has provided a free-of-cost platform for females to become financially independent by starting a home-based online business with minimal investment. In this regard, the study explored the journey of females in becoming online entrepreneurs and achieving financial independence. Although the female entrepreneurs outlined various challenges encountered by them, they regarded the activity as no less than a "blessing" in their lives. Moreover, all the females pointed out "consistency" as a key to running an online business successfully. As the transition from a traditional "face-to-face" business to an "online" business is taking place, there is a need to strengthen the digital infrastructure and promote the online entrepreneurial culture to improve the status of women and their families as well.

According to the findings, it is recommended that the government of Pakistan should promote the online business culture by providing training on using social media and online learning platforms to all women in urban or rural areas. Registration of business has also been identified as a major problem. This process should be made easy for online businesses which are usually small and fail to fulfill numerous conditions. Government should provide micro-financing loans on easy terms to women who are willing to initiate or expand an online business. The State Bank of Pakistan in compliance with commercial and Microfinance Banks can introduce and pilot innovative offers for providing finance to women willing or running online businesses. Most importantly, there is a need to establish an effective online system with the help of a cybercrime security department to report any fraud/ scam in online business activity. This would also be a source of encouragement for females to become online business entrepreneurs, hence contributing to the household.

The current study was limited to the female entrepreneurs running home-based businesses from Islamabad only as there was a time constraint. For further studies on the same theme, it is suggested to include more cities and increase the sample size as for now, the total sum of female entrepreneurs running home-based online businesses is not available.

Acknowledgment

We are thankful to all reviewers and participants of the study for their valuable reviews and active involvement, respectively. We would also like to extend our sincere gratitude to the editor and his team for their unconditional support during the publication process.

Funding Source:

The author(s) received no specific funding for this work.

Conflict of Interests:
The authors have declared that no competing interests exist.

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Kashmir Economic Review
ISSN(P): 1011-081X, ISSN(E): 2706-9516
http://www.ker.org.pk

Probing the Nexus Between Innovative Work Behavior and Religious Belief: One Belt and One Road Perspective

ABSTRACT

The study aims to analyze the impact of organizational justice on innovative work behavior in the services sector. It capitalizes on the role of perceived organizational support as moderator and Muslim religious belief in three-way moderation. One of the principal objectives of the study is to find whether perceived organizational support and Muslim religious belief combined foster innovativeness. This study surveys 582 respondents randomly and utilizes PROCESS macro in SPSS to test hypotheses. The study reveals that perceived organizational support and Muslim religious belief distinctively play a vital role in the relation between organizational justice and innovative work behavior. The study concludes by presenting managerial and economic implications and paves for further research on various promising areas.

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Keywords
Organizational justice, Muslim culture, Innovative work behavior, Perceived organizational support, Muslim

JEL Classification
D23, M10, O31, Z12

Please cite this article as:
Abbas, W., Amin, H., Askari, M., & Khalil, H. (2022). CPEC benefiting Pakistan: Probing the nexus between innovative work behavior and religious belief. *Kashmir Economic Review*, 31(1), 25-39.

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Author's contribution in the article: 1- Conceived and designed the analysis, 2- Reviewed and compiled the literature, 3- Collected the data, 4- Contributed data or analysis tools, 5- Performed the analysis, 6- Wrote the paper, 7- Financial support for the conduct of the study, 8-Other

1. INTRODUCTION

The literature on human resource management has extensively discussed the importance of fairness in the organization. However, Organizational justice (O.J.) has been under discussion for more than three decades. Despite intensive empirical research on organizational justice, it still draws the attention of contemporary researchers (Akram et al., 2016; Taghrid et al., 2017). There are several reasons for gaining the attention of contemporary researchers. One of the vital reasons is that it is an important predictor of positive organizational outcomes. For example, Agarwal (2014) and Akram et al. (2016) suggest in their studies that organizational justice predicts innovative work behavior (as a positive organizational outcome). Since innovativeness is attractive to many organizations, several authors pay attention to innovative work behavior. For example, Cabello-Medina et al. (2011) have discussed innovative work behavior at the organizational level, and Bos-Nehles & Veenendaal (2017) have discussed it at the individual level. Irrespective of the focus of the studies, either at the organizational or individual level, innovative work behavior is declared a sustainable competitive advantage (Agarwal, 2014; Akram et al., 2016; Cabello-Medina et al., 2011; Bos-Nehles & Veenendaal, 2017). Literature reveals that organizational-level innovation has attained much attention, and little is discussed about individual-level innovation (Bos-Nehles & Veenendaal, 2017). Even though individuals originate and process innovative ideas (Van de Ven, 1986). This study conceptualizes innovative work behavior at the individual level and foregrounds the role of individuals in an organization.

Several studies have discussed the relationship between organizational justice with different organizational outcomes (Akram et al., 2016; Jiun-Lan & Jeng-Hwan, 2015). Nevertheless, the relationship between organizational justice and innovative work behavior is less explored. The literature discusses organizational justice in two broader streams. The first stream considers organizational justice a multi-dimensional construct. In contrast, the second stream considers organizational justice as a unidimensional construct holistically (Ambrose & Schminke, 2009; Greenberg & Colquitt, 2013; Mohammad et al., 2016). The multidimensional view of organizational justice discusses four facets of organizational justice— distributive, procedural, interpersonal, and informational (Akram et al., 2016; Jiun-Lan & Jeng-Hwan, 2015). This study follows the latter and considers the view of overall justice. In addition, organizational justice has been studied in different regions, sectors, and businesses. However, it has been studied extensively in developed nations and the western world. Likewise, the literature also revealed that most studies on IWB were conducted in the manufacturing sector (Li & Hsu, 2016). Therefore, considering organizational justice as culturally sensitive (Taghrid et al., 2017), this study attempts to analyze the moderating role of Muslim religious belief and perceived organizational support in the relationship between organizational justice and innovative work behavior.

This study will serve as an additive lead to individuals associated with the services sector, particularly in Pakistan. First, the study will assist H.R. professionals responsible for managing a diversified workforce. Second, it will be beneficial for strategic partners of an organization to adopt fairness and inculcate a creative approach at different levels of the organization. Third, the study will also be beneficial for the entities associated with China Pakistan Economic Corridor (CPEC), for example, SMEs, hotels, entrepreneurs, and national investors— a few to mention. Last, the study will also assist foreign investors in providing insight into workforce dynamics in the services sector. In addition, this study's findings will benefit academics, researchers, policymakers, and practitioners who can devise and apply conducive economic policies.

2. LITERATURE SURVEY

2.1 Innovative work behavior

Innovative work behavior (IWB) constitutes three interconnected behavioral dimensions— idea generation and idea realization. It surrounds the ideation leadership concept (Janssen, 2000). Ideation deals with the

formation of new ideas and concepts. In the creative process of ideation, ideas go through a certain process. It starts with creating, developing, and communicating new ideas to progress (Janssen, 2005). One research also argued that ideation is an ongoing process associated with innovative developments and realization (Shanker et al., 2017). Innovative work behaviors (IWBs) are discretionary roles rather than explicit behaviors. Janssen (2000) supports that IWBs are not explicitly stated in the job description; instead, they are volunteering attempts by an individual. It could be a result of self-motivation or personal traits. Similarly, another study found that it was impossible to determine the specific actions that lead to improved organizational performance through discretionary behaviors. However, it was noted that participating in these behaviors can enhance the organization's performance (Jiun-Lan & Jeng-Hwan, 2015; Ramamoorthy et al., 2005).

2.2 Organizational justice

Organizational justice (O.J.), a concept under discussion for decades, is considered significant in management and industrial psychology (Mohammad et al., 2016). It highly contributes to organizational effectiveness, stability, and efficient performance. In the entire literature, two ideas are associated with organizational justice (O.J.) have discussed; the first view suggests that employees assess organizational justice in three dimensions, and the second view suggests evaluating overall justice. One study found the set perception of workers about organizational justice in the workplace (Holtz & Harold, 2009). However, there are also studies that measure organizational justice in three dimensions (Jiun-Lan & Jeng-Hwan, 2015; Demir et al., 2017).

Literature relating to organizational justice discusses three dimensions— procedural, distributive, and interactional justice. Procedural justice is concerned with procedures and policies in determining consequences (Folger & Cropanzano, 1998). Distributive justice is about the distribution of resources based on equity (Adams, 1965). Interactional justice is a kind of fair interpersonal treatment from the supervisor's end, especially when measuring performance (Bies, 2005). Furthermore, one study has also discussed interactional justice in two aspects, (i) informational and (ii) interpersonal aspects (Colquitt, 2001). The proponents of the second dimension criticized specific types of organizational justice. They argued that it is better to consider the concept of organizational justice as a whole (Ambrose & Schminke, 2009). Mohammad et al. (2016) studied succeeding conventions and explained organizational justice concerning employees' experience in the workplace setting.

In this study, it is noteworthy that different cultures have different understandings of organizational justice (Parker & Kohlmeyer, 2005). Their cultural perceptions vary and reflect different meanings and opinions due to cultural influence and societal norms. As Adler & Graham (1989) mentioned, people living in different countries or societies hold different perceptions, views, beliefs, interpretations, and preferences in different situations. Different studies have proved that employees from different countries or cultural backgrounds keep different perceptions of justice because of different values (Tyler et al., 2000; Fischer & Smith, 2006). Additionally, organizational justice will enrich through cross-cultural understanding, incongruent with antecedents and consequences of justice in different cultures (Shao et al., 2013). This study, following Ambrose and Schminke (2009), considers Organizational Justice (O.J.) as a unidimensional (holistic concept), and it intends to fill the research gap by studying it in Muslim culture.

2.3 Perceived organizational support

Employees' performance and well-being can be improved if they receive support from their respective organizations. Perceived organizational support (POS) is one of the noticeable indicators of organizational performance. Employees believe their organization cares for and acknowledges their comfort and contributions (Eisenberger et al., 1986). POS also reduces job insecurities and negative perceptions among employees, aids in stress relief, and enables them to accomplish organizational goals (Arslaner & Boylu, 2017; Ding & Shen, 2017). Furthermore, it also enhances employees' working capacity. It keeps them productive by creating a sense of providing a better work environment (Wang et al., 2017). Consequently,

POS also improves the discretionary working behavior of employees (Kurtessis et al., 2017), which leads to improvement in organizational performance.

The concept of POS caters to perceptions of support given by the organization, value to contribution by the organization, and recognition (Eisenberger et al., 1986). Different research studies found that high POS facilitates employees in several ways. For example, it enables employees to work without getting stressed. It is positively associated with performance and helps reach the set goals (Ding & Shen, 2017). It is also helpful in mitigating the adverse effects, i.e., job insecurity.

2.4 Muslim religious belief

Religion is considered a social determinant of innovation. However, the existing literature remains divided in discussing the relation between religion and innovation. One stream believes religion hinders innovativeness, while the other trusts religion facilitates innovativeness.

Several studies claim that religiosity discourages diversity of ideas, breeds conservativeness among individuals, and halts individuals from leaving their traditions. For example, Okulicz-Kozaryn (2015) discusses that religiosity compels individuals to obey, comply, and follow defined rituals. Therefore, religious individuals are less likely to engender novelty. Similarly, a Dollinger (2007) argue that religiosity inculcate fundamentalism. Therefore, they are most likely to have a conservative mindset. Schwartz and Huismans (1995) discuss that religious individuals are more confirmative and fewer believers in self-directions. Therefore, conformity and innovativeness cannot share a similar table. Since innovativeness demands new ideas, challenges traditions (Gino & Wiltermuth, 2014), breaks predominating and pre-decided standards (Brenkert, 2009), and builds diversity, therefore, religiosity curtails innovativeness.

In contrast, Assouad and Parboteeah (2018) discuss that religion nurtures several traits that are directly associated with innovativeness. For example, hard-working, honest, self-control, and a spirit of cooperation are traits that boost religious individuals to foster innovativeness. Similarly, Dana (2009) debates that religion inculcates positivity in the environment, which is constructive for entrepreneurs and people with a creative sense. Another study by Day (2005) postulates three different mechanisms facilitating innovativeness. Firstly, religious activities bring new experiences to individuals who contribute to innovativeness. Secondly, religiosity enables individuals to identify multiple ways of organizing information which helps risk takers to measure their potential. Lastly, religious individuals have greater inter locus of control, which helps in encountering problematic situations. Likewise, Shen et al. (2019) found that religiosity boosts mortality among individuals, and innovativeness is positively associated with morality. Therefore, individuals with greater morality tend to be more innovative than those with less morality. Hence, religiosity has a greater tendency to foster innovativeness among individuals.

This study intends to find whether individuals with Muslim religious beliefs foster innovativeness when perceiving organizational support. Therefore, it is pertinent to identify individuals who are practicing Muslims and are associated with a culture of a Muslim country. There may be a difference in belief among Muslims originating from a non-Muslim country (Liu et al., 2018). They may prefer to call themselves Muslim but may have an acute sense of the practices of Islam and faith. Hence, Pakistan is a culturally Muslim country, with more than 95 percent of its population categorizing themselves as practicing Muslims.

At its core, Muslim religious belief (MRB) is based upon two primary sources, the Quran and the Sunnah, in which work is considered a religious duty solely for the sake of Allah (Kamaluddin & Manan, 2010; Mohammad et al., 2016). For instance, the Prophet Muhammad (PBUH) stated that "work is worship" and asserted that hard work absolves sins (Mohammad et al., 2016). Further, he (PBUH) asserted that quality and quantity are two dimensions of successful work: "Allah blesses a person who perfects his craft" and

"Allah loves a person who learns precisely how to perform his work and does it right" (Ali & Al-Owaihan, 2008).

Islam (Muslims' religion) also promotes equality. Muslim religion teaches that no one is superior due to wealth or status. Therefore, managers in Muslim cultures are assumed to practice equality, justice, and fairness with everyone (Mohammad et al., 2016). Allah says in the Holy Quran, "Give full measure when you measure out and weigh with a fair balance. This is fair and better in the end" (17:35). Likewise, Muhammad (PBUH) instructed his followers, "When you hire, compensate the workers and treat them fairly" (Mohammad et al., 2016). It signifies that Muslims' religious beliefs prohibit them from allowing workplace injustice, discrimination, and intolerance. Moreover, MRB has great importance in Muslim societies and their organizations.

Keeping in view the literature review, we propose the following research model (Figure 1). We hypothesize that Muslim religious belief will moderate the moderated relation (considering POS as the moderator) between organizational justice and innovative work behavior.

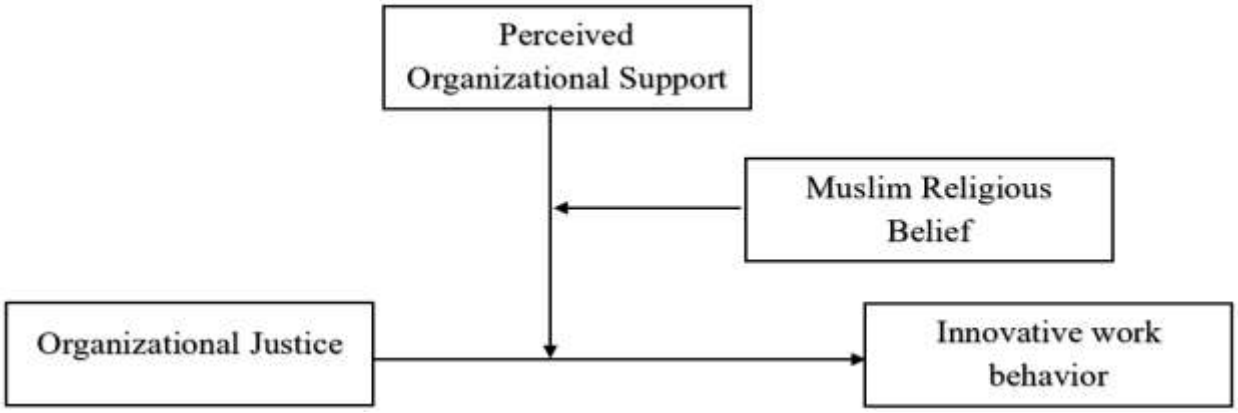

Figure 1: A research framework

In this study, we examine O.J., POS, MRB, and IWB from the perspective of social exchange theory (SET) and the theory of planned behavior (TPB). According to SET, an equal and gratifying workplace is created for both employees and employers when managers and supervisors work together to build and maintain mutual trust (Cropanzano et al., 2017). Likewise, when employees feel encouraged and boosted by the practices of fairness in the workplace, they are more likely to contribute in three ways: (1) depict involvement, (2) active participation in the assigned tasks, and (3) adopt new approaches to their jobs. As stated in the TPB, individuals' behavior is partly governed by their behavioral goals, intentions toward the behavior, and subjective norms around the behavior (Steinmetz et al., 2016). Factors that determine whether or not an activity is considered right or wrong are included in the categories above. Individuals' attitudes about important parts of life, such as employment, are shaped by religious beliefs and practices Parboteeah et al. (2009).

Since research into the relationship between organizational justice (holistically) and innovative work behavior in services is also lacking, it is pivotal to identify the mechanisms to enrich innovativeness among individuals. Many scholars have studied the relationship between justice and IWB (Akram et al., 2016; Jiun-Lan & Jeng-Hwan, 2015). However, less is known about the relation between O.J. and IWB in the dominant Muslim culture. It is because most studies are conducted in the West than in the East. We believe that the relationship between O.J. and IWB can further be enhanced when employees perceive support from the organization and are allowed to practice their religious belief system. For example, providing employees

with enough discretionary rewards will make them think that the organization meets their requirements and can be trusted to do so in the future (Côté et al., 2021).

An explanation for the moderating relationship of POS between O.J. and IWB is that perceptions of fairness promote trust between employees and their organizations. Therefore, workers with a high POS feel the organization will treat them properly. In contrast, workers with a low POS may respond more severely to the same injustice because they consider it is continuing the organization's unwillingness to treat them fairly. Prior research (Xu & Yang, 2021) on POS has shown that a high POS level leads to more voluntary acts performed by workers that benefit the organization. According to the research, when an employee's POS is high, they feel obliged to repay the favor by going above and beyond the limits of their job.

Similarly, individuals committed to a particular set of religious beliefs display enhanced cognitive patterns, improved cultural understandings, and better-striving capabilities to meet organizational objectives. Therefore, religion is the most important element affecting a person's way of life and actions (Ayar et al., 2022). Everyone has a religious affiliation and makes decisions based on the teachings and texts of their faith(s). People try to live their lives by their religious beliefs and reject those seen as immoral by the rest of society. As a result, it is legitimate to claim that religion impacts personal and professional lives. Likewise, individuals with a strong religious belief system tend to be more helpful, kind, cooperative, less biased, and vice-versa.

Therefore, based on the discussion above, we propose the following hypotheses,

H_1: There is a positive correlation between O.J. and IWB in Muslim culture.

H_2: Different levels of POS impact the relationship between O.J. and IWB in Muslim culture, where a higher level of POS will strengthen the positive relationship between O.J. and IWB, and a lower level will weaken.

H_3: MRB moderates the moderated relation between O.J. on IWB in Muslim culture in a way that high MRB will further strengthen the positive relationships among O.J., IWB, and POS.

3. METHODS

3.1 Procedures, participants, and sample

This quantitative study utilizes a cross-sectional survey method to collect data using e-questionnaires. The data has been collected from graduates holding Master's degrees in business. The HEC-recognized business schools were selected for data collection purposes.

The questionnaire was shared with the respondents through email. Mostly, the respondents are from Karachi city. In the first stage, randomly chosen business studies institutes were approached to obtain graduate directories. Based on directories information, around 1150 randomly selected graduates were contacted to participate in this research study. Research protocols were taken into account very seriously, whether it was a matter of data confidentiality or an explanation of the purpose of the study. Out of 1150 respondents, 750 were willing to participate in the study, and we received 623 questionnaires with responses.

In the second stage, an online link using google forms was generated. The link was disseminated among respondents via email. The email also comprised a cover letter explaining the research purpose, confidentiality clauses maintained by the researcher, anonymity clauses ensured by the researchers, and instructions relating procedure for filling out the questionnaire. Respondents were given thirty days to respond, and a reminder was also sent to students in the third week.

After a month, we achieved a response rate of 83.06%. Then, a few responses during screening were excluded due to not qualifying criteria, i.e., full-time employed, Muslim, live in Pakistan, employed in a

service sector— a few to mention. Finally, 582 responses were considered valid for further statistical analyses after they completed screening. Among these responses, most of the respondents were male (n=306) and married (n=446).

3.2 Measures

This research study has used validated scale items to measure the constructs. O.J. construct was developed by Ambrose and Schminke (2009), Greenberg and Colquitt (2013), and further validated by Mohammad et al. (2016). POS was validated by Wiesenberger et al. (1986), Rhoades and Wiesenberger (2002), and Soumendu and Kanwal (2017). Muslim Religious belief construct was adapted from AlMarri et al. (2009) and Wilde and Joseph (1997) studies. IWB was adapted from Janssen (2000). All scales were measured on 5 points Likert scale with Cronbach Alpha values of 0.80, 0.90, 0.89, 0.93 for organizational justice, perceived organizational support, Muslim religious belief, and innovative work behavior.

4. ANALYSIS OF DATA

Initially, the data were analyzed for common method bias (CMB). In this research, the data were collected on a self-reporting basis. Therefore, the issue of CMB may exist. This study, following Podsakoff et al. (2012), has already incorporated procedural remedies, i.e., ensuring the confidentiality and anonymity of the respondents (Konrad & Linnehan, 1995) and using previously validated scales (Doty & Glick, 1998). Both of the procedural remedies help reduce potential bias respectively. However, the Harman single-factor test was conducted (Podsakoff et al., 2003). The results revealed that CMB is not an issue in our data because the total variance explained by all variables— organizational justice, innovative work behavior, perceived organizational support, and Muslim religious belief— subject to exploratory factor analysis (EFA) was 30.02%. According to Eichhorn (2014), this result is below the threshold of 50%; therefore, CMB is not an issue in our study statistically.

Next, we checked our data for multicollinearity. To diagnose multicollinearity, we conducted a variance inflation factor (VIF). The test results revealed that there is no significant multicollinearity in our data. The VIF for organizational justice was 1.297, Perceived organizational support was 1.532, and Muslim religious belief was 1.216. Since the largest VIF, i.e., 1.532, is below the threshold of 5, according to Neter et al. (1996), multicollinearity is not an issue in our study. Considering all statistical results, the current data is considered appropriate for further statistical analysis (Devellis, 2003).

4.1 Analytic plan

Following Bos-Nehles and Veenendaal (2017), we conceptualize innovative work behavior as a one-dimensional construct. That is a single construct having three innovative stages. Therefore, we conducted confirmatory factor analyses using two competing models (Hair et al., 2010). First, a second-order three-factor model was tested. For this, we loaded items in proposed innovative stages and found these results; CFI= 0.928, GFI= 0.925, and RMSEA= 0.086. Later, we loaded all items onto a single factor and found CFI= 0.961, GFI =0.928, and RMSEA= 0.076. Since the threshold, i.e., CFI > 0.90, GFI > 0.90, and RMSEA < 0.08 (Hair et al., 2010), therefore, between competing models, the single-factor model is statistically better and confirms that innovative work behavior is a one-dimensional construct.

We have used PROCESS Macro in SPSS (V.23) to conduct moderation analysis in this study. Initially, simple moderation is conducted considering the interaction between POS and O.J. Then, moderated moderation was examined, considering interaction among O.J., POS, and MRB. The interactions were further probed for conditional effect. Also, each interaction was plotted using a +/-1 standard deviation. All interaction terms were mean-centered to improve the interpretability of interacting effects, following Hayes (2012).

4.2 Findings

Table 1 shows the descriptive statistics comprising the mean, standard deviation, and Correlation of all variables.

Table 1: Descriptive statistics

Variables	Mean	SD	1	2	3
1. Organizational Justice	2.996	.836			
2. Perceived Organizational Support	3.150	.9513	.477**		
3. Muslim Religious Belief	3.154	1.104	.166**	.420**	
4. Innovative Work Behavior	3.299	.9920	.546**	.407**	.441**

**Correlation is significant at the 0.01 level.

Table 2 shows the main effect of the variable (O.J. → IWB).

Table 2: Main effect of the independent variable

Measures	
Organizational justice [a] (O.J.)	0.648 ***
F stats.	248.390***
R	0.546
R^2	0.298

[a] Predictor: Organizational justice, Dependent variable: Innovative work behavior, *** $p < 0.001$

The above (Table 2) found that organizational justice positively affects innovative work behavior in the Muslim culture. That is, the beta value for organizational justice *(b= 0.648, p < 0.001) and statistics of the overall model* F *(1, 584) = 248.390, p < 0.001 signifies that our Hypothesis 1* is accepted. Also, Table 1 shows that organizational justice and innovative work positively correlate in Muslim culture.

Table 3 shows the moderation analysis, where perceived organizational support is considered the moderator. The moderation analysis is conducted using PROCESS macro in SPSS.

Table 3: The moderating role of POS

Measures	
Organizational justice [a] (O.J.)	0.4690***
Perceived Organizational support [c] (POS)	0.2115***
Interaction: O.J. x POS	0.1898 [d]***
R	0.5987
R^2	0.3585
ΔR^2	0.0341***
F-stats	247.7832***
ΔF	31.0922***

[a] Independent variable, [c] Moderator, [d] Mean-centered interaction, *** $p < 0.001$

From above (Table 3), we found that organizational justice (b=0.4690, p < 0.001) and perceived organizational support (b=0.2115, p < 0.001) have a positive impact on innovative work behavior. Similarly, the interaction effect between organizational justice and perceived organizational support (b=0.1898, p < 0.001), overall model statistics F (3, 578) = 247.7832, p < 0.001, and change statistics ΔR^2= 0.0341, F (1, 578) = 31.0922, p < 0.001 signifies that the interaction between POS and O.J. has accounted for more variance than just O.J. and POS themselves. Therefore, Hypothesis 2 is accepted. The two-way interaction is plotted in Figure 2 (organizational justice x perceived organizational support).

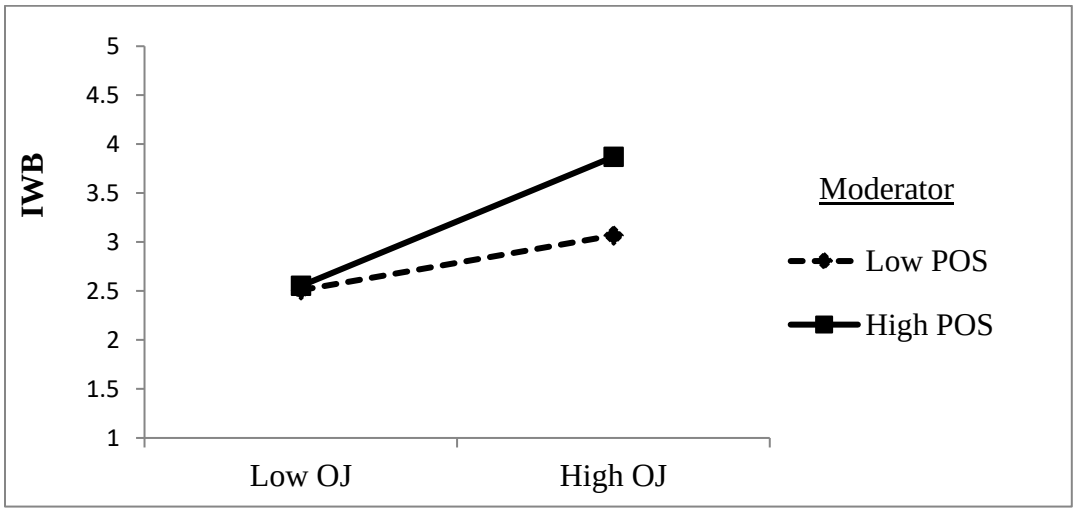

Figure 2: Effect of two-way interaction

Table 4 shows the moderated moderation using two moderators; perceived organizational support and Muslim religious belief.

Table 4: The moderating role of POS and MRB

Measures	
Organizational justice [a] (O.J.)	0.4151 [b***]
Perceived Organizational support [c] (POS)	0.0797[*]
Muslim religious belief [d] (MRB.)	0.2164 [***]
Interaction [1]: O.J. x POS	0.1143 [e***]
Interaction [2]: O.J. x MRB.	0.1142 [e*]
Interaction [3]: POS x M.R.B.	0.1249 [e***]
Interaction [4]: O.J. x POS x M.R.B.	0.1012 [e***]
R	0.6803
R^2	0.4629
ΔR^2	0.0156[***]
F stats	134.4119[***]
ΔF	19.0989[***]

[a] Independent variable, [c] Moderator 1, [d] Moderator 2, [e] Mean-centered interaction, [*] $p < 0.05$, [**] $p < 0.01$, [***] $p < 0.001$

From above (Table 4), we found that organizational justice (b=0.4151, p < 0.001), perceived organizational support (b=0.0797, p < 0.001), and Muslim religious belief (b=0.2164, p < 0.001) have a positive impact on innovative work behavior. Similarly, the interaction effect between organizational justice perceived organizational support and Muslim religious belief (b=0.1012, p < 0.001), overall model statistics F (7, 574) = 134.4119, p < 0.001, and change statistics ΔR^2= 0.0156, F (1, 574) = 19.0989, p < .001 signifies that the interaction between O.J., POS, and MRB has accounted for more variance than just O.J., POS, and MRB themselves. Therefore, Hypothesis 3 is accepted. The three-way interaction is plotted in Figure 3 (organizational justice x perceived organizational support x Muslim religious belief).

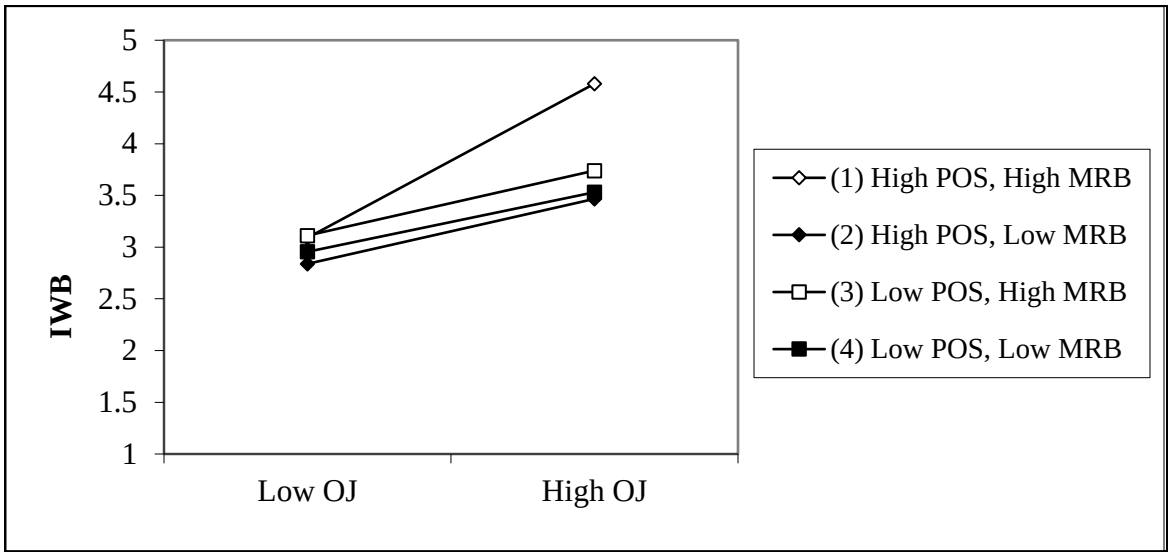

Figure 3: Effect of the three-way interaction

5. DISCUSSION

This empirical study analyzed the relation between four variables. First, the study analyzed the relationship between organizational justice and innovative work behavior. Second, it evaluated the moderating role of perceived organizational support in the relationship between organizational justice and innovative work behavior. Lastly, it empirically assessed whether Muslim religious belief moderates the relationship between organizational justice and innovative work behavior. This study was conducted in the services sector of Pakistan— a country with dominant Muslim culture in South East Asia. This study drew three empirical hypotheses, and all hypotheses were supported.

This study revealed that organizational justice is positively related to innovative work behavior in the services sector of a Muslim-dominated culture. These results are consistent with studies conducted services sector of other Asian countries where the Muslim religion is less dominant. For example, Jiun-Luan and Jeng-Hwan (2015) concluded that organizational justice is positively related to innovative work behavior in Taiwan's hospitality industry. Likewise, Akram et al. (2016) found a positive relationship between organizational justice and innovative work behavior in the Chinese telecommunication sector. In addition, our results are also consistent with the studies conducted in dominating Muslim cultures around the world. For example, Kurniawan and Ulfah (2021) also found that organizational justice is positively associated with innovative work behavior among female government servants in Indonesia. Likewise, Knezović and Drkić (2020) also found that organizational justice is positively related to innovative work behavior in SMEs of Bosnia and Herzegovina.

The result of the study also revealed that perceived organizational support moderates the relationship between organizational justice and innovative work behavior. The result shows that when perceived organizational support is higher, the relationship between organizational justice and innovative work behavior intensifies positively. Our results of the study are also consistent with the literature. For example, Qi et al. (2019) found a positive relationship between perceived organizational support and innovative work behavior in the services sector of China. Likewise, Nazir et al. (2019) found that organizational justice and perceived organizational support are positively related to innovative work behavior. Since perceived organizational support is culturally sensitive (Eisenberger et al., 2020), it impacts stronger on the outcome variable, i.e., innovative work behavior, in Eastern cultures and collectivist nations. Therefore, the study

results confirm that in the Muslim-dominated collectivist culture— Pakistan— high perceived organizational support, when interacting with organizational justice, reduces the emotional and cognitive burden and increases self-enhancement and self-efficacy, which positively fosters innovative work behavior.

Finally, the result also shows that in three-way interaction, Muslim religious belief and perceived organizational support moderate the relationship between organizational justice and innovative work behavior. It intensifies the relation so that high perceived organizational support and firm Muslim religious belief give rise to organizational justice and innovative work behavior. The results explain that in the service sector of Muslim cultures, such as Pakistan, employees perceiving high organizational support and having firm Muslim religious beliefs tend to demonstrate high innovativeness in their behaviors.

5.1 Managerial Implications

This study provides managerial implications for H.R. professionals in multicultural environments who serve Muslim workforces in Muslim countries and non-Muslim countries. The organizations should not constrain Muslim religious practices at work; for example, giving prayer breaks and a dedicated prayer room will help enhance productivity. Similarly, equipping the prayer room with religious books like the Holy Quran will help employees perceive that the organization values the personal values inherent in their religious beliefs. This perceived care will let employees become psychologically intense and provide stress relief. Consequently, it will encourage employees to initiate risk-taking behavior and responsibility, thus enhancing organizational performance by adopting IWB.

5.2 Implications for Belt and Road Initiatives

Pakistan is strategically placed in the One Belt, One Road initiative (OBOR). The China-Pakistan Economic Corridor (CPEC) encourages businesses in the region, particularly in Pakistan, through the Arabian sea. Since more than thirty percent of the world's oil uses the Arabian sea as its trade route, business opportunities in Pakistan are expected to accelerate. The rise in businesses in Pakistan is expected in three dimensions. First, through establishing Small and Medium Enterprises (SMEs). Second, promote entrepreneurial activities and welcome entrepreneurs. Last, by developing infrastructures, industries, hotels, workshops, and health centers, i.e., roads, motorways, highways, dry ports, seaports, or establishing industries like cement and steel. These opportunities boost economic activities, support Pakistan's manufacturing and services sector, generate employment, attract foreign investments, and encourage business collaborations across borders.

Given this, this study provides significant implications for policymakers to design policies by keeping in mind current results. Since CPEC may allow Chinese manufacturers to flood our markets with low-cost commodities (as Chinese manufacturers are considered cost leaders), policies shall be given attention to protect the interest of national industries and ways to compete for Chinese goods. The study also encourages foreign investors (opting for foreign direct investments) to allocate and permit religious practicing places in the organization. The current study provides evidence that Muslim religious belief fosters innovative work behavior when accompanied by justice and support from the organization. Similarly, the study results also provide an insight into the workforce dynamics relating services sector of Pakistan. Like, employees in the services sector, like in other nations, prefer to be treated equally, fairly, and justly and encourage equity. They also tend to reciprocate positively when they perceive support from the organization, religious freedom, and justice, allowing organizations to embrace innovativeness.

Despite having managerial and economic implications, the study is not free from limitations. First, the study relates to the services sector; therefore, the current results may not generalize to other sectors. Second, the study only caters to Muslims' religious beliefs in Pakistan, making it a highly context-specific study. Considering the specific context nature, the current study results are not generalizable to other religious beliefs and nations where Muslim belief is not dominating. Third, the culture of Pakistan is collectivist;

therefore, the results are inadequate for the services sector of individualist cultures. Fourth, the study only looks at the constructive side of the CPEC, i.e., greater business opportunities. Future researchers may focus on the manufacturing sector or comparative study using a similar model between services and the manufacturing sector.

6. CONCLUSION

This study underlines the significance of perceived overall organizational justice, perceived organizational support, and religious belief in the service sectors of Muslim cultures and their effect on innovative work behavior. It emphasizes that organizations operating in Muslim cultures are advised to adopt policies that accommodate the cultural components of workforce diversity. Consequently, it will aid in motivating workers to participate in discretionary behavior, i.e., innovative work behavior, to improve the organization's overall performance by introducing novel ways, processes, and procedures.

Acknowledgment
We are thankful to all reviewers and participants of the study for their valuable reviews and active involvement, respectively. We would also like to extend our sincere gratitude to the editor and his team for their unconditional support during publication.

Funding Source:
The author(s) received no specific funding for this work.

Conflict of Interests:
The authors have declared that no competing interests exist.

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Kashmir Economic Review
ISSN(P): 1011-081X, ISSN(E): 2706-9516
http://www.ker.org.pk

Impact of Energy Price on Technological Innovation through the channel of Human capital: The Case of Developed and Developing Economies

ABSTRACT

This Study investigated the moderating role of human capital in the relationship between energy price and technological innovation for 81 developed and developing countries from the period 1990-2019. For empirical investigation, we have employed fixed effect, random effect, and generalized method of moments (GMM). This study analyzed the conditional effect of energy price on technological innovation at different levels of human capital. According to findings, both developed and developing countries experience an increase in technological innovation when energy prices are high. The moderating role of human capital, confirms that energy price and human capital are substitutes in explaining the relationship with technological innovation. It is proposed for policy implications that financial support is required to increase technological innovation because it is an expensive investment to pursue. Furthermore, to build the absorptive capacity of the country, which in turn increases factor productivity, nations need to develop their human capital.

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Keywords
Energy Price, Technological Innovation, Induce Innovation Hypothesis, Absorptive Capacity
JEL Classification
Q42, Q55, J24, O40

Please cite this article as:
Sadaf, I., & Hussain, Babar (2022). Impact of energy price on technological innovation through the channel of human capital: The case of developed and developing economies. *Kashmir Economic Review*, 31(1), 40-54.

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Author's contribution in the article: 1- Conceived and designed the analysis, 2- Reviewed and compiled the literature, 3- Collected the data, 4- Contributed data or analysis tools, 5- Performed the analysis, 6- Wrote the paper, 7- Financial support for the conduct of the study, 8-Other

1. INTRODUCTION

The process of the invention has a crucial part in economic progress (Solow, 1956). Therefore, it is important to investigate the influencing forces that affect technological innovation at the national level. The studies on innovation in both emerging and developed countries have received a lot of interest, as more empirical efforts are being made to understand innovation. The price of energy is a key element in determining technological innovation because changes in the relative price of energy can lead to its substitution by other production components. This will promote the development of technologies that save energy. Hicks (1932) is recognized for highlighting the importance of energy prices as a driver for technological advancement.

The primary goal of this study is to examine how energy price affects technological innovation. It is also aimed at identifying other factors such as human capital that are important in determining technological innovation. Our analysis has emphasized both demand-side and supply-side factors of technological innovation. On one hand, demand-side factors encourage technological innovation by raising the value of new innovative activities. According to demand-pull theories of innovation, Hicks (1932) claimed that increasing energy prices cause the development of more energy-saving technologies. Therefore, suitable energy prices are essential to promote technological innovation. On the other hand, supply-side factors primarily examine how the availability of existing knowledge would affect the direction and rate of technological advancement. The existing knowledge stock has been taken into consideration while determining the direction of technological innovation, despite being overlooked by literature on the induce innovation hypothesis.

The results of technological advancement are measured by patent counts. These are considered useful pieces of information about the innovation's nature (Archibugi & Planta, 1996; Griliches, 1990; He et al., 2018; Lam et al., 2017; Li & Lin, 2016; Schleicha et al., 2017). As a result, the most accurate measure of technological innovation patents is also used as a proxy variable for technological innovation (Wang et al., 2012). There are a lot of innovations, but only a small number of them are significant enough to merit patenting (Johnstone et al., 2009). Using patent counts as a proxy for technological innovation has two additional benefits. First, patent counts are linked to technological innovation and can be divided into different technological fields. Second, information on the number of patents is easily available (Cohen et al., 2017; Lindman & Söderholm, 2016). Thus, the total number of patents is a reliable indicator of technological innovation.

The findings of previous literature on the link between energy price and technological innovation are still up for debate. Some findings indicate that energy price has a substantial positive impact on the level of technological innovation (Kim, 2014; Kumar & Managi, 2009; Lin & Chen, 2019). Fewer studies, on the other hand, showed a conflicting or nonexistent association between energy prices and technological advancement (Holladay et al., 2019; Mulder et al., 2014; Nie & Yang, 2016). This suggests that it is essentially an empirical question to determine how energy prices affect innovation. As a result, there is a need to investigate whether rising energy prices promote or deter technological innovation. This leads us to look into the link between energy prices and technological advancement while taking into account the importance of human capital. This is because highly educated people can adopt new technologies more quickly and effectively (Blundell et al., 1999). Additionally, they are best prepared to recognize and take advantage of emerging technological opportunities and to enhance a company's capacity for absorption (Cohen & Levinthal, 1990; Goedhuys et al., 2014).

Following are the ways that this approach advances the literature: First, we look at the demand and supply factors that influence technological innovation. From the perspective of the demand side, we have included energy prices. From the supply side, we have added how the existing technological knowledge affects future

technological innovation. Second, we empirically explore the interactive role of human capital in the relation between the price of energy and technological innovation. Third, unlike most other studies which focused on specific firms, industries, or countries we employed data that includes a large number of countries. This analysis provides a clear demonstration of the effect of energy prices on technological innovation across a wide range of developed and developing countries.

The paper is organized into four parts. Part, one includes a review of the literature, the second part is discussed as theoretical framework, and the third section includes techniques and data sources. The results, conclusion, and findings are discussed in the final section.

2. LITERATURE SURVEY

2.1 Energy Price and Technological Innovation

To empirically look into the link between energy prices and technological innovation, the theory of induced innovation hypothesis is mostly used in the literature (Popp, 2002). The idea of "induce innovation" is a key hypothesis that explains how energy prices influence the technological innovation of firms. With the increase in energy prices, energy-related businesses and firms are motivated to develop and move to new energy technologies which help reduce the production cost and save extra energy when energy prices are high (Ikenberry, 1986).

Popp (2002) makes use of patent data to empirically investigate the link between energy prices and energy-saving technologies. The study discovered that energy price significantly and positively contributes to technological innovation. Kumar & Managi (2009) determine the change in technological innovation because of the change in oil price and confirms that oil-price induce technological innovation when the oil prices are high for a long time. Gasoline prices have a strong beneficial impact on patents (Kim, 2014). Lin and Chen (2019) conclude that an increase in electricity price has a favorable effect on patenting in the long run. Some scholars, on the other hand also hold the opposite viewpoint. For example, Nie and Yang (2016) determines that higher the level of energy price leads to deter firms' productivity. According to Holladay et al. (2019), subsidies related to energy and price have no substantial impact on individual decisions to invest in new energy technology. Mulder et al. (2014) looked at the example of OECD countries and indicate that energy price has a limited effect in explaining changes in energy productivity. The literature makes it quite evident that establishing a relationship between energy prices and technological innovation is an empirical issue.

Nicolli and Vona (2016) studied the factors that influenced the development of renewable energy in EU nations. They found that the advancement of solar power technology and renewable energy sources was positively impacted by rising electricity prices. Nunes and Catalão-Lopes (2020) discovered that the price of oil had a considerable beneficial influence on patent counts for alternative energy. These results are consistent with (Cheon & Urpelainen, 2012; Verdolini & Galeotti, 2011). Noailly and Smeets (2015) analyze firm-level data on patents and determine how knowledge, market size, and energy prices influence the level of technologies at a micro level. Moreover, Kruse and Wetzel (2016) used data from 26 OECD nations and discovered that rising energy prices had a substantial positive impact on innovative activities. In addition, increasing electricity price will signal a higher profit in the future, which will drive innovation of renewable energy technologies (Schleicha et al., 2017).

Technological advances play an important role in solving environment-related issues and energy policies. The use of energy (or carbon) taxation is frequently mentioned in literature as a means of minimizing greenhouse gas emissions. However, technological advancement is included as an exogenous variable in the majority of the environmental policy models. The relationship between energy pricing and innovation that leads to energy savings is examined in many empirical studies. Most studies employ firm-level

industrial data and assess technology either in terms of outputs (e.g., the number of patents cited, granted, or filed in the field of energy-saving technological innovation) or inputs (e.g., new investment in research and development activities in energy-saving technological innovation). Rising oil prices can also support the current level of innovation (Cheon & Urpelainen, 2012).

Thus, literature confirms that energy price has a positive and substantial impact on technological innovation. According to some researchers, rising energy price will encourage the development of renewable energy technology (Johnstone et al., 2019; Nicolli & Vona, 2016; Schleicha et al., 2017). Others find that lower electricity price enhances renewable energy technologies (He et al., 2018). There is a controversy on the positive and negative impact of energy price on technological innovation. This study not only see the impact of energy price on technological innovation, but also see the moderating impact of human capital in the relationship between two variables.

2.2 Human Capital and Technological Innovation

Economic growth can be influenced directly or indirectly by human capital, especially by the development of technology. Acemoglu and Autor (2012) argue that human capital can influence technological progress through a variety of channels. First, given the required access to an educational resource, those with the greatest talents can advance technology by using their human capital. These individuals are most likely responsible for the advancement of technology. Second, individuals in general may have an impact on technology due to the externalities associated with human capital. It also modifies and strengthens the incentives to invest in new technologies. For instance, if there are few individuals with the necessary skills, likely, technology will not be profitable enough.

It has taken significantly longer for human capital to become a significant contributor to economic growth. Human capital's important contributions only emerged after the middle of the 20th century. Specifically, Becker (1964) is widely recognized as the originator of human capital theory, emphasizing that the quality of work is driven by human resources. Similarly to this, Arrow (1962) points out how experience affects technological progress. Nelson and Phelps (1966) also emphasize the significance of human capital in the implementation and adoption of new technology. Later, Schultz (1975) stated that workers with more human capital are better equipped to adapt to changes in the economic structure and new technology.

The knowledge, potential skills, and capacities that people have access to be referred to as human capital. It has been considered important for the competitive advantage of people, companies, and organizations. Gimeno et al. (1997), for instance, discovered a positive relationship between economic stress at the level of the entrepreneur, firm, and the overall level of human capital, as determined by educational attainment and work experience. At the national level, there is a connection between human capital and innovation that is based on "conversions," or the transformation of various forms of capital into resources and other forms of economic benefit. Several researchers have examined and verified this conversion process at the micro level (Gradstein & Justman, 2000). It is generally believed that those who invest more time and effort into improving their skills, acquire more education, and have more work experience are better suited to both earn high and contribute to society.

Moreover, innovation has various relationships with human capital given that it is a knowledge-intensive activity. According to Black and Lynch (1996), increasing organizational productivity means investing in human capital through formal education and on-the-job training. Similarly to this, Cannon (2000) suggested that human capital promotes macroeconomic output when both physical and mental efforts are increased by individuals to support economic growth. As a result, there is a growing demand for innovative procedures and innovations to support general growth in economic activity.

3. METHODOLOGY

3.1 Data Sources

The present study investigates 81 developed and developing nations from 1990 to 2019 using a balanced panel data collection (44 developing; 37 developed). Based on previous literature, we have included many variables that are important to technological innovation. These variables were notably added to the model that we have developed. The variables described as follows: Patent counts, including residents and non-residents (TECH), energy price (EP), human capital (HC), foreign direct investment (FDI) as a percentage of GDP, imports as a percentage of GDP (IMP), manufacture value added as a percentage of GDP (MANUF) and gross domestic product at constant 2015 US$ (GDP). The data related to TECH, FDI, IMP, and MANUF has been taken from the World Bank (WDI, 2019). For energy prices, spot crude oil price data is collected from British Petroleum Statistics. Data on HC is taken from the Penn World Table 9.1. Table 1 presents the summary of variables, expected signs of the parameters, and their sources.

Table 1: Variables Description

Variables	Definition	Expected Sign	Source
Technological Innovation (TECH)	Patents counts, residents and non-residents		WDI
Energy Price (EP)	Spot crude oil price, Brent US$	+/-	BP Statistics
Human Capital (HC)	Human capital index, based on education level and educational standards.	+	PWT 10.0
Foreign Direct Investment (FDI)	Net Foreign direct investment, as a percentage of GDP	+	WDI
Gross Domestic Product (GDP)	Gross Domestic Product (constant 2015 US$)	+	WDI
IMPORTS (IMP)	Imports of goods and services (% of GDP)	+	WDI
Manufacture value added (MANUF)	Manufacture value added as a percentage of GDP	+	WDI

3.2 Methodology

3.2.1 Theoretical Framework

Hicks (1932) explained the partial theory of invention in his well-known chapter “Distribution and Economics Progress” in the theory of Wages, which, while irrelevant to the theory of distribution, nevertheless embodies the use of concepts that have so captured the economist's view that the theory of invention has achieved a certain fame of its own. Indeed, the terms “labor-saving” invention, “autonomous” invention, and “induce” invention are becoming so popular and frequent to the economist that now they are in use more frequently without interrogating the utmost theory of technological innovation on which they are based. The Hicksian explanation is based on a distinction between induced and autonomous inventions, as well as a difference between labor-saving and very labor-saving innovations.

The theory of induced innovation is frequently referred to as the demand-pull theory of innovation. It highlights the significance of the change in relative price in determining the direction and speed of technological innovation. It is stated that “a change in the currency values of the factors of production is itself a major impetus to the invention, and to the discovery of a specific kind directed to economizing the use of a fairly expensive factor." This hypothesis has important policy implications. Increased investment in research and development to look into new prospects would further affect future input use as a result of changes in input prices beyond their immediate effects on input use.

Hicks (1932) thought that changes in prices of various factors would lead to promoting technological advancement. This will further lead to the replacement of one manufacturing production technique with a different input-output ratio. As a result, it will encourage technological innovation in the use of production factors in more cost-effective ways. Binswanger (1974) introduced uncertainty in the theory of induced innovation hypothesis. He explored that the rising expected cost of one factor induces research and development activities and a decrease in the use of another factor. The major focus of the theory of induced innovation is how the direction of technological innovation is affected by changes in factor prices.

A thorough theoretical framework for the link between energy prices and technological innovation has been built by Hicks' research methodology. In general, the cost of production may rise with the increase in the price of any factor of production. Typically, businesses offer lower production costs in two ways. One approach is to employ technological innovation to make the factor of production more effective, hence minimizing the utilization of the factor that is relatively expensive. The alternative approach is to search for comparable different factors such as energy prices. An increase in the relative price of energy will encourage the business to increase energy-saving technological innovation and enhance the efficiency of conventional energy (Verdolini & Galeotti, 2011). This is because energy is an essential component of production that cannot be replaced by another component, such as stock of capital and labor (Sohag et al., 2015; Zhou & Teng, 2013). In this regard, higher energy prices will have an induced effect on energy saving and alternative energy technologies, with a stronger effect on development and environment-friendly technologies.

Although innovation is a well know determinant of economic growth, it can be difficult to understand what drives firms to innovate (Montalvo, 2006). According to Fulmer and Ployhart (2014), human capital, which includes skills, knowledge, and other abilities that can to converted into production is essential to a company's ability to innovate and organize information (Protogerou et al., 2017; Subramaniam & Youndt, 2005). People with more educational skills are more likely to have higher technical skills, increased income, and more varied spending habits. An increase in the level of energy price may provide an incentive for users for adjusting their energy consumption. With the increase in energy prices, more incentives are available to the users for managing higher energy costs. Highly educated workers might be able to adapt to new technology more rapidly and effectively (Blundell et al., 1999). They are more effective in recognizing and investigating advanced technologies, and also helpful in supporting a company's absorption capacity (Cohen & Levinthal, 1990).

3.2.2 Empirical Model

To conduct an empirical analysis of the factors influencing technological innovation, the basic functional equation of the framework is defined as follows.

$$TECH_{i,t} = f(EP_{i,t}, HC_{i,t}, FDI_{i,t}, GDP_{i,t}, IMP_{i,t}, MANUF_{i,t}) \quad (1)$$

Where in the above equation, TECH is a technological innovation which is the main dependent variable. For the independent variable, we have added energy price (EP) and human capital (HC). Following the literature, we also added some control variables, including FDI which is a foreign direct investment as a percentage of GDP, IMP is the sum of imports of goods and services as a percentage of GDP, MANUF is the manufacturing value added which is used to measure the size of the economy. Then we have added GDP which is gross domestic product 2015 US$ per capita, to see the impact of economic development on technological innovation.

$$lnTECH_{i,t} = \beta_0 + \beta_1 lnEP_{i,t} + \beta_2 lnHC_{i,t} + \beta_3 lnFDI_{i,t} + \beta_4 lnGDP_{i,t} + \beta_5 lnIMP_{i,t} + \beta_6 lnMANUF_{i,t} + \varepsilon_{i,t} \quad (2)$$

The impact of some unobservable elements on the independent variable is not taken into account by standard static panel models such as fixed and random effect models. For instance, because technological advancement is a continual process, it is influenced not just by the most recent influencing variables but also by earlier technologies. Therefore, adopting a static panel model will result in estimation error. As a result, we added the first order lag of the dependent variable to the framework and construct the dynamic panel linear regression model as follows:

$$lnTECH_{i,t} = \beta_0 + \alpha lnTECH_{i,t-1} + \beta_1 lnEP_{i,t} + \beta_2 lnHC_{i,t} + \beta_3 lnFDI_{i,t} + \beta_4 lnGDP_{i,t} + \\ + \beta_5 lnIMP_{i,t} + \beta_6 lnMANUF_{i,t} + \varepsilon_{i,t} \quad (3)$$

The interaction term (EP*HC) is incorporated into the model to advance it further. Exploring the relationship between energy pricing and technological innovation as moderated by human capital is the major purpose of establishing the interaction term.

$$lnTECH_{i,t} = \beta_0 + \alpha TECH_{i,t-1} + \beta_1 lnEP_{i,t} + \beta_2 lnHC_{i,t} + \beta_3 (lnEP_{i,t} * lnHC_{i,t}) + \beta_4 lnFDI_{i,t} + \\ \beta_5 lnGDP_{i,t} + \beta_6 lnIMP_{i,t} + \beta_7 lnMANUF_{i,t} + \varepsilon_{i,t} \quad (4)$$

where, β_0 represents constant, α refers to the coefficient of the lag term of TECH, and other variables are defined in the same manner as those in Eq (2). The parameters that need to be evaluated are represented by $\beta_1, \beta_2, \beta_3, \beta_4, \beta_5, \beta_6, \beta_7$. i stands for regions and t for the year, the random error term is $\varepsilon_{i,t}$. The effect of human capital is captured as follows:

$$\frac{\Delta TECH}{\Delta EP} = \beta_1 + \beta_3 HC \quad (5)$$

The conditional impact of human capital on the relationship between energy prices and technological innovation is seen in Equation 5. The parameter can take on various signs, e.g. if both $\beta_1$and β_3 have the same sign then one can interpret that HC reinforces the effect of EP on TECH, while if $\beta_1$is positive and $\beta_3$is negative, then HC reduces the positive effect of EP on TECH and vice versa. To remove possible heteroskedasticity all variables are in natural logarithm form. Table 2 displays the statistical analyses of each variable.

3.3 Estimation Method

We first estimate Eq. (3) and Eq. (4) by employing a fixed effect model. This approach helps in preventing the cross-sectional heteroscedasticity driven by the differences in technical development between various countries. We have performed Hausman test as the first step as systematic choice between fixed effect and random effect. The fixed effect model is better way to use the panel data set and it offers many advantages. In fixed effect approach intercept vary across terms but they keep constant over time. Since the lag term of the dependent variable is closely connected with the error term, we added it as an independent variable in Eq. (4). Lag term of each independent variable is selected as the instrumental variable and then Hansen test is carried out to verify the validity of these instrumental variables. The endogeneity of the explanatory variables in the fixed effect model could lead to estimate bias. To further estimate Eq. (3) and Eq. (4) we make use of the dynamic GMM model. Due to the characteristics associated with GMM, it is believed to be an appropriate technique for estimating dynamic panel model (Blundell & Bond, 1998). The dynamic panel data model has two distinct types: Difference-GMM (Arellano & Bond, 1991) and System-GMM. Most of these distinct models each offer advantages of their own. To reduce individual effects, the Difference-GMM applies a first-order differential process to the model and includes any potential higher-order lag terms as an instrumental variable. Comparatively to Difference-GMM, System-GMM can increase estimation efficiency and evaluate independent variable that does not change over time. An

equation for systematic estimation that combines Difference-GMM and level GMM is called System-GMM, and it is more effective than Difference-GMM.

4. RESULTS

4.1 Empirical Analysis

Table 2 shows the descriptive statistics in panel (a) and includes mean value of the variables, standard deviation and its minimum and maximum values. Panel (b) shows the correlation matrix along with their significance.

Table 2: Summary Statistics and Correlation Matrix

Panel (a): Descriptive Statistics					Panel (b): Correlation matrix						
Variable	**Mean**	**Std. Dev**	**Min**	**Max**	**TECH**	**EP**	**HC**	**FDI**	**IMP**	**MANUF**	**EG**
TECH	12.393	8.421	0.696	27.69	1.000						
EP	392.0	2422.0	0.679	47398.82	-0.048**	1.000					
HC	2.696	0.634	1.039	4.351	0.116***	-0.08***	1.000				
FDI	19.234	11.378	0 .696	38.968	0.040**	0.060**	0.065*	1.000			
IMP	19.061	11.369	0.696	38.789	-0.0089	-0.06***	0.043**	0.040**	1.000		
MANUF	16.087	11.003	0.696	35.569	0.090***	0.014	0.013	0.090*	0.054**	1.000	
EG	3.173	4.252	-41.8	19.68	0.040*	0.014	0.083***	0.987**	-0.076*	0.052*	1.000

Notes: Levels of significance ***, **, * are 1, 5, & 10%.

For empirical analysis we have analyzed the linkages between energy price and technological innovation for the case of developed and developing countries. First, we present the results for 44 developing countries. Table 3 presents the empirical results on the link between energy price and the level of technological innovation. Panel (a) displays the findings of the influence of energy price on technological innovation, without considering the moderating role of human capital. These results are based on pooled ordinary least square (POLS), fixed effect (FE), random effect (RE), and system GMM and are presented in columns 1, 2, 3, and 4. On the other hand, panel (b) shows the moderating role of human capital that influence price and technology. These results including interaction terms are presented in panel (b) in columns 5, 6, 7 and 8.

Table 3 shows that the value of the lag term of the dependent variable is significantly positive for both the baseline model (eq. 3) and the interaction term model (eq. 4). This indicates that existing technologies will encourage the development of new technologies. These results are consistent with the findings of Lin and Zhu (2019). Regarding energy price, the sign of the coefficient is positive in all models indicating that rising energy prices can promote technological innovation. With higher prices, energy consumption will be costly, resulting in significant economic benefits for infrastructure using more energy-efficient and environmentally friendly technology. Companies will encourage to implement technological innovation under these circumstances (Yang et al., 2019). The observation that rising energy prices promote technological advancement in energy-saving measures is in line with the theoretical justifications for price-induced technological innovation (Hicks, 1932).

Human capital promotes firms' capacity to absorb knowledge and is favorable to the creation of new knowledge (Cohen & Levinthal, 1990). The coefficient of human capital is positive and significant in all models. These results are consistent with Dakhli and De Clercq (2004), confirms that human capital is an important driving force of technological innovation. Since, individuals with greatest educational skills use their human capital to advance technology if they have proper access to the educational resource. They are most likely responsible for the advancement of technology.

Table 3: Linkages Between Energy Price and Technological Innovation (Developing Countries)

Variables	Panel(a): Base Line Results				Panel(b): Interaction Results			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	POLS	FE	RE	Sys GMM	POLS	FE	RE	Sys GMM
Lag TECH	0.525***	0.393***	0.523***	0.397***	0.558***	0.429***	0.556***	0.418***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
EP	0.031*	0.159***	0.183	0.058*	0.207***	0.517***	0.202***	0.265***
	(0.061)	(0.001)	(0.338)	(0.088)	(0.002)	(0.000)	(0.002)	(0.002)
HC	0.426*	1.552*	0.301***	0.719**	2.00***	2.974**	1.960***	2.506***
	(0.055)	(0.059)	(0.002)	(0.049)	(0.000)	(0.017)	(0.000)	(0.003)
EP*HC	-	-	-	-	-0.240***	-0.458***	-0.241***	-0.300***
					(0.002)	(0.000)	(0.002)	(0.003)
FDI	0.095*	0.083***	0.081	0.119**	0.040	0.025*	0.034***	0.073*
	(0.067)	(0.000)	(0.122)	(0.013)	(0.431)	(0.075)	(0.000)	(0.087)
IMP	0.119***	0.078*	0.125***	0.123**	0.0798***	0.0919*	0.105***	0.139***
	(0.001)	(0.072)	(0.000)	(0.038)	(0.002)	(0.089)	(0.002)	(0.009)
GDP	-0.024	-0.025	-0.026	-0.021***	-0.004	-0.097*	-0.025***	-0.076***
	(0.607)	(0.621)	(0.582)	(0.006)	(0.102)	(0.089)	(0.003)	(0.009)
MANUF	0.0369	0.052*	0.033**	0.042	0.036	0.055*	0.034	0.0436
	(0.108)	(0.095)	(0.036)	(0.155)	(0.108)	(0.074)	(0.119)	(0.160)
Constant	0.421	31.9077*	-4.388	0.404	-0.076	4.98	-4.5913	-0.352
	(0.359)	(0.062)	(0.645)	0.584	(0.903)	(0.868)	(0.629)	(0.630)
No of Observations	1319	1319	1319	1319	1276	1276	1276	1276
No of countries	44	44	44	44	44	44	44	44
No of Instruments	-	-	-	11	-	-	-	37
F-Stat	-	45.32***	-	549.55***	-	46.55***	-	557.17***
		(0.000)		(0.000)		(0.000)		(0.000)
AR(2)	-	-	-	0.49	-	-	-	0.23
P-value				(0.622)				(0.820)
Hansen	-	-	-	5.25	-	-	-	25.39
P-value				(0.155)				(0.607)
Hausman	-	193.37***	-	-	-	148.30***	-	-
P-value		(0.000)				(0.000)		
Bruesch-Pagan LM	-	-	175.22*** (0.000)	-	-	-	210.93*** (0.000)	-

Note: The estimation results of pooled OLS, fixed effect, random effect, and system GMM estimation are represented by POLS, FE, RE, and Sys-GMM. Brackets surround the p-value, which is * p<0.1, ** p<0.05, and *** p<0.01. The null hypothesis is that there is no autocorrelation, and the second degree of residual autocorrelation is revealed by the AR(2) test. The purpose of the Hansen test is to determine if an instrumental variable is effective, considering that instrumental variables are valid as the null hypothesis.

Technological innovation is not only determined by factors that are directly associated with the generation of new research and development and educational experience but also by the institutional and economic structure of the country (Furman et al., 2002; Varsakelis, 2006). We have added foreign direct investment, which is an important economic element of the innovative structure of a country. The results show a strong positive and significant relationship between FDI and technological innovation. Since the entry of foreign firms is accompanied by a transfer of technology and knowledge into the host economy, FDI is an important source of access to resources and technology for some countries (Anwar & Sun, 2014). Along with FDI, import-related spillovers also play a very important role in determining technological innovation. The results confirm a positive and significant relationship between imports and technological innovation. Through import, companies can interact with foreign production technologies and production methods. With the introduction of new technologies, companies can benefit from significant technological spillovers and acquire new skills by increasing their capacity for regional innovation processes (Shang et al., 2022).

The findings also point to a strong and favorable association between innovation activity and economic growth rates. The sign of the first order coefficient of economic growth is negative and significant. This

suggests that until the level of economic development reaches the turning point, the higher the level of advancement of the economy, the less favorable it is for the firm to adopt the innovation process. When the level of regional economic growth exceeds the turning point, the process of technological innovation also increases with the increase in the level of economic growth. Since then, most countries have been implementing broad economic development strategies, which involve expanding the production process by investing in a variety of factors of production to increase economic growth and reduce interest in technological innovation. However, the extended economic growth pattern is not sustainable once a country's level of economic development reaches a certain level. Under extensive economic development, enterprises will focus on technological innovation. From this point, the degree of economic development will begin to have a beneficial effect by promoting the development of innovation (Liu et al., 2020).

4.2 Conditional Analysis

We take the partial derivative of equation 4 to assess the moderating role of human capital in the link between energy price and technological innovation.

$$\frac{\partial TECH}{\partial EP} = 0.265 - 0.300HC \quad (6)$$

From equation 6 it is clear that the partial derivative β_1 and β_3 are opposite in signs. This explains why human capital and technological innovation have an inverse association with partial increases in energy prices. Results confirm that energy price and human capital are substitutes in explaining the relationship with technological innovation. In this study, conditional analysis is used to access the conditional effect of energy price on technological innovation at three different levels of percentiles of human capital. The conditional impact of human capital is displayed in Table 4 at the 25th, 50th, and 75th percentiles.

Table 4: Conditional Analysis (Developing Countries)

	POLS	**FE**	**RE**	**Sys-GMM**
HC at the 25th percentile	-0.250***	-0.358***	-0.257***	-0.306***
	(0.003)	(0.004)	(0.002)	(0.005)
HC at the 50th percentile	-0.355***	-0.560***	-0.0364***	-0.438***
	(0.002)	(0.001)	(0.002)	(0.004)
HC at the 75th percentile	-0.444***	-0.730***	-0.453***	-0.550***
	(0.002)	(0.001)	(0.002)	(0.000)

Notes: Levels of significance ***, **, * are 1, 5, & 10%. The 25th, 50th, and 75th percentiles are P25, P50, and P75, respectively. P-values are listed in brackets.

Regarding human capital, results show significant negative signs at low, medium, and high percentiles. Over percentiles, the coefficient's magnitude is decreasing. Overall, conditional effects findings show that energy prices have a detrimental effect on technological innovation at different levels of human capital. It might be the cause of highly educated workers not always contributing to the innovation process. Nazarov and Akhmedjonov (2012) measure that people with a university education have little or no impact on a company's capacity to announce new technologies. This is because innovation in some economies is dependent more on acquiring than developing new technologies. As a result, employers need workers with highly specialized technical skills rather than those with more general (academic) knowledge. Indeed, in the present context, higher educational institutes are not as established as those in advanced countries. They are unable to provide individuals with the abilities needed to meet the level of human capital demanded by businesses.

Table 5 describes the linkages betwene energy price and technological innovation for 37 developed coutries. Panel (a) displays the findings of the influence of energy price on technological innovation, without considering the moderating role of human capital. These results are based on POLS, FE, RE and System GMM are presented in columns 1, 2, 3, and 4. On the other hand, panel (b) shows the moderating role of

human capital that influence price and technology. These results including interaction terms are presented in panel (b) in columns 5, 6, 7 and 8.

Table 5: Linkages Between Energy Price and Technological Innovation (Developed Countries)

Variables	Panel(a); Base Line Results				Panel(b); Interaction Results			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	POLS	FE	RE	Sys GMM	POLS	FE	RE	Sys GMM
Lag TECH	0.572***	0.460***	0.571***	0.452***	0.570***	0.458***	0.569***	0.448***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
EP	0.028	0.301***	0.034***	0.051*	0.345*	0.761***	0.335*	0.501*
	(0.108)	(0.000)	(0.006)	(0.087)	(0.053)	(0.002)	(0.060)	(0.074)
HC	0.438	1.535	0.580*	0.453	1.65**	3.157**	1.727**	2.234*
	(0.133)	(0.152)	(0.063)	(0.214)	(0.025)	(0.020)	(0.020)	(0.087)
EP*HC	-	-	-	-	-0.278*	-0.458**	-0.265*	-0.398*
					(0.074)	(0.049)	(0.090)	(0.091)
FDI	0.095*	0.073*	0.043	0.048***	0.029	0.025*	0.034***	0.048
	(0.067)	(0.078)	(0.241)	(0.004)	(0.417)	(0.075)	(0.000)	(0.347)
IMP	0.119***	0.065*	0.125***	-0.058	0.021***	0.074**	0.0216	-0.0734
	(0.001)	(0.069)	(0.000)	(0.905)	(0.002)	(0.041)	(0.484)	(0.999)
GDP	-0.024	0.013**	0.023	0.031	-0.021	0.0154	-0.023	0.021
	(0.607)	(0.021)	(0.408)	(0.532)	(0.453)	(0.635)	(0.421)	(0.591)
MANUF	0.0369	0.081***	0.037*	0.054**	0.0342	0.081***	0.034	0.0584*
	(0.108)	(0.001)	(0.086)	(0.038)	(0.108)	(0.001)	(0.119)	(0.070)
Constant	0.421	64.268***	13.409	1.502**	-0.216	52.47***	10.936	-0.352
	(0.359)	(0.000)	(0.166)	(0.036)	(0.792)	(0.006)	(0.264)	0.630
No of Observations	1109	1109	1109	1109	1109	1109	1109	1109
No of countries	37	37	37	37	37	37	37	37
No of Instruments	-	-	-	37	-	-	-	37
F-Stat	-	45.32***	-	549.55***	-	46.55***	-	557.17***
		(0.000)		(0.000)		(0.000)		(0.000)
AR(2)	-	-	-	-0.55	-	-	-	-0.54
P-value				(0.584)				(0.586)
Hansen	-	-	-	30.87	-	-	-	28.28
P-value				(0.372)				(0.503)
Hausman	-	146.81***	-	-	-	150.56***	-	-
P-value		(0.000)				(0.000)		
Bruesch-Pagan LM	-	-	433.22*** (0.000)	-	-	-	412.30*** (0.000)	-

Note: The estimation results of pooled OLS, fixed effect, random effect, and system GMM estimation are represented by POLS, FE, RE, and Syst GMM. Brackets surround the p-value, which is * p<0.1, ** p<0.05, and *** p<0.01. The null hypothesis is that there is no autocorrelation, and the second degree of residual autocorrelation is revealed by the AR(2) test. The purpose of the Hansen test is to determine if an instrumental variable is effective, considering that instrumental variables are valid as the null hypothesis.

After determining the impact of energy price on technological innovation for the case of developing countries, we have found almost similar results as for developed countries. This implies that energy price and human capital are significant determinant of technological innovation for both the developed and developing countries. We have also determined the partial derivative to assess the moderating role of human capital in the link between energy price and technological innovation.

$$\frac{\partial TECH}{\partial EP} = 0.501 - 0.398HC \quad (7)$$

From equation 7 it is clear that the partial derivative β_1 and β_3 are opposite in signs. These results like developing countries implies that energy price and human capital are substitutes in explaining the

relationship with technological innovation. The conditional impact of human capital is displayed in Table 6. at the 25th, 50th, and 75th percentiles.

Table 6: Conditional Analysis (Developed Countries)

	POLS	**FE**	**RE**	**Sys GMM**
HC at the 25th percentile	-0.460*	-0.495***	-0.431***	-0.650***
	(0.092)	(0.004)	(0.002)	(0.009)
HC at the 50th percentile	-0.546*	-0.628***	-0.512***	-0.772*
	(0.089)	(0.001)	(0.002)	(0.096)
HC at the 75th percentile	-0.616*	-0.738***	-0.579***	-0.873*
	(0.087)	(0.001)	(0.002)	(0.095)

Notes: Levels of significance ***, **, * are 1, 5, & 10%. The 25th, 50th, and 75th percentiles are P25, P50, and P75, respectively. P-values are listed in brackets.

5. CONCLUSION AND POLICY RECOMMENDATIONS

This study determines the impact of energy price on technological innovation by using the data set of developed and developing countries covering the period from 1990 to 2019. Further, this study also explores moderating role of human capital in the relationship between energy price and technological innovation. This study addressed this relationship for developed and developing countries, by applying POLS, FE, RE and System GMM.

The fact that technological development speeds up economic progress cannot be ignored. This is because technological advancement has played a significant role in improved productivity. This paper uses patent data to determine the driving forces behind technological innovation. It adds to the literature on the induced innovation hypothesis by considering energy price as a significant factor of technological innovation. In addition to that, it takes into account the usefulness of existing technology and absorptive capacity. Additionally, this study aims to find out more about how human capital moderates the link between energy prices and technological innovation. The earlier studies are questioned based on controversial findings between energy prices and technological innovation. This study offers empirical support in favor of the technology-push and induces innovation hypothesis.

Following are prime conclusions: First, energy price plays a positive and significant role in boosting the level of technologies. Second, the moderating role of human capital confirms that energy price and human capital are substitutes in explaining the relationship with technological innovation. Third, our findings support the notion that the advancement of technological innovation is positively influenced by the state of current knowledge. As benefits from technological improvements cannot be exclusively claimed by innovators. The knowledge already at hand enables researchers to do so at a lower cost and with less risk than earlier inventors. Finally, our findings support the idea that countries with significant human capital might benefit from knowledge spillovers, primarily by adopting advanced technologies.

In terms of policy implication, this study implies that countries require great financial support because promoting technological innovation is an expensive investment. Investors might also view information generated outside the boundaries of the business as a viable replacement for internal innovation efforts. This study evaluated the performance of developed and developing countries. Future research, however, can clarify the relationship between energy prices, technology, and human capital by undertaking within-country analyses to determine the effects of certain national characteristics. We employed HDI, which might not be an accurate indicator of the growth of human capital. Future studies might look into a measure that may also include other aspects of human capital at the national level, such as experience, skills, attributes, and behaviors. It should be noted that the only available policy variables in this work are the

price of energy and technological advancement. Yet, environmental taxes, discharge fees, total quantity controls, and other factors also have an impact on the advancement of energy technology innovation. In addition, we use the total number of patents in this study to represent the degree of technological innovation. We do not take into account the heterogeneity between various patents, despite the fact that the patent number has been shown to be a good indicator of the extent of technological innovation. As a result, there is still much to be learned and more research in these areas is required.

Acknowledgment
The authors acknowledge the comments made by the reviewers and members of the editorial board on the earlier version of this manuscript.

Funding Source:
The author(s) received no specific funding for this work.

Conflict of Interests:
The authors have declared that no competing interests exist.

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Kashmir Economic Review, Volume 31, Issue 1, June 2022

Kashmir Economic Review
ISSN(P): 1011-081X, ISSN(E): 2706-9516
http://www.ker.org.pk

Exploring the Historical Development of Kashmiri Shawl Industry and Future Prospects of the Industry

ABSTRACT

Throughout history, the shawl industry has been one of the most important industries in Jammu and Kashmir. It is not only culturally significant but has also been a major source of exports and employment. It is well-established and recognized that the shawl industry is declining, which has aggravated in recent years. This study aimed to explore the importance of foreign trade for the development of the shawl industry, the reasons behind the decline, and its future prospect. For this study, to understand the prospects of the industry, exports data from 1995-2017 was forecasted using ARIMA for the next 10 years. Using trade statistics, the present study has demonstrated that foreign trade has historically played a vital role in the development of the shawl industry, and its decline is rooted in the conflict and low investment spiral, which decreases its productivity and hence its competitiveness. Moreover, the study has also shown that the industry's prospects are negative, as shown by the point forecast decline. Future studies are needed to explore the relationship between the growth of the shawl industry and NSDP or employment rate in Kashmir, which can provide key insights for understanding the economy of Kashmir

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Keywords
Historical Development, Exploratory Data Analysis, Handicraft Industries, Jammu & Kashmir, ARIMA Forecasting
JEL Classification
D9, D74, L67

Please cite this article as:
Kiani, S. H., Khurshid, U., & Luqman, M. (2022). Exploring the historical development of Kashmiri shawl industry and future prospects of the industry. *Kashmir Economic Review*, 31(1), 55-64.

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Author's contribution in the article: 1- Conceived and designed the analysis, 2- Reviewed and compiled the literature, 3- Collected the data, 4- Contributed data or analysis tools, 5- Performed the analysis, 6- Wrote the paper, 7- Financial support for the conduct of the study, 8-Other

1. INTRODUCTION

There are two dominant understandings of the existence, role, and nature of traditional industries, such as handicraft industries, in economic literature. One position argues that handicraft industries continue to exist primarily due to state intervention (Richards, 1979; Jain, 1985), while another position argues that it is flexible nature and continuing aesthetic appeal which explains the survival of handicraft industries (Kautsky, 1984; Mukund & Syamasundari, 1998; Berg, 2014). Though both views differ on the reason behind the existence of traditional industries, there exists scholarly consensus on the essential role these industries play in employing the rural economy and in the production of exportable commodities. Handicraft also plays a vital role in the economy of Indian-occupied Jammu and Kashmir (Kashmir from here onwards). They not just provide employment but also through export revenues. The handicraft industries amount to around 72 percent of Kashmir's total exports (Directorate of Economics & Statistics, 2018).

The shawl industry is one of the oldest industries in Kashmir and is often referred to as "as old as the hills of Kashmir" (Chaku, 1909). Historically, the shawls industry has been one of the most organized and employment-generating sectors, with a major share of revenue coming from exports to India, Central Asia, and Europe (Bates, 1980). The historical importance and contribution of the shawl. The exact origins of the shawl industry are debatable; however, significant evidence shows that shawl manufacturing became an established industry under the reign of Sultan Zain-ul-Abidin, who ruled Kashmir between 1420-1470 AD (Ahmad, 2005; Digby, 2007; Skarratt et al., 2018). Zain-ul-Abidin gave state patronage to the shawl industry and brought innovations such as the introduction of looms. According to Ahmad (2015) and Khan (1986) introduction of looms by Zain-ul-Abidin was inspired by Ameer Taimur's introduction of looms in Samarkand. However, (Skarratt et al., 2018) criticize the theory of Zain-ul-Abidin's being the architect of the shawl industry as an overstatement. They argue that the theory of Zain-ul-Abidin being inspired by Taimur to establish the shawl industry is flawed because he was not even born when Taimur attacked India. Further, they also criticize travel accounts for simply reproducing local folktales and imposing Eurocentric ideas. After the death of the Zain-ul-Abdin and the end of Shah Mir's reign, there was not any significant development in the shawl industry as most of the era of the Chak dynasty in Kashmir was marked by invasions, wars, and communal disturbances between Shia and Sunni sects of Islam (Ahmad, 2017; Khan, 1953).

The shawl industry saw another renaissance in the Mughal period, which dates from 1586 to 1751 AD. Like, under the reign of Zain-ul-Abdin, the shawl industry also enjoyed state backing under the Mughals. Shawls were not only used as prestigious gifts, but the Mughals also encouraged trade which increased the overall exports. Mughals under Akbar developed Srinagar into an industrial center. Several state-owned factories were set up with over 40,000 looms in operation, 24,000 of which were in Srinagar. Mughals also introduced new production techniques, which increased the productivity of loom manifolds (Maskiel, 2002; Ashfaque, 2010; Mandloo, 2016). Similarly, Maskiel (2002) and Mattoo (1975) emphasize the importance of the Mughal gift economy in increasing the demand for Kashmiri shawls. Moreover, they argue that the interest of the Mughal court in the shawl industry also increased the trade volume of Kashmiri shawls in Central Asia, outperforming Iranian handicrafts, which eventually led to the monopolization of trade.

The shawl trade continued to flourish under Afghan rule due to the high demand for Shawls in India and Central Asia. Afghans established Daag-i-Shawl, a department to regulate the shawl trade and collect taxes. Heavy taxes on shawl weavers and shawl exports, which were one of the main sources of employment, led to famines, resulting in the migration of weavers and artisans (Dar & Shah, 2019).

The Sikh regime, according to Ahmad (2005), inherited a crisis-ridden shawl industry from Afghans. They initially removed all the taxes imposed on shawl manufacturing, which helped stabilize it for a brief time,

but later, they re-imposed taxes, which, coupled with the famine of 1834, further deepened the crisis and worsened working conditions for weavers. After the establishment of the Dogra regime in 1847 the conditions of the shawl industry did not change much until the 1860s when the Maharaja waived off all taxes and allowed weavers to change employers, which drastically increased the number of weavers in the valley (Ahmad, 2005).

The main market for shawl exports in this era was Europe, especially France, but the Franco-Prussian war in 1870, followed by another famine in 1877 and subsequent World Wars, again flung the industry into a long crisis which forced Maharaja to re-impose taxes (Ahmad, 2004; Bajwa, 1993). Although shawl exports reached their highest pre-1947 level under Mahajra due to the establishment of the Jhelum Valley Cart Road and other investments in social overhead capital, however, the shawl industry did not recover from the crisis in Europe as local and Indian demand was not sufficient (Jahan & Ahmed, 2020). However, Sharrad (2004) attributes this decline to the rise of paisley production, shawls based on pirated designs of original Kashmiri shawls, in Europe, especially in the South of Scotland.

There exists an agreement among researchers regarding the decline in the shawl industry. However, there is no consensus on the causes of this decline. Ashraf et al. (2016) attribute the decline to a lack of competitiveness with the Indian shawl industry based in Amritsar whereas, Prakash (2000) while in his analysis and review of the developmental policy of Kashmiri state argues that due to protectionist policies adopted by the state government based on the New Kashmir manifesto, there existed a conflict between the state government and the entrepreneurial class, which prevented any significant investments from the private sector.

On the other hand, Butt and Pandow (2012) are of the view that the tensions between the two neighboring countries result in a lack of investment in the region which has resulted in the decline of all major industries, including the shawl industry. Similarly, Mahapatra and Shekhawat (2008) argue that the conflict in the region and militancy makes it challenging to implement developmental policies, thus negatively impacting the shawl industry. Emphasizing, a multi-causal explanation of the crisis, Hassan and Mir (2020) argue that the decline of the shawl industry cannot be explained without taking into account a multitude of different reasons, including high prices, lack of technology, an unorganized market, unskilled labor, and fake products.

With this in the background, this study using exploratory data analysis showed how the development of the shawl industry was affected by internal conflicts and external crises. Moreover, it used univariate forecasting to show the negative prospects of the shawl industry. The rest of study is organized as follow. Section 2 describe the data and methodology. The results and discussion are presented in section 3 while section 4 concludes the study.

2. DATA AND METHODOLOGY

This study uses data from 1918-1941 and 1995- 2018 based on trade reports, and from various Government publications such as Digest of Statistics 2018-2019 (Directorate of Economics and Statistics Planning and Development Department J&K), Economic Survey 2016-17 (Directorate of Economics and Statistics Planning and Development Department J&K) as shown in Table 1, Table 2, and illustrated in Figure 1.

Table 1: Exports of Kashmiri Woolen Shawls (1918-1941)

Year	Exports in Crores	Year	Exports in Crores
1918-1919	0.0890	1929-1930	0.0925
1919-1920	0.0619	1930-1931	0.0365
1920-1921	0.0538	1931-1932	0.0520
1921-1922	0.0228	1932-1933	0.1288
1922-1923	0.0695	1933-1934	0.0467
1923-1924	0.1104	1934-1935	0.0595
1924-1925	0.1766	1935-1936	0.0472
1925-1926	0.1301	1936-1937	0.0472
1926-1927	0.0207	1937-1938	0.0595
(Apr) 1927-1927 (Oct)	0.0809	1938-1939	0.0721
(Oct) 1927-1928 (Sept)	0.0871	1939-1940	0.0005
(Oct) 1928-1929 (Sept)	0.0927	1940-1941	0.0015

Source: Trade Reports 1918-1941 as cited in (Ganju, 1945)

Table 2: Annual Exports of Woolen shawl

Years	Exports (Crores)	Total Handicraft Exports	Percentage Change in Shawl Exports	Shawl Exports as % of Total Handicraft Exports
1995	13.5	293.5	-	-
1996	4.02	88.14	-70.22%	-70%
1997	NA	NA	NA	NA
1998	15.7	247	NA	NA
1999	8.5	556.99	-45.93%	126%
2000	54.42	439.9	540.24%	-21%
2001	36.69	504.25	-33.13%	15%
2002	175	549.2	380.90%	9%
2003	195	595	11.43%	8%
2004	210.5	642	7.82%	8%
2005	220	705	4.64%	10%
2006	275	785	25%	11%
2007	310.29	1200.47	12.83%	53%
2008	226.5	705.05	-27.16%	-41%
2009	137.13	661.27	-39.46	-6%
2010	302	1004.1	120.23%	52%
2011	607.03	1643.37	101%	64%
2012	104.11	1538.28	-82.85%	-6%
2013	579.72	1695.65	456.83%	10%
2014	368.2	1287.04	-36.49%	-24%
2015	376.79	1059.41	2.17%	-18%
2016	304.05	1151.12	-24.58%	9%
2017	284.13	1090.12	7.66%	-5%

Source: Computed from Economic Survey of 2016-17 and Digest of Statistics 2018-2019

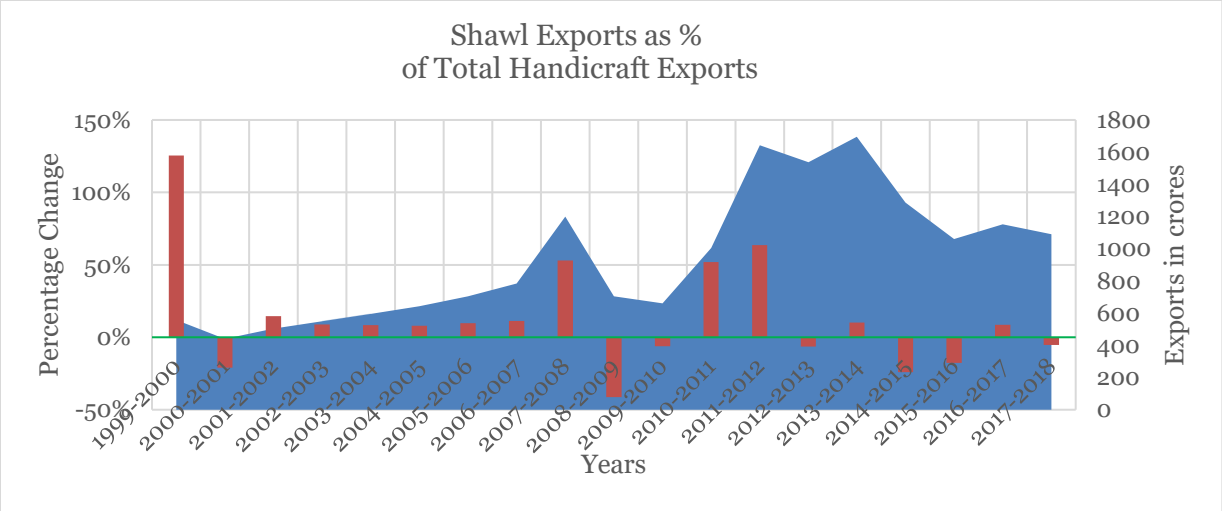

Figure 1: Shawl Exports as Percentage of Total Handicraft Exports

Several studies have shown that ARIMA performs better than seasonal naïve and exponential smoothing models based on different forecast errors (Bodo et al., 1991; Erkekoglu et al., 2020; Sbrana & Silvestrini, 2014; Tomić and Stiepanovic, 2017). However, some studies also suggest that the smoothing model can also perform better than ARIMA (Oliveira & Oliveira, 2018). Therefore, to find the best model for forecasting the shawl exports data of Kashmir, a simple naïve forecasting model was used as a benchmark for the comparison of the performance of exponential smoothing and ARIMA based on different forecast errors such as MAPE, MPE, and MASE in which ARIMA model outperformed both simple naïve and simple exponential smoothing models.

The ARIMA model is made up of two models, the Autoregressive (AR) and the Moving Average (MA). It has specific parameters for the time series: the parameters p and q, which represent the order of the AR and the order of the MA, respectively. A parameter d is added that represents the number of differences. The general ARIMA model is given by:

$$\hat{Y}_t = \mu + \phi_1 Y_{t-1} + \cdots + \phi_p Y_{t-p} + \theta_1 \varepsilon_{t-1} + \cdots + \theta_q \varepsilon_{t-q} \quad (1)$$

Here φ corresponds to the autoregressive coefficient to be determined, θ is the moving average coefficient to be determined, ε_t is the white noise which is a set of identically distributed random variables and has the mean of the values equal to zero with constant variance, and Y_{t-p} is the normalized log of the series to be modeled.

The selection of the adequate ARIMA model to fit the data observed was carried out using the Akaike Information Criterion (abbreviated as AIC) (Akaike, 1973). This criterion is based on the identification of the lowest value for AIC, which theoretically results in the best model to fit the observed data.

3. RESULTS AND DISCUSSION

The exports increased from 0.0890 crore rupees in 1918-1919 to 0.1301 crore rupees in 1925-1926 after the First World War as shown in Table 1. However, the shawl exports declined significantly from the previous high of 0.1766 crore rupees in 1924-1925 to 0.0365 in 1930-31, the year of the Great Depression

which resulted in the adaptation of protectionist policies all across Europe, especially in France, which was one of the biggest importers of Kashmiri shawls (Dobbin, 1993; Jackson, 2002; Eichengreen & Irwin, 2010) The shawl export did increase in 1932-1933 due to short-lived reforms done by Maharaja, but this era also marked the rise of Paisley, which significantly reduced the European demand for Kashmiri shawls that led to the reintroduction of taxes that were previously waived off (Ahmad, 2005). This reimposition of taxes led to significant distrust among the masses, which eventually led to the events of 1947 (Naik, 2012).

Similarly, Figure 1 illustrates that throughout the 90s, the percentage change in shawl exports did not increase significantly due to the militancy in the region and the Kargil War of 1999. The exports increased in the subsequent decade at reached a peak in 2011-2012. Besides, the percentage share of shawl exports also did not significantly increase during this period. Later, the shawl exports did increase in 2014-2015, which shows that there was asymmetric growth in the industry; however, the overall trend indicates a decline in the shawl industry due to periodic waves of lockdowns within the state. Many studies finds similar pattern of growth in shawl industry (Emmett, 2019; Hassan et al., 2020). Following Box and Jenkin's methodology (Box & Jenkins, 1976) the time series was plotted without any difference to check seasonality. The plot did not show any significant trend or pattern as shown in Figure 2.

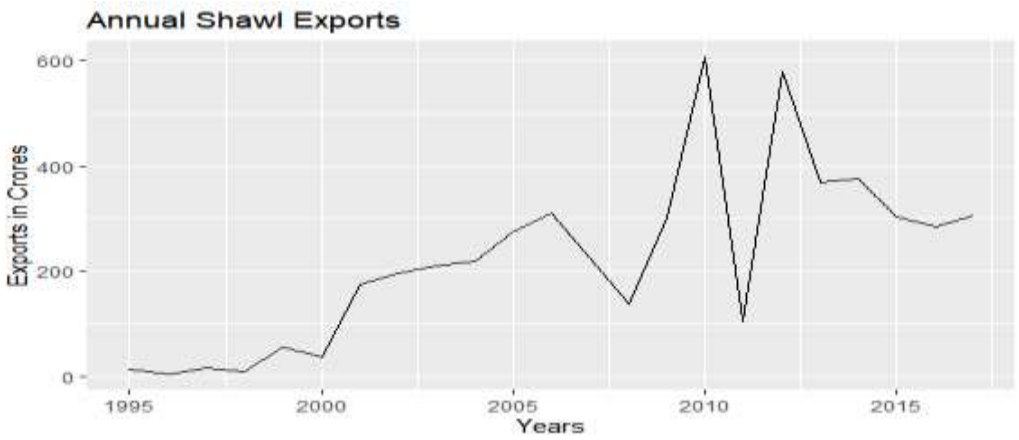

Figure 2: Time Plot of Annual Shawl Exports

Next, to check autocorrelation in the data, the autocorrelation function (ACF) was used to plot the residuals. The result of ACF illustrated that the data was not highly autocorrelated as shown in Figure 3.

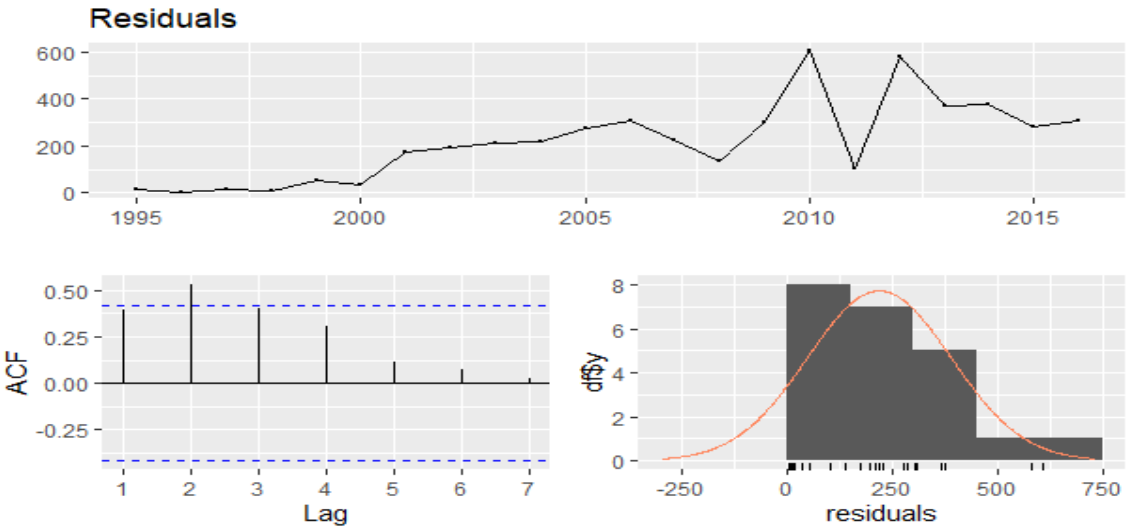

Figure 3: Residual Plot for Annual Exports.

After having checked the autocorrelation, the Augmented Dickey-Fuller test was used to check the stationarity of the data using two lags of the dependent variable. The coefficient of Dickey-Fuller was -1.8218 with p-value of 0.6403, indicating significant to accept the null hypothesis that the data was non-stationarity.

Using the benchmark test, the ARIMA (2, 1, 0) was selected for forecasting based on the relative values of forecast errors. The comparison of the values of standard deviation and mean errors is given in Table 3 and the residuals for ARIMA (2, 1, 0) are given in Figure 4.

Table 3: Comparison of Standard Deviation and Mean Errors

Test	SD	MAPE	MPE	MASE
Seasonal Naïve	181.9428	73.0097	-26.5711	1
Exponential Smoothing	140.9582	74.9621	-26.9311	0.8265
ARIMA (2,1,0)	134.4284	49.6321	-0.7219	0.7618

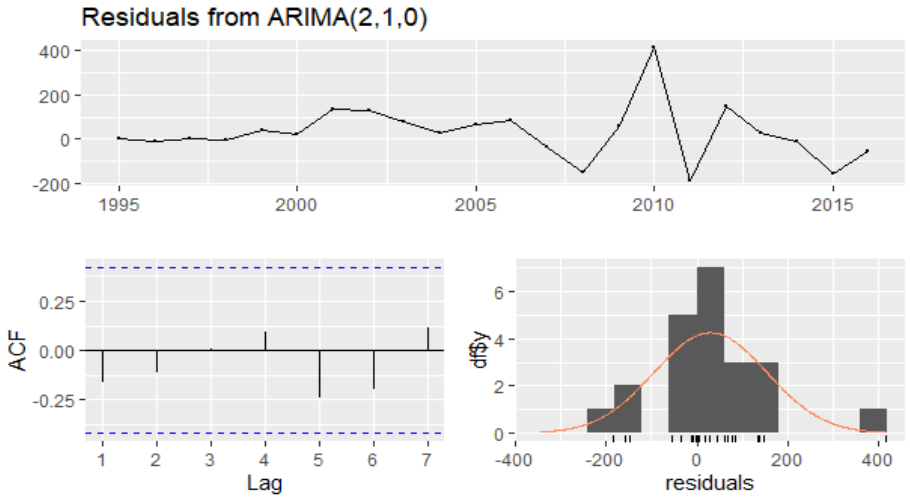

Figure 4: Residuals from ARIMA (2, 1, 0) for Annual Exports

After selecting ARIMA (2, 1, 0) model, the shawl exports data was forecasted for 10 years at a 95% confidence interval, and the first difference returned the data shown in Table 4.

Table 4: The 10-year point forecast of shawl exports

Year	Point Forecast	Lo 95	Hi 95
2018	318.4923	55.0168	566.4820
2019	300.3483	34.2147	581.4820
2020	311.6600	9.8217	613.4983
2021	308.0807	-20.0467	636.2082
2022	307.3339	-37.2041	651.8719
2023	309.1820	-59.0494	677.4134
2024	307.8491	-78.3961	694.0943
2025	308.3687	-95.9852	712.7225
2026	308.3528	-113.8494	730.5949
2027	308.1939	-130.4457	746.8336

Finally, the 10-year shawl exports forecast was plotted, which showed a downward trend as shown in Figure 6.

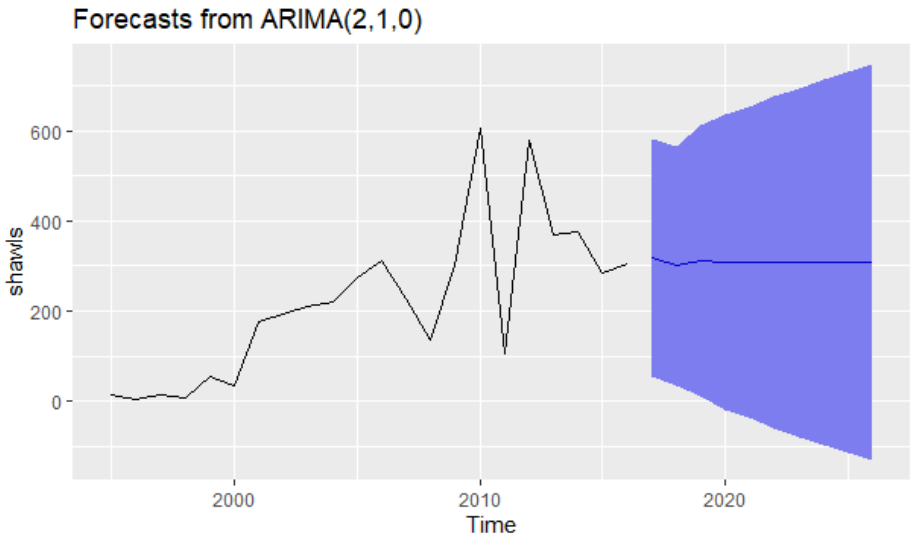

Figure 6: 10-year Forecast of Annual Exports with ARIMA (2, 1, 0)

4. CONCLUSION

Throughout history, the shawl industry has been one of the most important industries in Jammu and Kashmir. It is not only culturally significant but has also been a major source of exports and employment. It is well-established and recognized that the shawl industry is declining, which has aggravated in recent years. This study aimed to explore the importance of foreign trade for the development of the shawl industry, the reasons behind the decline, and its prospect. For this study, to understand the prospects of the industry, exports data from 1995- 2017 was forecasted using ARIMA for the next 10 years. Using trade statistics, the present study has demonstrated that foreign trade has historically played a vital role in the development of the shawl industry, and its decline is rooted in the conflict and low investment spiral, which decreases its productivity and hence its competitiveness. Moreover, the study has also shown that the

industry's prospects are negative, as shown by the point forecast decline. Future studies are needed to explore the relationship between the growth of the shawl industry and NSDP or employment rate in Kashmir, which can provide key insights for understanding the economy of Kashmir.

Acknowledgment
The authors acknowledge the comments made by the reviewers and members of the editorial board on the earlier version of this manuscript.

Funding Source:
The author(s) received no specific funding for this work.

Conflict of Interests:
The authors have declared that no competing interests exist.

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Kashmir Economic Review
ISSN(P): 1011-081X, ISSN(E): 2706-9516
http://www.ker.org.pk

Banks Soundness in Pakistan: SEM-PLS Approach

ABSTRACT

The research is conducted to test the soundness of 20 listed Pakistani banks post-crisis (2009-2018). The banks included Islamic, private, and publicly-owned banks. PLS-SEM technique was applied on CAMELS with 42 indicators, and the most significant parameter for Banks' soundness was identified. Stock Returns were taken as the dependent variable and direct indicator for Bank's soundness. Outcomes showed that Earning parameter contributed most significantly to Banks' soundness in Pakistan. Other parameters like management, capital, and liquidity were also significant, but results showed that banks are executing with a lower capital base and less liquidity, and management also needs improvement. The sensitivity parameter showed no relevance to banks' soundness in Pakistan. Overall, the Pakistani banking industry is sound, and worldwide banking crises affect Pakistani banks considerably.

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Keywords
Banks Soundness, Partial Least Squares, CAMELS

JEL Classification
E59, G21, G33

Please cite this article as:
Satti, A., Khalid, M., Kanwal, S. & Solangi, A.Q. (2022). Banks Soundness in Pakistan: SEM-PLS Approach. *Kashmir Economic Review*, 31(1), 1-16.

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Author's contribution to the article: 1- Conceived and designed the analysis, 2- Reviewed and compiled the literature, 3- Collected the data, 4- Contributed data or analysis tools, 5- Performed the analysis, 6- Wrote the paper, 7- Financial support for the conduct of the study, 8-Other

1. INTRODUCTION

The Bank industry plays a crucial role in developing a country economically, so there must be a sound and stable banking industry in any country. Banks are prone to periodic crises, which can lead them to Bank default can trigger financial crises throughout the economy. Financial crises can be infectious and damaging, inciting calls for quick reaction. Financial crises have driven economies into deep recessions and sharp current-record inversions in the past. Laven and Valencia (2008) describe systematic crises as when a country's financial and corporate sector encounters enormous numbers of defaults and monetary establishments, and companies confront extraordinary challenges in reimbursing contracts on time. Therefore, nonperforming loans increase drastically, and most of the aggregate banking capital is depleted. Discouraged resource costs might join this circumstance (for example, real estate and equity prices) on the impact points of run-ups before the crises, sharp increments in real interest rates, and a log jam or inversion in capital streams.

A systematic banking crisis is not a single-country event. It creeps from country to country, a prominent example of which is the global financial crisis of 2008. Financial crises, if they occur in the present day, financial crises would be bigger financial crisis than ever. This is due to the ripple effect, as most perspectives in the present financial sector are interrelated. The finance world is more reliant than at any other time in recent memory, with expanded and more extensive banking exercises that associate most monetary institutions on the planet (Gofman, 2017). This was seen by the latest financial crises that started in 2007 that influenced the worldwide economy. This crisis prompted a recharged enthusiasm for how a crisis of this scale was allowed to occur in any case and what sort of control could have been executed to counteract it. This premium mainly concerned the banking division which got a great deal of criticism in directing their tasks.

Pennacchi (2005) describes the requirement for bank control as a security net to ensure depositors' interest and maintain a strategic distance from other financial outcomes. Dima et al. (2014) conclude that global financial stability significantly depends on a sound banking framework. Instability in the banking division speaks to the primary transmission medium for different shocks that are endogenous or exogenous. Since the global financial crisis of 2007, catching early cautioning signs of potential banking or financial sector shocks has turned out to be progressively vital. In such a manner, a basic need has emerged from testing the health indicators and soundness of banking and financial sectors and perceiving how they can be improved.

"By Soundness of banking sector, it is meant that the principal components of the framework are capable of absorbing engrossing unfavorable unsettling influences and can manage risk effectively and efficiently." The study offers two main contributions. First, identify the most significant CAMELS parameters indicators to test the Bank's Soundness in the case of Pakistan. Second, investigate the effect of CAMELS constructs on Stock Returns and identify the most significant construct for Bank's Soundness in Pakistan.

2. LITERATURE REVIEW

Various financial soundness indicators (FSIs) have been used in various studies worldwide to measure financial soundness. Čihák and Schaeck (2007) are pioneers in studying potential banking sector crises by using FSIs. They run the main tests on the capacity of FSIs to clarify the emergence of banking crises. They used FSIs that were not arranged under a generally acknowledged worldwide system. Along these lines, some FSIs are not entirely comparable.

Vaithilingam et al. (2004) used the 6 I's framework that included Intellectual capital, Integrity, Infrastructure, Interaction, Institutions, and Innovation to measure the bank's soundness of underdeveloped,

developing empirically, and developed countries. Results established a significantly higher value of 6I'for developed countries. It was also established that a high level of 6I's contributed decidedly to the soundness of banks.

Dang (2011) used the CAMEL framework to examine the soundness of the banks. Authors discovered that CAMEL rating is critical to banking supervision and is a well-known approach among regulators around the world. The authors also used the stress test tool that indicated the banks that failed due to insufficient capital. The authors discovered huge similarities between the CAMEL model and Basel Regulations. Bastian et al. (2016) worked on Iranian Banks with CAMELS arrangement and used the Causal Loop diagram to study the causal structure in CAMELS. The research examined the correlations in the causal variables. The outcomes demonstrated that Iranian banks are low in capital and assets, and there found no excellent quality Management that translated into the most imperative issues of Iranian banks. Increased performance and soundness can be achieved by managing and building up the aforementioned variables.

Kolum (2016) used CAMELS and Z scores testing approaches to examine the performance of Kenyan commercial banks. His research discovered that the CAMELS approach is bet at conceiving distinct ratings than CAMEL. The study recommended that bank administrators center on guaranteeing that their banks are well-capitalized, limit nonperforming advances, quality administration, and satisfactory liquidity to accomplish bank soundness. Likewise, speculators and depositors ought to survey banks dependent on these significant elements when settling on their venture and banking choices.

Bergenendorff and Osbäck (2015) performed quantitative research by taking d from the 30 largest banks in the European Union. They used CAMELS variables and discovered that there had been apparent changes in the banking division throughout the years in terms of betterment. Results showed a reasonable increment in the banks' capital proportions because of the new capital prerequisites. However, the discoveries demonstrated that productivity and liquidity are still too low for an utterly good banking segment which might be due to the ongoing retreat. They found that there is still space for further enhancement in both leverage and liquidity proportions and profitability.

Dima et al. (2014) took the data set for 63 developed and underdeveloped countries, including OECD and non-OECD countries, and measured banks' soundness using the Z score methodology. They examined that the development of capital, efficiency in the banking sector, and bank soundness form a financial nexus for the country. They discovered that various kinds of risks could be controlled, managed, and overcome by sound and large banks in the banking sector. Likewise, it is discovered that banks' soundness can robust by the enhanced actions of supervising and reducing banks' operational risks through advanced capital development.

Salina (2017) used the cluster analyses technique and Principle component Analysis to group sound and unsound banks in Kazakhstan. Authors tested, and re-estimated Altman Z' and EM score models and constructed logit, probit, and MDA models. Altman models demonstrated adequate capacity to anticipate banks' financial unsoundness in Kazakhstan. The MDA, logit, and Probit models demonstrated more than 80% predictive accuracy. The model coordinating the MDA, logit, and Probit types presents predominant consistency. The cluster analysis technique identified the degree of financial soundness in Kazakhstan banks.

In their paper, Masud and Haq (2016) examined Bangladesh's private commercial banks and checked their soundness. The data was taken from 2006 to 2014. They used trend analysis and statistical tools techniques. Based on financial indicators, they ranked the commercial banks. The outcomes showed that higher deposit branches, higher loans, and higher investments by a bank do not necessarily mean that it is sound and has higher profits. The general financial situation is forecasted through trend analysis of the available historical data.

Moyo (2018) investigated South African Banks to establish a relationship between efficiency and competition. Seventeen international and local Banks were taken in the study from 2004 to 2015. The author checked how the bank's soundness was affected by efficiency and competition using the Lerner index, Boone indicator, and Z score methodologies. Results demonstrated that the Lerner index negatively affected the competition's efficiency while the Boone indicator showed a positive effect. On account of bank soundness, the outcome is incompletely reliable with what different analysts have found. He observed that competition when utilizing the Boone indicator is negatively related to the Z score, inferring that challenge upgrades bank soundness.

Roman and Sargu (2013) explored 15 commercial Romanian and investigated their soundness from 2004-2011. To accomplish this, they used a standout amongst the most prominent strategies for investigating the financial soundness of banks, the CAMELS ratio analyses analysis. The averages of the variables were computed separately, and banks were ranked according to the obtained averages. The acquired outcomes featured the banks' qualities and vulnerabilities, underlining the need to fortify the concerns of decision-makers to enhance and expand bank soundness.

Prompella and Dicanio (2016) measured the financial soundness and vulnerability of 246 listed banks worldwide by performing a stress test. They developed a stochastic method to test banks' resilience and formed banks' resilience index. Resilience was described as the ability to absorb shocks in distress situations. They inferred that bRi could establish another incredible choice to test financial soundness because it can prove which banks are solvent. They demonstrated that bRi could be the major well-being of the well-being of banks, and it is suitable for observation purposes.

Gagnis et al. (2006) developed a multi-criteria decision aid model for 894 banks from 79 countries and classified banks based on their soundness into three groups. UTADIS method was used to develop the model. The banks were assigned to the respected groups using the Fitch rating system. The outcomes demonstrated that capitalization, asset quality, and the market where banks operate are the most critical criteria in grouping the banks. Productivity and effectiveness are also critical properties, while stock exchange and size are the minimum imperative ones. UTADIS accomplishes higher-order precision than ordinary logistic regression and discriminant analyses utilized for benchmarking purposes.

Onyema et al. (2018) examined ten Nigerian commercial banks for 15 years from (2000 to 2015) for soundness. Instead of using traditional models like CAMELS ratio analysis and CLSA-stress test, another successful model for estimating the soundness of banks has been utilized in this examination named the "Bankometer S-score model." The outcome demonstrated a noteworthy contrast in banks contemplated utilizing the Bankometer S-score model. The investigation presumed that the Bankometer S-score model could help the administration of any bank determine the issue of insolvency and remove the inadequacy created by inefficient banking activities.

Rahman (2016) examined twenty-four Bangladeshi commercial banks and investigated their soundness. The study also utilized the Bankometer model instead of using other CLSA-Stress tests and CAMELS methodologies. The soundness of chosen banks has been estimated for the year 2015, and the consistency of soundness of these banks has been assessed for significant lot covering (2010-2015). The examination uncovers that every one of the banks has guaranteed good financial status exclusively. The banking industry has dependably been in an ideal position (2010-2015). At long last, this examination infers that the "Bankometer" model will help the internal administration of any bank in deciding indebtedness issues and expelling the inadequacy created from wastefulness in keeping money activities.

Literature Review regarding Pakistan:

In Pakistan, Ali and Ansari (2007) attempted to use CAMELS ratio analyses for Islamic and Conventional Banks. They investigated and compared the performance of both types of banking systems in Pakistan for four years (2008-2012). T-Test statistical measure was used to find the significance of mean differences between the two banks of these ratios. The investigation reasons that Conventional banks are increasingly productive and operationally effective while not so much solvent but rather riskier when contrasted with Islamic Banks.

Zeb and Sattar (2017) conducted a threefold study measuring the profit efficiency, and impact of financial regulations on soundness, efficiency, and profits of Pakistani commercial banks for six years (2008-2014). They used the methodology of Data Envelopment Analysis (DEA) and examined profit efficiency. They further applied the Z-score methodology to test the soundness of the said banks and applied Panel Regression Approach to examine the effect of financial Regulation on these banks. The research primarily influenced the efficiency of profits in larger banks. The outcomes of the research suggested that banks' financial soundness and profit efficiency are significantly affected by financial regulations.

Ishaq et al. (2016) evaluated ten Pakistani commercial banks and examined how they performed from 2007 to 2013 using CAMEL ratio analyses. To measure the execution of the banks, regression and correlation techniques have been used. The study concludes that the CAMEL methodology is a significant and fit measure to examine banks' performance in Pakistan.

Shar et al. (2010) tested the vulnerability of Pakistani Banks individually in financial distress by using the Bankometer model covering the period from 1999-2002. They affirmed the precision of the barometer methodology by applying it to banks individually and measuring each bank's solvency. The outcomes were then contrasted with the CAMEL methodology and the CLSA stress test. Bankometer results were validated through a balanced standard for a stress test. Bankometer analyses classified the banks under pressure as insolvent, whereas sound banks of past examination were discovered to be solvent. Bankometer analyses could not classify the banks as sound banks that passed the standard of the stress test and were classified as sound banks by the stress test standard primarily because they were deficient in capital. The majority of the banks were found to be solvent under both the standards of the CLS stress test and Bankometer.

Irama et al. (2018) critically assessed loan securitization and bank soundness and evaluated the impact of loan securitization on bank soundness for 10 selected banks from 2007-2015 in Pakistan. Z score testing technique was applied to the Logit model to understand the impact of securitization on soundness. Various correlation tests were also performed. This study's outcome demonstrated that the securitization process looks unequivocally influenced by firm-specific uniqueness. Furthermore, it is found that banks participating in credit securitization likely lessen their liquidity. Furthermore, the expected credit risk of those banks was analyzed which came out to be high. Henceforth, it's reasoned that securitization is being utilized as a risk transfer tool in public and private banks.

Ashraf and Tariq (2016) used Bankometer in their study and tested the soundness of Pakistani banks. They applied the model to every bank recorded on Pakistan Stock Exchange over the period 2006-2014. The soundness of each bank has been figured independently, which exhibits which bank is too steady and which is near bankruptcy. A Z-score display is likewise utilized for banks recorded on Pakistan Stock Exchange for examination reasons. These two models revealed similar outcomes, yet some are marginally extraordinary anyway. According to the consequences of the two models, the Bank of Punjab's budgetary soundness is hazy and should be improved to reach the ensured zone of soundness.

Sarwar and Asif (2011) led this examination to check the wellbeing and soundness of the banking sector of Pakistan. CAMEL Framework was used to analyze soundness. Simply ratios were calculated and compared for the selected six banks, two from each major zone of the banks: Banks, Domestic Foreign, and Islamic

Banks in Pakistan for the last three years. The outcome demonstrates that regardless of monetary issues worldwide, Pakistan has a solid and sound banking framework to help its economy.

FSIs like the CAMELS ratio have also been used to examine and compare Islamic Banks' performance and commercial banks in Pakistan from 2005 to 2009 (Jaffar & Manarvi, 2011). It is also used to empirically test the overall execution of Pakistani commercial Banks for the period of 2000-2012 (Zafar et al., 2017).

3. DATA AND METHODOLOGY

The sample includes Government-owned and Private Banks. A total of 20 banks listed at the Karachi stock exchange have been taken and investigated for soundness of the banking sector in Pakistan for the financial year 2009-2018. Banks listed provide homogeneity in comparing banks, as done by Ayadurai and Eskandari (2018). The overall averages of the whole data were computed. There were three government-owned Banks and 17 Private sector Banks, including 2 Islamic Banks. This research covers ten financial years starting from 2009 to 2018. The financial year starts on January 1st and ends on December 1st of the same year, and the data analyzed in this research is purely secondary. It is collected from the yearly published Financial Statements by each of the respective Bank's understudies and from The State Bank of Pakistan published statistical reports.

This study selected Partial Least Square Structural Equation Modeling Technique for many reasons. The PLS-SEM model resolves measurement errors in variables (Chen, 2001), and it is a non-parametric technique. PLS-SEM has extensive applications to administrative difficulties, specifically, where a human association is found. For instance, the illustrative model utilized in this section clarifies administrative ability by watching other latent constructs, for example, relational aptitudes, innovative style, and passionate development and experience. Such builds are frequently estimated indirectly through composite markers dependent on metric or semi-metric information (Avkiran, 2018). PLS-SEM turned out to be especially prevalent in social sciences, for example, in marketing and family business by Sarsted et al. (2014), in Accounting, by Lee et al. (2011), and tourism by Rasoolimanesh and Ali (2017). PLS-SEM works well with the formative measures and answering the research questions. According to Babin et al. (2008), SEM's success is ascribed to its ability to measure latent variables and their relationships. It is a beneficial technique to investigate complete theories and understand concepts (Ridgon, 1998).

Table 1: List of Variables

S. No.	Category	Code	Variables
1	Capital	X1	CAR
2		X2	Tier 1 to RWA
3		X3	D/E
4		X4	E/A
5		X5	Capital to Asset
6	Asset	X6	NPLs to Total Loans
7		X7	Pr. to NPLs to NII
8		X8	Total Loans/ Total assets
9		X9	Net NPLs to Capital
10		X10	Equity to net loan
11		X11	Deposits/ Assets
12		X12	NPLs to net loan
13		X13	NPLs to Total Equity
14	Management	X14	Management Expense to Total Assets
15		X15	Total Loans/ Deposits
16		X16	Business per employee
17		X17	Net Income to No. of Br.
18		X18	Total Liabilities to No. of Br.
19		X19	Total Assets to No. of Br.
20		X20	Total Deposits to No. of Br.
21		X21	Total loans to No. of Br.
22	Earning	X22	ROA (before tax)
23		X23	ROA (after tax)
24		X24	Cost/ Income
25		X25	NII to interest expensed
26		X26	NII to total income
27		X27	Non-interest income to total income
28		X28	ROE (before tax)
29		X29	ROE (after tax)
30		X30	ROCE
31		X31	Non-interest expense to total income
32	Liquidity	X32	Liquid Assets to Total Assets
33		X33	Liquid Assets to Total Deposits
34		X34	Deposits to Assets
35		X35	NPLs to Asset
36		X36	Investments to Assets
37	Sensitivity	X37	Log of Total Assets
38		X38	P/E
39		X39	Log of Total Assets + P/E
40		X40	DuPont Ratio
41		X41	Net NPLs to Net Loans
42		X42	Pr. To NPLs to Total Loans
43	Stock Returns	X43	BE/ME

The initial model design has six exogenous constructs (CAMELS) with 42 manifest variables. The manifest variables were reduced to 25. The path model shows the relationship between the six hypotheses and manifest variables. The inner model displays the relationship between the constructs, while the outer model displays the relationship between the construct and indicator variables.

4. RESULTS AND DISCUSSION

Twenty-five manifests variables were significant during the initial assessment of the measurement model based on Outer Loadings, AVE, Cronbach's Alpha, and Composite Reliability.

Table 2: Outer Loadings, Cronbach's Alpha, and Composite Reliability Values

Variables	Items	Loadings	(P-Values)	AVE	Cronbach's Alpha	Composite Reliability
Capital	X1	0.85	(0.00)	0.77	0.79	0.78
	X2	0.91	(0.00)			
Asset	X8	0.81	(0.02)	0.66	0.77	0.81
	X9	0.70	(0.01)			
	X12	0.87	(0.00)			
	X13	0.86	(0.00)			
Management	X15	0.71	(0.00)	0.63	0.73	0.76
	X16	0.87	(0.00)			
	X17	0.87	(0.01)			
	X18	0.73	(0.00)			
	X19	0.74	(0.02)			
	X20	0.79	(0.04)			
Earnings	X23	0.93	(0.03)	0.69	0.70	0.82
	X25	0.82	(0.02)			
	X26	0.78	(0.00)			
	X27	0.70	(0.00)			
	X28	0.94	(0.04)			
	X30	0.82	(0.02)			
Liquidity	X32	0.75	(0.00)	0.69	0.86	0.88
	X33	0.91	(0.00)			
Sensitivity	X37	0.47	(0.00)	0.50	0.82	0.83
	X38	0.74	(0.00)			
	X39	0.42	(0.03)			
	X40	0.90	(0.02)			
	X41	0.82	(0.00)			

Analysis

The capital construct shows weak path coefficients with stock returns and earnings. It has small predictive relevance with stock returns and earnings as f square stand at 0.061 and 0.027, respectively. Capital construct has established a significance at a 97.5% confidence interval for stock returns (0.282, 0.996) and with earnings (0.121, 0.884). Thus hypothesis 1 is accepted. The study is in line with Berger and Bouwman (2012) study results that bank capital improves the organizational execution of a small bank in any circumstance, while the medium or bigger bank's adequate capital improves the company's performance during banking crises. It inferred the significance of capital in deciding the survival of banks. Having sufficient capital helps the banks cope admirably during financial crises, thus positively ensuring bank soundness. Dao and Ankenbrand (2014) found that capital risk is directly related to capital adequacy in Vietnamese Banks. It empirically supported that the capital regulation approach should deal with banking risk. Weak and negative path coefficients in this study show that Pakistani banks are operating at low capital levels. Chen (2001) predicted that a low level of capital reduces a bank's lending ability, reducing aggregate investment. When aggregate investment falls, it reduces revenue. Persistent low revenue reduces banks' net worth, reducing the stock returns.

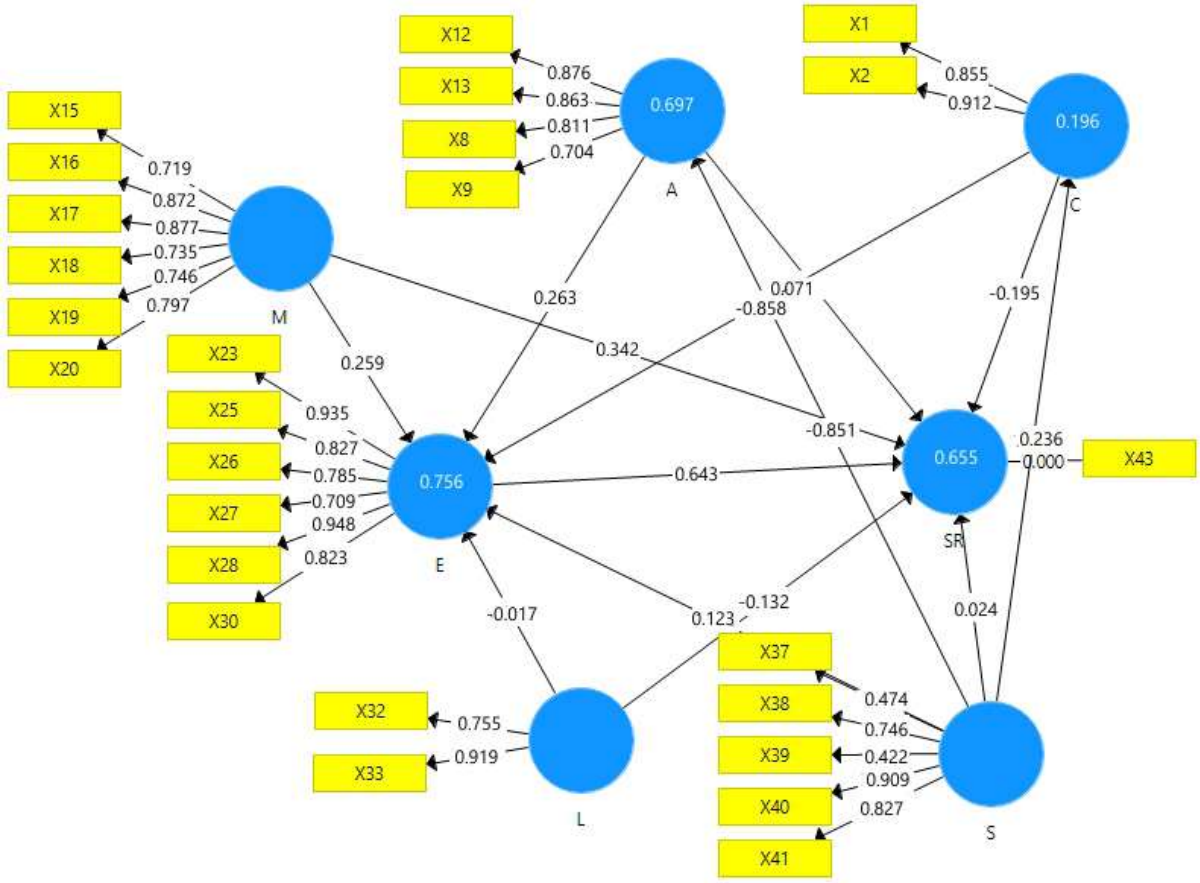

Figure 1: SEM Model of bank Soundness

Asset construct shows significance at a 97.5% confidence interval with stock returns (0.194, 0.245) and earnings (0.077, 0.181), thus supporting hypothesis 2. A weak path coefficient (0.341) with stock returns suggests that banks are operating at a low level of assets. The asset has minor predictive relevance with stock returns and no predictive relevance with earnings. Sriwardany (2006) showed in his study that the asset growth of a company is directly related to the change in stock prices of the company. According to him, the asset growth information of a company brings a positive response from the investors that increase the firm's stock price.

Management construct has not established a significance at a 97.5% confidence interval, thus rejecting hypothesis 3. Path coefficients show weak but positive values whereas the f square value for stock returns and earnings shows no predictive relevance. The results contradict the theory that better service and management quality play an important role in creating the company's value by influencing the purchasing pattern of the customers, hence affecting investment and profitability. Management quality is an internal determinant of the bank's profitability because management objectives, policy decisions, and actions are reflected in banks' operating results. Zimmerman (1996) found that an important contributing factor to bank performance is the management's decision regarding loan portfolio concentration. Good bank performance is often associated with many researchers' good management quality. Various investigations have reasoned that cost control is the essential determinant of a bank's profitability. Expense management offers noteworthy and predictable opportunities to increase profitability. With the enormous size and the huge contrasts in pay rates and wages, the efficient utilization of workers is a key determinant of relative profitability as the total operational cost of the banks is reduced by these costs. Staff expenses seem to negatively affect the bank's ROA. They investigated the effect of management and service quality on the

profitability of the banks in Nigeria and found no significant relationship between management and service quality and the profitability of the banks.

The earnings construct has established sound significance at a 97.5% confidence interval with share returns, thus failing to reject hypothesis 4. The path coefficient is 0.643, suggesting that earnings have a positive and moderate relationship with stock returns. F square value shows average predictive relevancy. Mshoka (2013) showed a significant and strong positive relationship between the earnings of the banking sector and their stock returns. Many studies investigated earnings by breaking down income into its fundamental factors: accruals and cash flow components. These investigations suggested accruals are lesser persevering as compared to cash flows According to the study of Mshoka (2013), cash flows and accruals, both of the components, have a significant positive relationship with the stock returns; however, the cash flow component is given more weightage than accruals. For the banking and servicing sector, the cash flow higher the stock returns.

The liquidity construct has negative path coefficients with stock returns of -0.132 and with earnings of -0.017. There is a sound significance at a 97.5% confidence interval with share returns and earnings (0.366, 1.592), thus failing to reject hypothesis 5. Negative path coefficients show there is insufficient liquidity. No predictive relevance is seen. Liquidity risk became the most dreaded financial risk of all time after the financial crises of 2007-2008. Liang and Wei (2012) demonstrated that continued fears of market illiquidity aggravated the global financial crises. Liquidity has become an important financial phenomenon since the Russian debt crisis in 1998, further impelled by the recent global financial crisis of 2007-2008. These eras were associated with a widespread deterioration in liquidity across countries and markets.

Table 3: Path Coefficients

Soundness Constructs	Path Coefficients	97.5% BCa confidence interval	F square values	Significance?
C-SR	-0.195	(0.282, 0.996)	0.061	Yes
C-E	0.071	(0.121, 0.884)	0.027	Yes
A-SR	0.341	(0.194, 0.245)	0.083	Yes
A-E	0.263	(0.077, 0.181)	0.004	Yes
M-SR	0.342	(-0.056, 2.082)	0.010	No
M-E	0.259	(0.003, 0.174)	0.023	No
E-SR	0.643	(0.224, 0.679)	0.134	Yes
L-E	-0.017	(0.234, 0.913)	0.007	Yes
L-SR	-0.132	(0.366, 1.592)	0.019	Yes
S-SR	0.024	(-1.331, 1.298)	0.027	No
S-E	0.123	(0.002, 0.77)	0.019	No
S-C	0.236	(-0.504, 0.711)	0.002	No
S-A	-0.858	(-0.037, 0.289)	0.006	No

The sensitivity construct highlights ineffective path coefficients with stock returns (0.024), earning (0.123) capital (0.236), and negative path coefficient with asset (-0.858). None of the constructs established a significant relationship at a 97.5% confidence interval, thus rejecting hypothesis 6. Minor predictive relevance is seen with stock returns and earnings, while no relevance is seen with capital and asset. The results suggest that sensitivity is not affecting bank soundness in Pakistan. Fama and French (1992) reported that the market beta has little or no ability in explaining the variation in stock returns on US stock on selected non-financial firms.

The summarized results show that earning is significant for bank soundness, whereas sensitivity is insignificant. Banks are executing their operations with lower liquidity ratios and capital levels, which can

cause bank failures. Bank failures with similar causes were seen during the 1930s Great Depression. Basel III established Liquidity Coverage Ratio (LCR) and Net Stable Funding Ratio (NSFR) seem insufficient to generate enough liquidity levels and capital.

5. CONCLUSION

The investigation exhibits PLS-SEM application on 20 listed banks to assess banking sector soundness in a parsimonious way in Pakistan. Forty-two ratios were taken as indicators of CAMELS, and the most relevant ratios in the case of Pakistani banks were identified. After identifying the ratios, the effect of CAMELS parameters on share returns was observed, and the most significant parameters were identified. Both processes were completed by using the PLS-SEM methodology. The most relevant ratios to measure capital adequacy was CAR and Tier1 to RWA. The ratios that determine asset quality are mostly NPLs ratios: Net NPLs to capital ratio, NPLs to net loans, NPLs to total equity, and total loans to asset ratio. The most relevant ratios for the Management parameter are the total loans to deposit ratio, management expense ratio, Net income to number of branches, and total deposits to no. of branches. The earnings parameter's most significant ratios are ROA (after-tax), NII to interest expense ratio, and NII to total income ratio, ROE (before tax), ROCE, and cost to income ratio. Significant ratios for the Liquidity parameter are found to be liquid assets to total assets and liquid asset to total deposit ratios.

In contrast, relevant ratios for Sensitivity are Net NPLs to Net Loans, DuPont ratio, price to earnings ratio, and log of assets. The most significant construct for Pakistani bank soundness is earning, whereas sensitivity is the least relevant. However, liquidity, capital adequacy, and management are significant to share returns hence, playing a considerable role in the banks' soundness in Pakistan. Outcomes also recommended that banks worked with lacking capital and liquidity to pad adversity. Basel III regulations were expected to deal with this situation, but no effective solution was seen for two major problems replacing lost capital in time and risk measurement.

Acknowledgment
We are thankful to the anonymous reviewers of the paper and members of the editorial board for the valuable comments that helped us improve its quality.

Funding Source:
The author(s) received no specific funding for this work.

Conflict of Interests:
The authors have declared that no competing interests exist.

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