Volume and Issues Obtainable at the Department of Tourism and Hospitality Management-
The Islamia University of Bahawalpur, Bahawalpur, Pakistan 63100.
Journal of Tourism, Hospitality, and Services Industries Research
ISSN: 2958-5570 ; ISSN (E): 2958-5589
Volume 2, No.1, June 2022
Journal homepage: https://journals.iub.edu.pk/index.php/jthsir
DOI: 10.52461/jths.v2i01.1657

Role of Fintech Innovation in Financial Inclusion: Avoiding Vulnerability of Cybercrime and Backwardness

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ARTICLE DETAILS

History
Revised format: May 2022
Available Online: June 2022

Keywords
Fintech Innovation; Financial Inclusion; Vulnerability; Cybercrime; Backwardness; Individual wellbeing; Societal wellbeing.

ABSTRACT

Fintech plays a vital role in the financial industry as it has experienced tremendous growth in the last decade and more importantly, services sector is shifting towards digitalization. Financial inclusion particularly contributes to the economic and social well-being of the country. This study provides insight into fintech and financial inclusion by addressing vulnerability, including cybercrime and backwardness, to explain their impact on individual and societal well-being using the PLS-SEM analysis technique. The findings of the study explore that Fintech has significantly affected financial inclusion which is positively associated with individual and societal well-being. Moreover, the study suggests that vulnerability (cybercrime and backwardness) does not moderate societal and individual well-being. An explanatory cross-sectional study is conducted to investigate the role of fintech innovation in financial inclusion avoiding the vulnerability of cybercrime and backwardness. Applying a simple random sampling technique with a sample size of 514 respondents, primary data is collected through self-administered survey questionnaires. The PLS-SEM approach is used to test the study's theoretical framework. Empirical results of the research support the proposed hypothesis by determining the significant influence of financial inclusion on individual and societal well-being, fintech and financial inclusion, and vulnerability to individual and societal well-being.

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Introduction

Financial technology has long been lauded as a powerful tool to drive sustainable growth by improving financial activities and transactions. With the advent of the internet and modern technology, Fintech institutions are now taking innovative measures for financial inclusion – from microlending, and micro-payments to microinsurance and remittances, especially in Asian countries, for example, Pakistan, where a substantial number of the population do not use financial services due to infrastructural, geographical, education and technological challenges (Ozili, 2021). Financial inclusion indicates people's ability to reach and efficiently utilize the required monetary products and financial services. Fintech has encouraged people to avail this opportunity for financial inclusion by providing conventional and unconventional financial services including the usage of smartphones, digital currency, internet, software, hardware, and online banking transactions (China kpmgcom, 2018). Though it is unreasonable to assume that people may preferably use conventional financial services instead of using cash, yet it still is imperative and advisable to provide them equitable opportunities and a chance to access innovative financial services. In this way, the role of fintech innovations like credit financing, online payments, debt servicing, etc (Duvendack & Mader, 2020). in these technologically advanced times cannot be ignored, and all the players in the financial market can take benefits from the usage of innovative financial services appropriately. Recently COVID-19 has affected the economic activities of many countries and under such circumstances, Fintech determines how important is financial inclusion and development for improving the livelihood of the poor and financially deprived people. Financial inclusion contributes to economic growth and social well-being stated by the central bank of Malaysia (Razak et al., 2017).

The research under discussion tends to identify with respect to the positivity of financial inclusion impact upon individual and societal wellbeing in Southern Region of Punjab. The study of literature is concerned about the influence of fintech innovation for the progress of financial inclusion avoiding the vulnerability of cybercrime and backwardness measuring yardstick of spectrum.

The literature review also reveals an important correlation among studies results supported by NGOs and MFIs and reverse results from other free studies. Moreover, the socio-economic impact shows its stress on the significance of research through influence appraisal technique that is an extensive method anyway.

Various studies have been carried out on Fintech, and financial inclusion; however, in rare cases any study has ever addressed the combined relationship between fintech, societal well-being, and individual well-being and the relationship among financial inclusion, societal well-being, and individual well-being. The vulnerability includes many factors; some of which are backwardness, and cybercrimes through which the moderating effect is determined between the Fintech and Financial Inclusion which ultimately impacts societal and individual well-being. Especially, the current study is focusing on individual and Societal well-being in South Punjab. Previous studies have not studied the relationship between Fintech and financial inclusion with the vulnerability of backwardness and cybercrime. Therefore, the current study is going to bridge this literature gap by examining the relations between these variables. Primary motive of the aforesaid study is explore the effects of fintech innovation on strengthening the financial inclusion in

South Punjab and as well as improving the individual and societal wellbeing of people by mitigating the vulnerably of cybercrime and backwardness.

This research will be equally helpful for the rich and the poor of South Punjab having no or little knowledge about financial technology that how the adoption of this technology will improve their livelihood and create ease in life. This research will also give wisdom to the banks, financial institutions and financial service providers. This research will deliver vision to the scholars and intellectuals to generate the capacity of fintech innovation, financial inclusion and wellbeing. Policy makers, regulators, bankers and all other stakeholders will also get vision from this research to launch fruitful and outstanding strategies to develop the financial technology. In addition, this research will also open unique horizons for further research in this field.

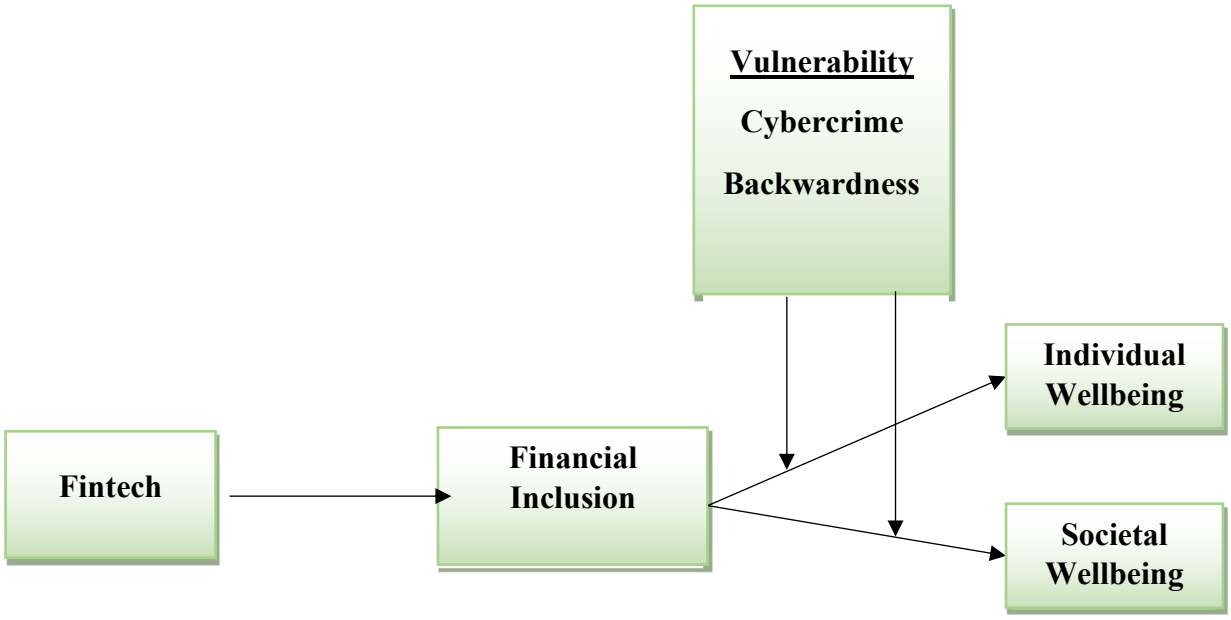

Figure 1. Theoretical Framework

Literature Review

Relationship between Fintech and Financial Inclusion

Fintech through financial inclusion is the blood for economic development but it varies in its impact. Fintech has created favorable circumstances for growth through supply-driven or demand-driven channels. An easy approach to credit and other safe, convenient, and affordable financial services for the poor and disadvantaged groups, poor areas, and underdeveloped sectors is seen as a prerequisite for expediting/speeding up growth and turning down income disparity and poverty (Swamy, 2014). A study conducted in India revealed that Fintech is the most important ingredient in the profitability of the banking sector (Desai et al., 2019). Fintech isn't an assistance that is given by banks however, it is another plan of action that is exceptionally supportive t individuals' necessities. The administration given by fintech organizations assists the local area with trip monetary exchanges without having a record like those in banking overall. With the goal that the local area doesn't have to utilize individual personality in doing a monetary exchange, Fintech has

a major contribution to human activities in the current era (Le; Chuc; & Hesary, 2019). Fintech through financial inclusion is giving a boom to business activities that contribute significantly to the essential modifications to the structure, actions, and control of the organization. (Reviewed & Journal, 2019). A recent study illustrates that fintech reduces income inequality and that financial inclusion also contributes to the reduction of inequality by improving the financial well-being of developed countries but is not as effective in underdeveloped countries. Conclusive development could be achieved by countries by promoting fintech and financial inclusion (Demir et al., 2020). Thus, the following hypothesis has been developed:

H1: There is a significant relationship between fintech and financial inclusion.

Relationship between Financial Inclusion and Individual wellbeing

Financial inclusion directly affects Economic progress regardless of the socioeconomic class by enhancing the financial access to the individuals. A study conducted in Burkina Faso has evaluated the integral role of Fintech in the promotion of favorable effects of financial inclusion. The dream of speedy and smooth financial transaction of financial institutions came true only with the emergence of Fintech. Thus, the people living in remote areas who earlier do not have easy access to the financial institutions are now getting benefit from emergence of Fintech. They are now operating their bank accounts and can perform financial transaction without visiting financial institutions (N'dri & Kakinaka, 2020). Financial inclusion is directly associated to the individual well-being specially for old people who feel loneliness after getting retirement (Gyasi & Adam, 2021). A study conducted in Malaysia on social and individual well-being explores that financial inclusion significantly contributes to the improvement of social and individual well-being. The economic growth greatly depends on financial development by enhancing individual efficiency towards financial investment (Razak et al., 2017). Although accessibility towards financial institutions, products and services is solely not enough to lessen poverty. As only opening bank accounts of people cannot enhance their financial position without generating income ways for individuals and businesses. Lack of savings and credits availability could affect the progress of economy and may indicate low level of standard of living due to low availability of income generating opportunities. Financial inclusion provides accessibility towards financial services at cheaper cost to individuals and society, hence, reduces the poverty and brings prosperity of individual and societal wellbeing. Financial Inclusion has raised the financial literacy and now people who were unable to write earlier, can operate and manage Fintech by creating their interest towards technology. A study conducted in Burkina Faso has proved the financial inclusion through fintech, promotes wellbeing at the individual as well as societal level by improving their livelihood which increases their access towards education and nutrition facilities (N'dri & Kakinaka, 2020). Thus, the following hypothesis has been developed:

H2: There is a significant relationship between financial inclusion and Individual wellbeing.

Relationship between Financial inclusion and Societal wellbeing

Financial inclusion through Fintech innovation transforms the overall societal landscape as it distributes the financial services equitably and cheaply. It helps in the concerted efforts for poverty alleviation. It is also useful in providing agile services to the market and the people feel satisfaction for the speedy transaction of their financial products. It exerts lesser regulatory pressure over the individuals, and they become ready to take risks which overhauls the societal mindset. Proper management of financial resources can safeguard socio-economic justice, ensure equal distribution

of wealth and financial resources, and alleviate poverty (Abdul Razak, Muhammad, Hussin, Zainol, & Hadi, 2017). Several studies have evaluated the connection between financial inclusion and societal well-being. Financial inclusion has a vigorous role in reducing poverty by individual and societal well-being. Financial inclusion helps poor people in financial management, its efficient allocation, and spending which in turn alleviates poverty and creates equilibrium in society (Dri & Kakinaka, 2020). Financial inclusion plays an integral role in maintaining equilibrium in society and ultimately results in individual well-being which enhances the demand for financial services. Higher demand for financial services gives a boom to business activities, growth, and development with lower market uncertainties resulting in the efficient exploitation of capital resources in society (S. Cole et al., 2009). Financial inclusion provides accessibility to financial services at a cheaper cost to individuals and society, hence it reduces the poverty and brings a prosperity to individual and societal wellbeing. Financial Inclusion has raised financial literacy and now people who were unable to write earlier can operate and manage Fintech by creating their interest in technology. A study conducted in Burkina Faso has proved that financial inclusion through fintech, promotes well-being at the individual as well as societal level by improving their livelihood which increases their access to education and nutrition facilities (N'dri & Kakinaka, 2020). Thus, the following hypothesis has been developed:

H3: There is a significant relationship between financial inclusion and societal well-being.

Relationship of Vulnerability with financial Inclusion and Individual Wellbeing

Cyber insecurity and backwardness of individuals pose a grave threat to the ever-increasing role of fintech innovation in financial inclusion. While markets across the globe are recording the highest use rates of digital payment applications, digital currency, and mobile banking, they are also experiencing the highest number of cyberattacks on financial institutions. Rapid Financial Inclusion has a major part in reducing class differences in the society by providing financial services, especially to the deprived class. The disadvantaged class can improve their livelihood and can promote savings and borrowings through financial inclusion which enables poor people to tackle the vulnerabilities of their lives. Vulnerability factors negatively affect financial inclusion and individual well-being. As the financial inclusion and individual well-being are interconnected and directly proportional but the effect of vulnerability factors such as cybercrime and backwardness (illiteracy, poverty, hesitation, and low or little knowledge about technology) is obstructive; hence, vulnerability factors moderate the effects of Fintech and financial inclusion. Vulnerable factors hamper the progress of fintech and financial inclusion as people belonging to poor areas and low-income groups feel hesitation in the adoption of Fintech and are not able to get advantage from the financial inclusion / financial services provided by banks or other institutions. Protecting individuals from fraud and phony violation of information is crucial. Therefore, it may be expected that social welfare would rise when there is an efficient economy. On the contrary social welfare would be low when economic efficiency decreases. Hence societal well-being can be predicted through efficient economic conditions (Sirgy & Yu, 2012). Thus, the following hypothesis has been developed:

H4: Vulnerability hampers the relationship between financial inclusion and Individual well-being.

Relationship of Vulnerability with financial Inclusion and Societal Wellbeing

Most people are backward and unfortunately, cybercrime has become a growing challenge for developing economies like Pakistan, where consumers often accomplish financial transactions

through unsafe and insecure transmission lines. According to (Baur-Yazbeck, Frickenstein, & Medine, 2019), falling victim to a scam or experiencing system access errors can result in financial and psychological harm and will most certainly affect a customer's confidence and trust in the financial service. Rapid Financial Inclusion has a major part of reducing the class difference in society by providing financial services especially to the deprived class. The disadvantaged class can improve their livelihood and can promote savings and borrowings through financial inclusion which enables poor people to tackle the vulnerabilities of their lives. Vulnerability factors negatively affect financial inclusion and individual well-being. As financial inclusion and societal well-being are interconnected and directly proportional but the effects of vulnerability factors such as cybercrime and backwardness (illiteracy, poverty, hesitation, and low or little knowledge about technology) are obstructive hence vulnerability factors moderate the effects of Fintech and financial inclusion. Vulnerable factors hamper the progress of fintech and financial inclusion as people belonging to poor areas and low-income groups feel hesitation in the adoption of Fintech and are not able to get an advantage from the financial inclusion/ financial services provided by banks or other institutions. Protecting consumers from fraud and phony violation of information is crucial. Therefore, it may be expected that social welfare would rise when there is an efficient economy. On the contrary social welfare would be low when the economic efficiency decreases. Hence societal well-being can be predicted through efficient economic conditions(Sirgy & Yu, 2012). The theoretical framework is presented in figure 1. Thus, the following hypothesis has been developed:

H5: Vulnerability hampers the relationship between financial inclusion and societal well-being.

Methodology

Data Analysis

The data procured from respondents and questionnaires were assessed with the help of statistical tools SPSS 21 and SPSS AMOSS software version 23.0. The information was tested to judge the effectiveness of fintech innovation in financial inclusion avoiding the vulnerability of cybercrime and backwardness.A variable of quantitative impact in nature was defined for all hypotheses. The variables of impact were compared among participants to upraise its statistically used analyses of variance (ANOVA). The first part of the analysis contains the explanation of distribution figures and charts. The second part contains outcomes and evaluation of the statistical analysis e.g. ANOVA.

Normality Test

It can be analyzed with many tests to check the deviation along with skewness and kurtosis that are proposed by (Meyers et al., 2012), in case the value of skewness and Kurtosis exists between +/- 1.0 and +/- 3.0 accordingly. This indicates that the data is normally disseminated (Shafique, 2017).

Multicollinearity Test

The study utilizes multicollinearity test to strengthen correlation between 2 and more variables in the regression model, for the strength of correlation negatively affects the accuracy of the estimations. Moreover, it also exacerbates to standard error of

coefficient in a model that's why putting hazard to the model and affects the statistical influence of coefficients. Secondly, high collinearity escalates the existence of type II error by enhancing the opportunities of refuting a good hypothesis (Shafique, 2017). The tolerance value 1 identifies low multicollinearity among the variables and a value close to 0 shows high multicollinearity leading to a problem. According to (Meyers et al., 2012), the multicollinearity between the variable if the values of tolerance exists between 0.01 (Shafique, 2017). VIF (the reciprocal to the tolerance) indicates the effect of multicollinearity on variance coefficient estimates. The VIF near to 0 shows little or no correlation between the variables (Shafique, 2017).

Statistical tool

Smart partial least Square (PLS 3) is used to assess the collected data of this current study. Through smart PLS 3, the analysis is being divided into two major parts. In the first part, assessment of measurement model is executed. In second part, assessment of structural model has been performed. Measurement model has been examined through factor loading, Cronbach's alpha, composite liability, convergent validity, discriminant validity and average variance extracted (AVE). according to factor loading should be more than 0.5. Furthermore, the average variance extracted (AVE) should be more than 0.5. Convergent validity will be assessed through internal consistency. In second part, Smart PLS bootstrapping is being utilized to test the moderation effect, moreover, for moderation effect Smart PLS bootstrapping has been used in which direct and indirect effects are analyzed. Furthermore, effect size (f2) and predictive relevance (Q2) are also being analyzed.

Analysis and Results

This chapter analyzes the results for the current study by using the PLS path modeling. A total number of 532 questionnaires were distributed directly to the individuals, of banks and financial institutions and businessmen of south Punjab consisting of the three divisions Multan, Bahawalpur and Dera Ghazi Khan and 11 districts: Multan, Khanewal, Lodhran, Vehari, Dera Ghazi Khan, Muzaffargarh, Layyah, Rajanpur, Bahawalpur, Rahim Yar Khan and Bahawalnagar of Pakistan. In order to improve the response rate at highest possible level, phone call reminders (Silva et al., 2002; Traina et al., 2005) were sent after two weeks. As a result, 514 questionnaires were received making the total response rate of 96% which is in parallel with the response rate definition provided by Jobber (1989). This accounted for 98% of the valid response rate which is acceptable following the criteria provided by (Baruch & Holtom, 2008) which suggests a 35% response rate from the managers is acceptable for surveys (refer to Table 1).

Response Rate of Questionnaires

Response	Frequency/ Rate
No. of distributed questionnaires	532
Returned and usable questionnaires	514
Returned and excluded questionnaires	18
Response Rate	96%

Table 1.

Data Screening and Preliminary Analysis

Initial screening of data is very critical for multivariate analysis as it helps in identifying any possible violations of the key assumptions regarding the application of multivariate techniques of data analysis. It also helps the researchers for developing better understanding about the data collected for further analysis. Prior to performing data screening, all the 514 useable returned questionnaires were coded and entered into the SPSS. Additionally, the negatively worded items were reversed coded using SPSS. The FT1, FT2, FT3, FT4, FT5, FI1, FI2, FI3, FI4, FI5, IWB1, IWB2, IWB3, IWB4, IWB5, SWB1, SWB2, SWB3, SWB4, SWB5, SWB6, SWB7, VLB1, VLB2, VLB3, VLB4 and VLB5 were the items that were reversed. After data coding, the missing value analysis, assessment of outliers, normality test and multicollinearity test were performed.

Assessment of Outliers

According to Barnett and Lewis (1994), the outliers are "observations or subsets of observations which appear to be inconsistent with the remainder of the data" (p. 7). The presence of outliers in any data set can seriously distort the regression coefficient estimation hence, leading to unreliable results (Verardi & Croux, 2009). The frequency distribution was also tabulated in SPSS, using minimum and maximum statistics for all the latent variables in order to determine values that appear to be outside the value labels provided in SPSS in this study. From previous studies it is suggested that, although definitions vary, an outlier is normally examined to be a data point that is away outside the norm for a population or variable (e.g., Jarrell, 1994; Rasmussen, 1988; Stevens, 1984. in estimation of regression co-efficient the availability of outlier in any data set is considered a distortion (Verardi & Croux, 2009). According to Lewis and Barnett (1994) the outliers are defined as "observation and their subsets which seem to be uncertain with the remainder of the data". The presence of outlier in any data can truly deform the regression coefficient measure that constructed to unreliable results (Verardi & Croux, 2009). For all the variables (present in the data sheet), minimum and maximum frequency distribution statistics was sequenced in PLS for the purpose of evaluation of values appeared to the outside of the value. In the current study, no outlier is present, or no value was found outside the range (expected) that is minimum 1 and maximum 5.

Normality Test

When the distribution of data is normal and the relationship among the variables is linear, the regression and correlation tests are performed easily (J.F. Hair & Joseph, 2006). According to Coakes & Steed, (2001) the data is observed good when it has anormal distribution, and there is no availability of noticeable skewness. Normality of data can be measured by using various tests. According to (Peng & Lilly, 2000). The within range values of skewness and kurtosis are +_ 1.0 and +_ 3.00 respectively and these values can be used to identify the normality of data in the given study. Another way to determine normality test is Kolmogorov-Smirnov test. (Chua, Kuang Chua, Chandran, Vinod, Acharya, Rajendra, & Lim, Choo B, 2010) said that the data is considered normally

distributed if the kurtosis and skewness value falls between -2 and +2. Further, (J. Hair et al., 2010) explained that the Skewness values falling in the range of -1 to +1 (outside) show a considerably skewed distribution (J. Hair et al., 2010).

Findings

(Data Statistics)

	No.	Mean	Median	Min	Max	Standard Deviation	Excess Kurtosis	Skewness
FT1	1	3.644	4	1	5	1.213	-0.306	-0.778
FT2	2	4.002	4	1	5	0.919	2.057	-1.297
FT3	3	3.801	4	1	5	0.943	0.484	-0.78
FT4	4	3.522	4	1	5	1.059	-0.596	-0.425
FT5	5	3.871	4	1	5	0.933	0.809	-0.947
FI1	6	3.444	4	1	5	1.171	-0.703	-0.474
FI2	7	3.677	4	1	5	1.019	-0.034	-0.726
FI3	8	3.749	4	1	5	1.128	-0.408	-0.691
FI4	9	3.312	4	1	5	1.228	-0.99	-0.315
FI5	10	3.549	4	1	5	1.093	-0.222	-0.639
IWB1	11	3.616	4	1	5	0.939	0.461	-0.783
IWB2	12	3.871	4	1	5	0.9	0.658	-0.856
IWB3	13	4.081	4	1	5	0.812	1.524	-1.016
IWB4	14	3.808	4	1	5	1.006	0.347	-0.848
IWB5	15	4.036	4	1	5	0.923	1.17	-1.072
SWB1	16	3.378	4	1	5	1.067	-0.537	-0.486
SWB2	17	3.495	4	1	5	0.944	-0.36	-0.448
SWB3	18	3.627	4	1	5	1.059	-0.078	-0.743
SWB4	19	3.421	4	1	5	1.054	-0.544	-0.44
SWB5	20	3.445	4	1	5	1.041	-0.427	-0.478
SWB6	21	3.441	4	1	5	1.112	-0.707	-0.415
SWB7	22	3.982	4	1	5	0.935	1.051	-1.037
VLB1	23	3.557	4	1	5	1.048	-0.223	-0.681
VLB2	24	3.686	4	1	5	0.969	-0.041	-0.605
VLB3	25	3.633	4	1	5	1.039	-0.594	-0.498
VLB4	26	3.865	4	1	5	0.888	0.673	-0.817
VLB5	27	3.751	4	1	5	1.043	0.161	-0.816

Table 2.

Linearity was evaluated on the basis of residual plots from the regression analysis. Normally and independently distributed residuals showed independence of error terms. Bivariate scatter plots between variables showing associations are evenly distributed (Tabachnick, 2012). In general, such tests show that the data is reliable and appropriate, suitable for further research (Shafique, 2017).

Multicollinearity test

The multicollinearity test is highly recommended to measure the strength of correlation among variables or to comprehend the degree of relationship among independent variables. If there is strong relationship among variables, it shows that the multicollinearity appears but if the value of r > .9 then it may create problems in testing (Taylor et al., 2012). Using of Variance Inflation Factor (VIF) proves benchmark. Its range is between 1-5. Values near to 1 are desirable for tolerance but the values ranging between 5 to 10 show doubtfully high multicollinearity in variables (Tsagris & Pandis, 2021).

(Multicollinearity Test)

	Financial Inclusion	Fintech	Individual Wellbeing	Societal Wellbeing	Vulnerability
Financial Inclusion			1.094	1.176	
Fintech	1				
Individual Wellbeing					
Societal Wellbeing					
Vulnerability			1.084	1.091	

Table 3.

The above table indicates that the values of VIF are within the cut-offs (Risher, 2018), hence there is no issue of multicollinearity for this study.

Descriptive Analysis of the Latent Constructs

This segment deals with the descriptive statistics for the latent constructs. The descriptive analysis was performed in order to explain the general situation of Fintech, Financial Inclusion, Individual wellbeing, Societal wellbeing and vulnerability of the financial technology adopters of Southern Punjab. Means and standard deviation of descriptive statistics are calculated for the latent variables of this study. The level of implementation of Fintech, Financial Inclusion, Individual wellbeing, Societal wellbeing and vulnerability of the financial technology users of Southern Region of Punjab are reflected in these results. Five-point Likert scale is being used for the present study in order to measure all the latent variables, this scale was anchored by 1=strongly disagree and 5=strongly agree. Table 4.7 shows the tabulated results of the descriptive statistics for the latent variables of the present study.

Estimation of Measurement Model

According to (Mag & Hopkins, 2014) (Risher, 2018) (Readers et al., n.d.) Assessment of measurement model; it is important for the researchers to 1) determine individual item reliability, 2) determine internal consistency, content validity, convergent validity and discriminant validity. As per these instructions, every step is performed and the details are provided below:

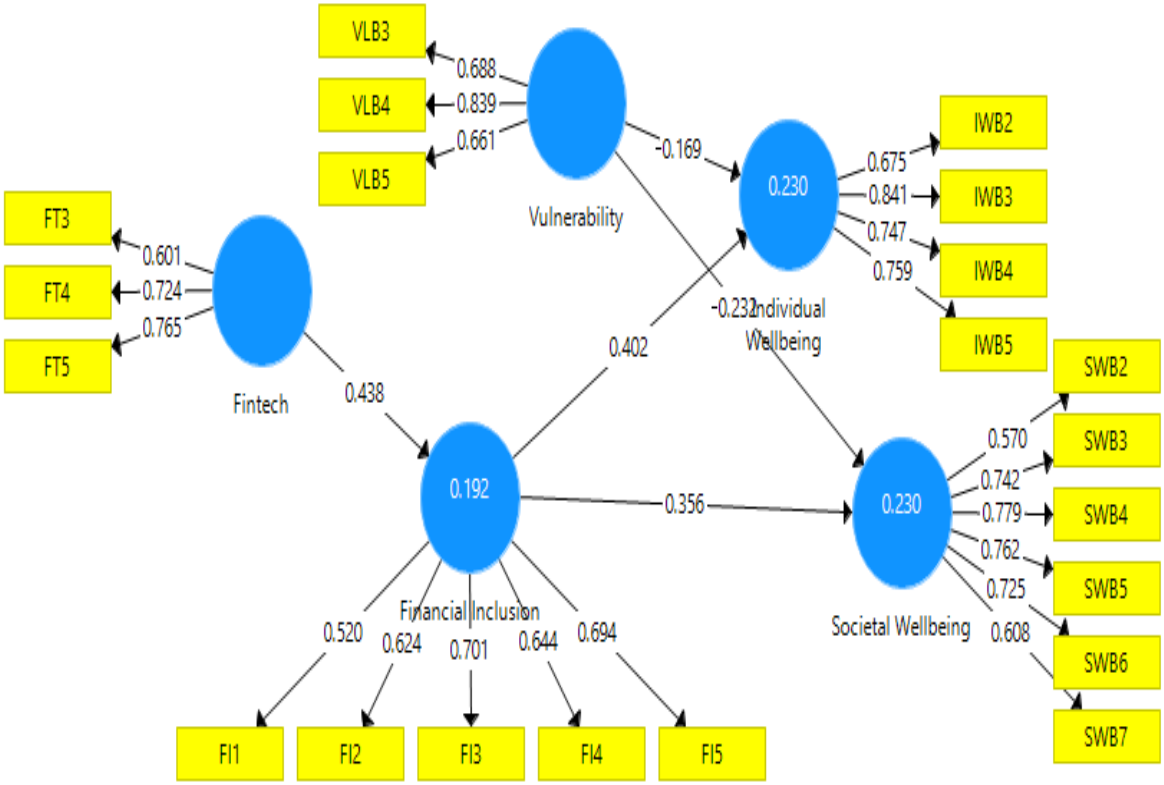

Figure 2. (Measurement Model)

Single Item Reliability

According to (Wanous & Hudy, 2001) there are two methods for the measurement of single item reliability. Additionally, in order to compare the data, it is collected individually and in group/ class. There is a rule of thumb for retaining the items whereby they have advised to retain items between .40 and .70 (Joe F. Hair et al., 2014).

Internal Consistency Reliability

Reliability and validity of measures refer to the quality of research, its techniques and accuracy of methods. Substantially, reliability and validity define the consistency and accuracy of the measures of research study (Joe F. Hair et al., 2011). To measure the internal consistency reliability of the measures "Cronbach's alpha" is used where it defines how closely the construct items are related. Standing withthe fact, as per standard given rule of values regarding Cronbach alpha numeric values are accepted if it ranges between 0.60-0.70 level and considered to be poor if its numeric values are below 0.60 level (Joe F. Hair et al., 2011). In present study, (Table 4) numeric values illustrate good internal consistency between the items of construct where all values are greater (>0.70). Precisely above values of Cronbach alpha than 0.70 indicating the multiple measures are consistently reliable for measurements of each construct. Indicator reliability or Construct reliability-CR is

measured as per rule of thumb 0.70 and above is acceptable numeric value range (Joe F. Hair et al., 2011). Table:1 of the present study demonstrates the > 0.70 numeric value table, indicates the good construct reliability of the study.

(Reliability and Convergent Validity)

	Cronbach's Alpha	rho_A	Composite Reliability	Average Variance Extracted (AVE)
Financial Inclusion	0.761	0.718	0.774	0.509
Fintech	0.749	0.754	0.741	0.549
Individual Wellbeing	0.752	0.773	0.843	0.574
Societal Wellbeing	0.79	0.789	0.852	0.503
Vulnerability	0.771	0.728	0.775	0.538

Table 4.

Convergent Validity

The degree to which an item fairly represents the intended latent variable and connects with other measures of the same latent variable is called convergent validity (Bornmann & Tekles, 2021). For the assessment of convergent validity of every latent construct, the Average Variance Extracted (AVE) was used. Formell and Larcker have recommended the AVE to assess the convergent validity in 1981.

(AVE Square Root)

	Financial Inclusion	Fintech	Individual Wellbeing	Societal Wellbeing	Vulnerability
Financial Inclusion	0.64				
Fintech	0.438	0.7			
Individual Wellbeing	0.452	0.514	0.758		
Societal Wellbeing	0.424	0.442	0.512	0.702	
Vulnerability	0.293	0.277	0.287	0.337	0.733

Table 5.

Discriminant Validity

According to (Duarte & Raposo, 2010) discriminant validity is defined as the extent to which a specific latent construct is different from other latent constructs. Drawing upon the suggestion of (Fornell & Larcker, 1981), the present study assessed discriminant validity using AVE. In doing so, the correlations among latent

constructs were compared with square roots of average variance extracted (Fornell & Larcker, 1981). In addition to this, the discriminant validity was also determined using criterion provided by Chin (1998). According to Chin, the indicator loadings are compared with other reflective indicators in the table of cross loadings. First, the discriminant validity was assessed following (Fornell & Larcker, 1981) criterion. As a rule of thumb, Fornell and Larcker suggested to use AVE with 0.5 or higher value. Further for ascertaining discriminant validity, they have suggested that the square root of the AVE should be higher than the correlations among the latent variables. Table 4 suggests that the AVE for all the latent constructs was above minimum cut-off of 0.5. Table 4.9 indicates that the square root of average variance extracted was higher than the correlations among the latent variables. Therefore, it could be concluded that all the measures used in the present study have adequate discriminant validity as per guidelines of (Fornell & Larcker, 1981).

HTMT 0.9

	Financial Inclusion	**Fintech**	**Individual Wellbeing**	**Societal Wellbeing**	**Vulnerability**
Financial Inclusion					
Fintech	0.689				
Individual Wellbeing	0.581	0.862			
Societal Wellbeing	0.514	0.704	0.653		
Vulnerability	0.431	0.501	0.411	0.488	

Table: 6.

The Heterotatrait-Monotrait ratio of Correlations (HTMT) is the latest method to assess the discriminant validity in PLS the Partial least squares structural equationmodeling. This is highly recommended for the building blocks of model evolution which is one of the key building blocks of model evaluation.

Assessment of Significance of the Structural Model

After ascertaining the measurement model, the present study assessed the structural model. In doing so, the present study employed standard bootstrapping procedure with 532 bootstraps samples and 514 cases to determine the significance of the path coefficients. This was carried out by following the guidelines provided by the eminent scholars in their recent studies i.e. (Fisher & Hall, 1991; Hesterberg et al., n.d.; Mackinnon, 2001; Joe F. Hair et al., 2011; Henseler et al., 2009; Sarstedt, 2019). Table 4.13, Figure 4.4, and Figure 4.5 provide full estimates of the structural model along with statistics about moderating variable of organizational culture.

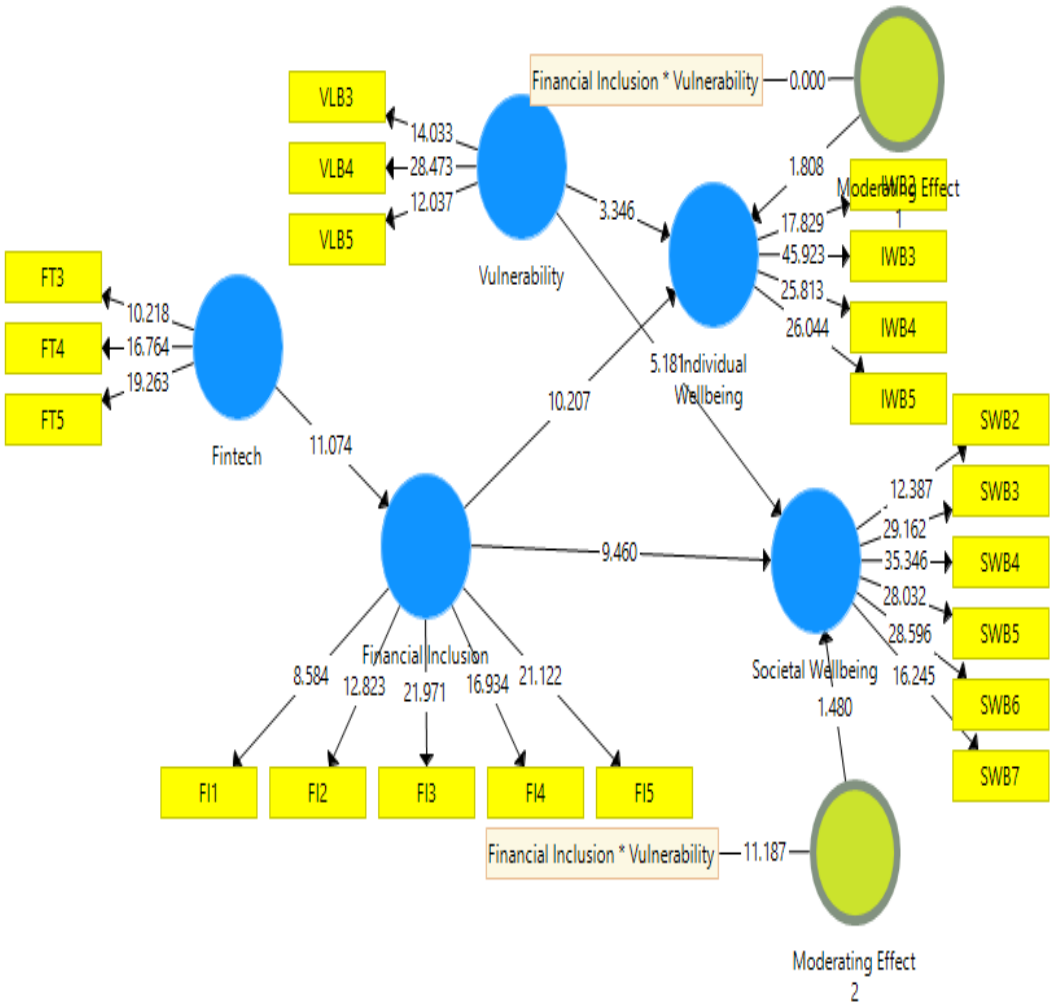

Figure: 3. (Structural Model)

Originally, Hypothesis 1 proposed Fintech innovation is positively related with Financial Inclusion. Results provided in Table 7.- and Figure 3. have revealed a significantly positive relationship between Fintech Innovation and Financial Inclusion (β=0.277, t=3.58, p<0.00). hence supporting Hypothesis-1.

Table 7.

	Original Sample (O)	Sample Mean (M)	Standard Deviation (STDEV)	T Statistics (O/STDEV)	P-Values
Supported H1: Financial Inclusion -> Individual Wellbeing	0.384	0.389	0.038	10.207	0

Supported **H2:** Financial Inclusion -> Societal Wellbeing	0.344	0.348	0.036	9.46	0
Supported **H3:** Fintech -> Financial Inclusion	0.438	0.442	0.04	11.074	0
Not Supported H4: Moderating Effect 1 -> Individual Wellbeing	-0.085	-0.081	0.047	1.808	0.036
Not Supported H5: Moderating Effect 2 -> Societal Wellbeing	-0.056	-0.052	0.038	1.48	0.07
Supported H6: Vulnerability -> Individual Wellbeing	0.156	0.156	0.047	3.346	0
Supported H7: Vulnerability -> Societal Wellbeing	0.224	0.227	0.043	5.181	0

Figure 4.

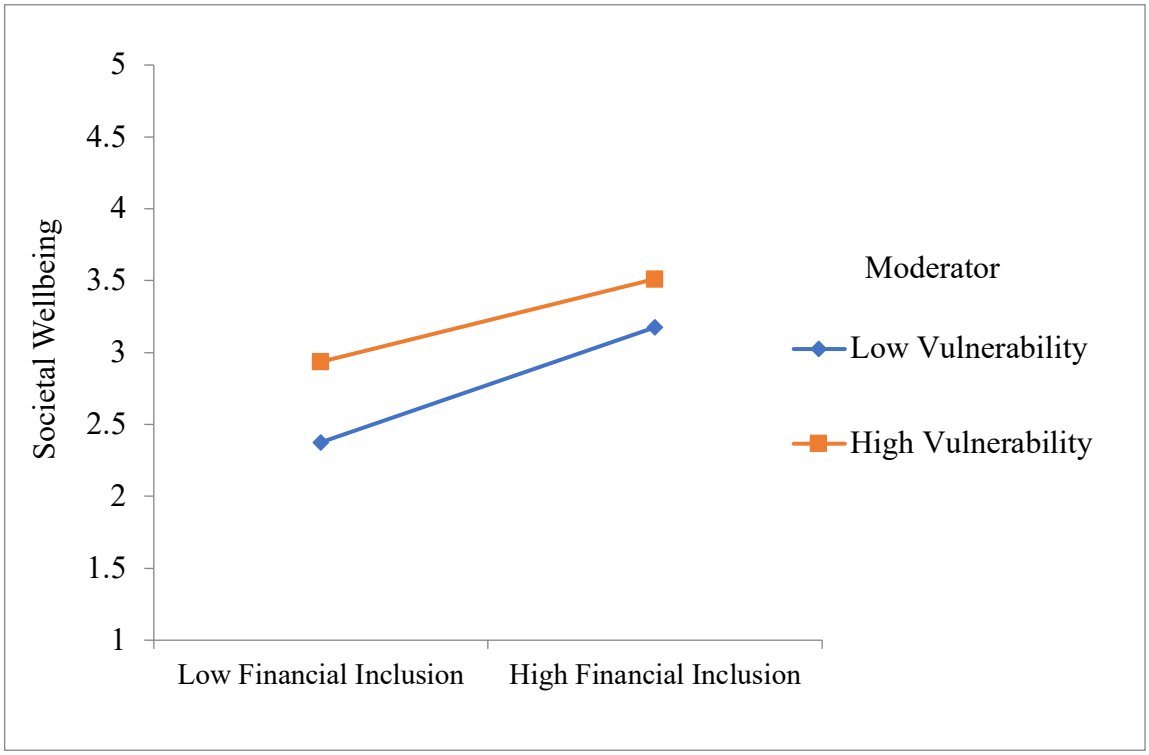

Figure 5.

Discussion and Conclusion

This segment represents a discussion of the key findings of the present study in connection with its underpinning theories and conclusions from prior investigations. The subheadings given hereunder are the research questions. In the foremost research question, it was emphasized to inspect whether there is a substantial relationship between fintech financial inclusion in Pakistan particularly in southern area of Punjab. In line to this, the first research objective of the study was to study the relationship between Fintech and Financial Inclusion. The concepts behind the advanced financial services and technological methods to deal any business or entity are provided whereas the concepts could also be themselves businesses (Di Pietro et al., 2021). Financial inclusion is defined as a process that provides the easy approach, provision, and usage of financial services to all the people in society (Sarma & Pais, 2008).

Numerous empirical studies have highlighted the significance of Fintech innovation and financial inclusion with regards to their contribution in improving overall wellbeing; individual, and societal (China kpmgcom, 2018; Shahid et al., n.d.; Zaworski & Latosiewicz, 2021). Thus, studies have suggested further investigation on the relationship. More importantly, previous studies have also indicated and suggested for further investigation on this relationship in the financial sector (Lisna et al., 2021). However, as discussed before, that studies have described mixed results on fintech innovation in financial inclusion avoiding the vulnerability of cybercrime and backwardness, the current study showed that the vulnerability factors moderately affect the effectiveness of the fintech innovation in financial inclusion. However, many studies do not describe any such type of effect that leads towards gap for further empirical attention. Thus, the current study hypothesizes that fintech innovation is positively associated with financial inclusion and further with individual and societal well-being. To achieve this, the current study adopted PLS path modeling to test this relationship statistically.

Consistent with hypothesis 1, the PLS path modeling results revealed a positive relationship between fintech innovation and financial inclusion with large effect size (f^2 =0.238). This suggests that fintech innovation has a noticeable impact on the financial inclusion. The current study refers large effect size. The findings of the present study have practical significance (Wong, 2016). Additionally, the results of the current study have highlighted the importance of fintech innovation on the financial inclusion as acknowledged in the existing literature (Butt & Khan, 2019; Demir et al., 2020; Franco et al., 2007; Suryono, 2019). This evenness with the previous studies has further supported the positive relationship between the variables.

The second research question points out to inspect whether financial inclusion is positively related to societal well-being in Pakistan particularly in southern Punjab. Second research objective to achieve this was expressed that studied the relationship between financial inclusion and societal wellbeing followed by hypothesis 2 respectively. Interestingly, consistent with hypothesis 2; the results of the PLS path modeling have suggested that financial inclusion is positively related with societal wellbeing in small effect size (f^2 =0.151). The results indicate that financial inclusion plays a critical role in enhancing societal wellbeing. This concept is also supported by the financial technology users in the southern region of Punjab, Pakistan empirically. These results have also added value in the present literature that supported positive link between financial inclusion and societal

wellbeing. Furthermore, the current study has also contributed in the body of knowledge by investigating the financial inclusion relationship with societal wellbeing in the service (financial) sector particularly southern Punjab.

The third research question describes the relationship between financial inclusion and the well-being of an individual. The third objective to attain this was to study the relationship between financial inclusion and individual well-being followed by hypothesis 3. When financial inclusion increases, it also promotes individual wellbeing (Razak et al., 2017). Generally Financial inclusion refers to the availability of financial resources to the individuals (Shahid et al., n.d.). Financial inclusion-context is an important consideration to ensure appropriate selection of mechanism for individual wellbeing. Consistent with hypothesis 3; the results of the PLS path modeling have suggested that financial inclusion is positively related to individual wellbeing with medium effect size (f2 =0.192). the results indicate that financial inclusion plays a critical role in enhancing societal wellbeing. This concept is also supported by the financial technology users in the southern region of Punjab, Pakistan empirically. These results have also added value in the present literature that supported positive link between financial inclusion and societal wellbeing. Furthermore, the current study has also contributed to the body of knowledge by investigating the financial inclusion relationship with societal well-being in the service (financial) sector, particularly in southern Punjab.

The fourth research question of the current study was whether the vulnerability factor moderates the relationship between financial inclusion and individual & societal wellbeing. In-line with this, the fourth research objective of the study was formulated to examine the moderating effect of vulnerability factors on the relationship among financial inclusion and individual and societal wellbeing. To address this, two research hypotheses were formulated and tested using PLS path modeling (i.e., H4, & H5). H4: Vulnerability hampers the relationship between financial inclusion and Individual wellbeing. H5: Vulnerability hampers the relationship between financial inclusion and societal wellbeing. The findings of this study did not indicate statistically significant moderating role of vulnerability factors i.e cybercrime and backwardness on the individual and societal wellbeing. Vulnerability is unable to moderate the relationship between financial inclusion and wellbeing of individual and society. This could be a major reason that vulnerability does not significantly moderate the relationship in southern region of Punjab which is agriculturally rich and literacy rate is relatively high in south Punjab Pakistan, so people find it a less effective phenomenon. Moreover, social media awareness is tremendously becoming high and people are no more backward in adopting technical products. The findings of this study did not indicate the statistically significant moderating role of vulnerability factors i.e., cybercrime and backwardness on individual and societal well-being.

Theoretical Implications

The conceptual framework of the present research was drawn on the basis of evidence and theoretical gaps identified in the literature. The support and explanation for the framework was drawn from two theoretical perspectives, i.e TAM management theory and technological innovation theory. In this study, the factor was incorporated as a moderating variable to better understand and explain the relationship between fintech innovation, financial inclusion, individual and societal wellbeing.

Practical Implications

Conclusively, the present study has promoted multiple practical understandings in connection to fintech innovation financial inclusion in Pakistan`s financial sector particularly in southern region of Punjab. Foremost, the results suggested that financial innovation practices are important consideration for financial and non-financial sector's performance. Institutions can take considerable efforts to maximize their performance through fostering financial inclusion perceptions. Secondly, financial innovation and financial inclusion in Pakistan can maximize the prosperity at individual and societal levels in Pakistan, and provide necessary discretion with regards to decision making, as the present study has empirically proved that these factors are very critical in nature. Thirdly, the results have provided support to the idea that fintech innovation is a major component that could potentially enhance individual and societal wellbeing through financial inclusion. The TAM theory claims the usefulness and comfort in the use of financial technology (Moon & Kim, 2001). The findings of the current study suggest that policy in the financial sector in Pakistan should give serious consideration in promoting fintech innovation and financial inclusion for improving the individual and societal wellbeing of the country. Specifically, the moderating role of vulnerability factors such as cybercrime and backwardness suggest that there should be an effective alignment between financial inclusion and individual wellbeing and financial inclusion and societal wellbeing. Thus, the above results and discussions summarize that financial inclusion was a potentially significant predictor of individual and societal well-being.

Limitations and Future Research Directions:

The current study applied self-reported measures. These measures could influence the behaviors, feelings, and attitudes of the randomly selected participants therefore, there are chances of social disability and/or CMV. Although the present study attempted to reduce the issues by ensuring anonymity and improving the items of the scale. But still, there are chances of the occurrence of these issues. Hence, future researchers may wish to use other strategies to assess the organizational culture-business performance relationship.

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