

IMPLICATIONS OF COVID-19 ON SELF-EMPLOYED FEMALES IN SERVICES SECTOR: AN EMPIRICAL INVESTIGATION FROM MAJOR CITIES OF PUNJAB

Zainab Farooq¹

Abstract

The purpose of this study is to find out the impact of covid-19 on self-employed females in services sector of Pakistan. How covid-19 effect their economic situation and psychological behavior or personality trait and attitude during pandemic. To evaluate the effects of pandemic we approach those self-employed females who launch their ventures by getting financial assistance from microfinance institutes. The relationship among covid-19 and economic impact is significant with path coefficient of 0.670 depicting the fact that 67% of economic situation is affected by covid-19 factors. Also, the relation among covid-19 factors and profession is significant. While the results showed not significant relation among covid-19 and psychological behavior. Our study explained that self-employed females of service sector of Pakistan more suffered economically from covid-19 as government put lockdown for precautionary measure. While covid-19 didn't affect their psychological behavior. And this study concluded that effective policy measures in future alleviate the penalties of such shocks and should be considered in economic problems.

Keywords: self-employed females, covid-19, incomes, psychological behavior, financial institutions

1. Introduction

In 2019 a disease coronavirus (Covid-19) has stated as pandemic by the World Health Organization (WHO) and to stop the spread of the virus required a universal effort. It affects the global economies. The preventive measures such as shutting down of business activities and lockdowns disturbed the growth rate and economic activities. (McKibbin and Fernando, 2020). In probably three ways this disease Covid-19 disturbed the economies which includes interruption in markets and supply chains, disconcerting the production level and negative financial influence on businesses (Maital and Barzani, 2020). Covid-19 severely distresses the global economy and because of this disaster numerous businesses suffering from high ratio of losses (Bartik et al., 2020). It may cause serious health issues worldwide which includes food poisoning and contagious sicknesses. Covid-19 declared as a public health emergency and lead to severe health problems (China Fangzhen Press; 2003). More than 183

¹ Author is a freelancer and can be approached at zainamalik92@gmail.com

million cases reported on July 5, 2021, which leads to 3.97 million deaths around the world. To stem out the cost of pandemic in economic and human health issues governments intervene and introduced non-pharmaceutical intrusions. In developing countries, the effects of Covid-19 were worse and far-reaching and there was huge reduction in GDP rate and increase in unemployment (Nicola et al., 2020). In developing countries strong liquidity constraints, new regular business models and banking systems may cause disruption in current and future activities of self-employed businesses.

As a developing economy the institutes of Pakistan also fails to provide proper resources, business skills and financial assistance to the deprived units of the society. (Pakistan Microfinance Network, 2009). Covid-19 also effect the service sector of Pakistan. This sector contributes the huge share almost 61.2 Percent in GDP and in 2018-2019 service sector growth rate was 4.71 percent. According to State Bank of Pakistan in 2019 service sector exports were \$5781 million dollar and this sector engrosses 38.6 percent labor force (Labor Force Survey, 2017-18). According to World Bank latest report the GDP may fall this year and its consequence on the economy of Pakistan might leads to serious economic issue such as increase in poverty and upsurge of unemployment and also affects the different sectors of economy including the service sector of Pakistan. The loss of almost rupees 1.3 trillion create reduction in GDP and closure of small businesses affects the crafts, wholesale and retail employment (World Bank, 2020). It is necessary for the growth of an economy that the women of the country also participate in economic activities and must be empowered. The government should provide opportunities to them so they can participate in business activities and achieved their goals. (Muhammad et al., 2020; Khursheed et al., 2021). To start up a business financial assistance in case of loan is necessary but in developing countries there is lack of such facilities and banks cannot provide loans without securities to the females (Rashid & Ratten, 2020). As females didn't have any experience to launch their setup and they face difficulties in getting loans from the banks as they are less skilled and in that case the microfinance institutions helped them by giving small and medium-term loans (Bongomin et al., 2020; Khursheed et al., 2021). Self-employed females face difficulties in setting up their businesses and still they are less in numbers in the national economy (Elahi & Malik, 2021). Some of the women's take initiative to start their own business but it's usually of home-based and small level. The reason behind it is they didn't get the large amount of financial assistance or loans from banks. They think that women cannot run the large businesses successfully (Abraham, 2020). Microfinance institutions playing vital role in emerging economies as they provide chances for women entrepreneurs to launch their ventures and make them financially independent.

It is an operative instrument in poverty alleviation (Palalic et al., 2020). In these days due to globalization and advancement of societal structure females taking part in economic activities and starting their own businesses despite all the issue and trying to raise their social status (Noor et al., 2021). Different sectors affected by the lock down during Covid-19 all over the world but the small businesses owned by the women entrepreneurs effect the most because they didn't have proper access to plenty resources. The lack of access to financial and managerial resources deteriorated their conditions (Bartik et al., 2020). In terms of participation of women in working force Pakistan ranked at 37th listed in 46 Asian countries and among 191 countries its rank is 165th according to the World Bank report (Global Economy, 2018). As Pakistan is a male dominant country woman facing difficulties in launch their ventures and have unemployment issues due to male domination in every area and industry. Their cultural and religious boundaries make it hard for them to become financial independent (Tambunan, 2009). But still some women showed the courage to launch their venture and trying to become financially independent. They run their business by taking some financial assistance from microfinance institutions to eradicate the poverty and participate in economic activities but the pandemic hit them hard to find out how much Covid-19 affect them we conduct this research. The purpose of this study is to find out the effect of Covid-19 on self-employed females in service sector of Pakistan. Their Economic situation, personality trait and their Psychological attitude, their income, working hours before and after crisis, household size and education. So, the objective of this study is to explore the impacts of Covid-19 on the women who started their business after taking loans and for this purpose took a selected microfinance institution Akhuwat. It is a private organization which provide loans. And took six big cities of Punjab which have major bulk of active borrowers of Akhuwat organization. And collect data of females which are active borrower of the firm. Contact with the organization and get the information and contact numbers of active female borrowers. To evaluate the impact of Covid-19 the survey was conducted to telephonic correspondents with respondents and collected data with the help of questionnaire. And questionnaire has been researcher administered. All the respondents are willing to respond and answered the calls and filled the questionnaire. Then analyze the data both descriptively and econometric techniques using SPSS and SMART PSL software. SMART PSL helps in finding the impact of Covid-19 category on other category such as regressend (dependent variable, Economic Impact (income monthly gross, working hours per week, remote working hours per week, profession), Psychological behavior (Big-5 personality traits Extroversion, Agreeableness, Conscientiousness, Neuroticism, Openness to experience).

1.2: Research Hypothesis

Covid-19 pandemic have negative impact on self-employed female workers in service sector of Pakistan. Diminution in working hours and working from home caused decrease in income of self-employed females and also effects their psychological behavior of self-employed female workers.

H1: Covid-19 has negative impact on Economic situation (income monthly gross, working hours per week, remote working hours per week) of self-employed females in service sector of Pakistan.

H2: Covid-19 has negative impact on Professions of self-employed females in service sector of Pakistan.

H3: Covid-19 has negative impact on Psychological behavior of self-employed females in service sector of Pakistan.

2. Literature Review

In this section we review the recent studies related to covid-19 pandemic which affects the whole world. In December 2019 a novel virus named as coronavirus (SARS-CoV-2) was diagnosed in Wuhan, China and the virus outspread over the mainland of China. At initially most of the countries didn't know about this disease but in 1st quarter of 2020 the Covid-19 was spread in most of the countries of the world as many peoples travel from one country to another country. Many countries didn't take precautionary measures as immediately to fight with this risk so the cases of the disease increases and in February 20 first case reported in Italy and Europe. (Cereda et al. 2020). This disease globally effects the business, stock markets, manufacturing sector etc. To stop the spread of this disease governments of different countries take precautionary measure by shutting down the industries, business sector and imposing the social distance measures which effect the labor markets. These actions taken by governments had serious impact on the economies of many countries in 2020 (Milani, 2021). Like other world USA also face the closure of works and schools. And start following the covid-19 restrictions to avoid the spread of the disease (Goolsbee & Syverson, 2021; Heggeness, 2020). Self-employed labors are those which provide services and run businesses that related to production factors. They sell the goods and provide services such as laborers etc. (Abraham et al., 2020). Research on Self-employment and issues related to it gain attention (see, e.g., Doern et al. 2019). Most importantly the modern economies focused on self-employment and entrepreneurship as in case of Germany about 10% of working population around 4.2 million persons working as self-employed individuals in different businesses with or without supplementary workers and

playing mandatory role in economic progress of Germany (Audretsch et al. 2020). Furthermore, a study conducted on Germany they measure the effects of Covid-19 on the female self-employees. They investigate the individuals in a primary survey about their situation during the period of pandemic and the finding indicate that around 1/3 female self-employees suffer from income loss as compared to male employees (Graeber et al. 2021). In Germany at the turn of century the contribution of females in self-employed sector was 25 percent which is a very low ratio (Fritsch et al. 2015). In 2017 this ratio rises gradually to 35 percent (Gunther & Marder-Puch, 2019). With the passage of time the ratio increases as different startup programs introduced which provide subsidies and promote the self-employment (Caliendo & Künn 2015).

In Pakistan the labor force participation rate of both male and female was 81.1% and 22.8% respectively in 2017-2018. And overall share of both male and female workers in service sector in total employment was 36.6 percent in 2006-07 and in 2017-18 was 38.6 percent which showing the increasing trends but the share of female workers were 16 percent in 2006-2007 and in 2014-15 it was 13.6 percent which indicating the decreasing trends but it gains steam in 2017-2018 as the percentage of 17.3% fluctuations occur throughout the time. Working women in Pakistan faced different type of challenges in which the social, religious, cultural and traditional factors play phenomenal role which sometimes hinders the mobility, participation in different economic activities, interaction with others for business development. But the constitution of Pakistan in Article 25 (1973) promises the equal rights of all inhabitants in spite of race, sex and class (Goheer, 2003). However, Covid-19 is an infectious virus spread from person to person and have flu like symptoms in Pakistan on February 26 -02- 2020 first case of Covid-19 was reported and within four to six months the reported cases increased by 76,398 till June 2020. The death toll at that time was 1621 almost 2.12%. Government announces lockdown in different cities of the provinces (WHO,2019). The impact of Covid-19 on the economy of Pakistan and safety measures SOPs was that it declines the regular business and had bad impact on informal sector, service sector and daily wagers faced severe consequences as all the firms shut down. With the raise in no. of cases the service sector suffers more as the closure of business occur both male and female employees getting worried about their jobs and businesses. Financial crises of 2007-2008 was considered as one of the major crises globally but these pandemic crises now consider as world major disasters. This disaster hit the service sector more badly according to the SOP's and social distancing precautions the restaurants, hotels, wedding halls, schools were closed which effect the economy severely (Wing, 2020). A study showed that Pakistan faced 1/3 loss in revenue due to Covid-19 which also effects the trade

as the rate of exports decreased by 50 percent during the pandemic. Pakistan may face recession in coming days predicted by World Bank (World Bank, 2020; Shafi et al., 2020). Moreover, the pandemic caused the downturn of economies and in this situation the female workers suffer most as the schools, daycare centers were closed and the women providing household services (cleaning, maintenance) quit their jobs because of pandemic they are the main caregivers in the homes so working women face difficulties and suffer a lot and some of them lost their job (Alon et al. 2020). In Pakistan micro-enterprises consists on shop owners, street vendors and small household businesses depends upon the cash economy. Covid-19 affects them more as they were occurred in informal sector, they are not registered so it's difficult to identify their actual number. According to recent statistics of 2017-2018 there are almost 35.7 percent of micro-businesses which participate in national employment. This pandemic will hit badly to the economy of Pakistan (Martines Dy and Jayawarna, 2020; Conti and Younes, 2020).

In Pakistan women in different sectors of economy already facing difficulties as there is no enterprise development facilities for them. Covid-19 also effect the service sector and whole self-employed population. This study adds in the present literature by investigating the post pandemic and pre pandemic situation of female self-employed in service sector of Pakistan. And getting information related to their earnings or incomes before and after pandemic. This study sightsee the Economic situation and Psychological behavior, well-being of self-employed females during pandemic.

3. Conceptual Framework

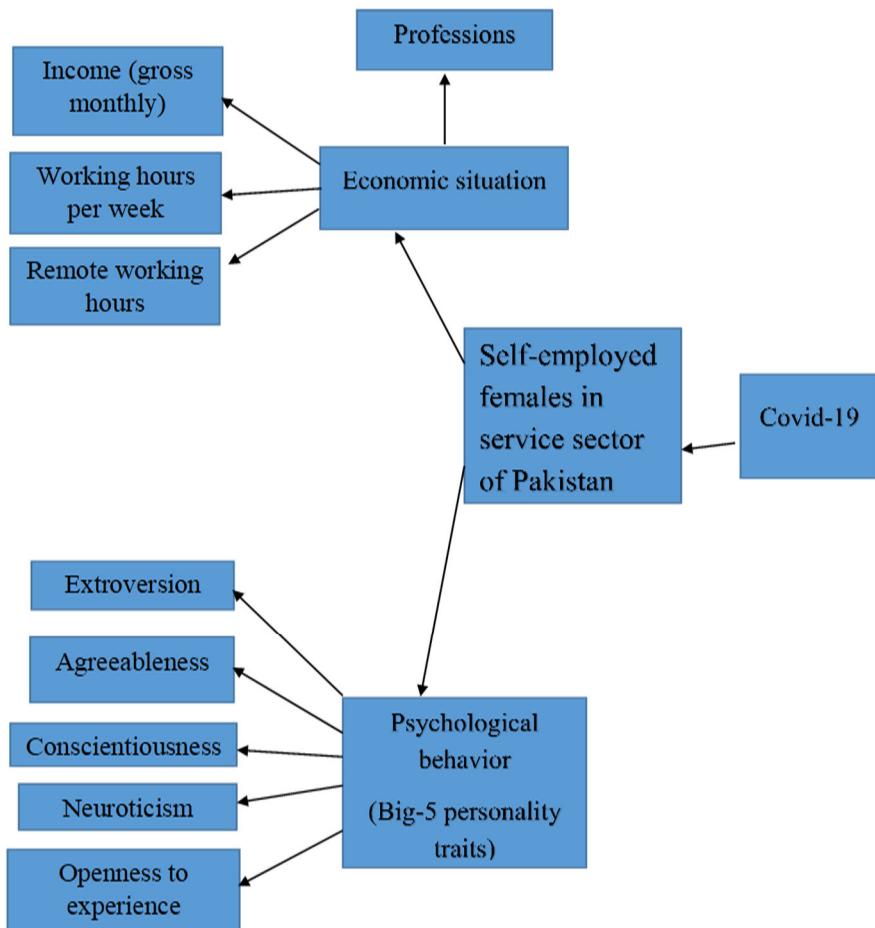
3.1 Women Entrepreneurs and Micro Finance Providers in Pakistan

In all societies women play vital role and in Pakistan almost 48.2 percent of total population are females and among them 27.8 percent females contribute in economy. In formal sector the female labor force participation rate for rural region is 0.88 percent and for urban area has been 1.02 percent while its ratio in informal sector for urban area has been 3.18 percent and for rural area the percentage has been 2.57% (Punjab Gender Parity Report; 2017, pp;95). Wages are different for males and females across the industries, almost 75 percent female's earnings are below the minutest wage level in labor force as compared to males which is about 43 percent and also there is difference in ownership of assets among male and female in Pakistan. Males owns more assets as compared to female (Punjab Gender Parity Report, 2017). Basically, there are three main finance landing programs or institutes which consist on Micro Finance Bank, Rural support program and Microfinance institutions. These three provide different type of loans i.e., SME's loans, agriculture loans,

express loans and micro enterprise loans. The purpose of these institutions is to empower the women provide them financial assistance so they can manage their health services, household activities and offer education to their children's. It's helpful in reduction of poverty and provide opportunities to youth so they can stand on their feet. In 2017 the number of microfinance institutions were 22, microfinance banks were 5 and microfinance programs were 10. The share of microfinance institutions is more and increasing with the passage of time in offering credit as likened to other. These organizations offering the loans to poor and lower income groups which consist on rural, urban clients, youth and females.

In this study our target are those females which are self-employed and providing amenities in service sector of Pakistan so, we choose the group of females which started their ventures by taking financial assistance from microfinance institutions. Akhuwat is a microfinance institution which providing loans and covering the largest districts of Punjab in 2017 and we choose those females which are active borrowers of Akhuwat and there are six major cities of Punjab (Gujranwala, Gujarat, Sialkot, Lahore, Sargodha and Faisalabad) where the ratio of female active borrowers is high. In its outreach and scale 63 percent growth rate was experienced by Akhuwat in 2017 among top ten microfinance institutions. And this organization Akhuwat covering the largest area of districts among other microfinance institutions and offering loan from the range of 15,000 to 90,000 (Microfinance Review 2017). This study will follow this frame work for conducting survey.

Figure 1: Factors showing the impact of Covid-19 on self-employed females in service sector of Pakistan.



Source: Author's own formulation of framework

This diagram aims to highlight how Covid-19 effecting the self-employed females in service sector of Pakistan. Each of these dimensions covering various indicators which self-employed females encounter during pandemic.

4: Research Methodology

4.1 Sample Design and Methodology

This study examines self-employed females in Punjab, who receive financial assistance from Akhuwat Islamic Microfinance. The majority of these females are regular borrowers, primarily from major cities like Gujranwala, Gujarat, Sialkot, Sargodha, Faisalabad, and Lahore. Data collection was conducted

through surveys and questionnaires, ensuring a comprehensive understanding of their experiences.

The sample has been collected from self-employed females. For each subpopulation (cities) the mean value of selected variables is dissimilar those are heterogeneous nature wise but internally each is considered to be homogeneous. The subpopulation (cities) representing the whole population and are non-overlapping. So, we use stratified random sampling for estimation of the whole population features. In stratified random sampling there are stratum which representing the total population and each stratum is the small form of population. For this reason, in sample designing, we use proportional allocation. In this technique proportional allocation for all stratum having the number of sampling units which is related to the stratum size. To allocate the proportion of every stratum following method is used:

Stratum weight (Wh)= Nh / N

Stratified proportional allocation of sample= $n \times (Nh / N)$

N represents the total population

$N = (N1+N2+N3+N4+N5+N6)$

Nh = total population in stratum h

n = no. of units in the sample

As we know about Nh and N but for sample size (n) of proportions we need to find out n_0 and further for final sample we must to calculate the finite population correction factor but at first, we find sample size (n) by given formula:

$$n_0 = \frac{z^2 \times (p) \times (1-p)}{c^2}$$

Formula FPC

$$n = \frac{n_0}{1 + (n_0 - 1)/N}$$

$Z=Z$ score (normally distributed) is 1.96 for 95% confidence level

$P=0.25$ or $1/4$ (percentage of selecting the desired sample)

C = confidence interval ($0.05=\pm 5$)

n_0 = Initial sample size

n= population corrected sample size

The calculated sample size (n) for Akhuwat is 265.10, the rounded sample size figure is 250. The Table 1 given below showing the stratified random sample sizes of each stratum with proportion allocation.

Table 1: Sample Design

Stratum	Akhuwat (No. of active borrowers)	Stratified Sample of Akhuwat	Random
Gujarat	484	29	
Faisalabad	598	28	
Sargodha	657	42	
Sialkot	578	44	
Gujranwala	822	76	
Lahore	168	31	
Total	3306	250	

The focused group will be between the ages of 20-60. There are different categories of businesses which has been started by women after taking loan in which beauty salon, cosmetics, tuition centers, food stuff, boutiques, stitching centers, livestock, grocery store, artificial jewelry, vendor, laundry, embroidery, garments and handicrafts etc. covering the informal sector. Other ventures were also found after interviewing them. The basic purpose of this research is to find out the impact of Covid-19 on self-employed females financial or Economic situation, their Psychological behavior or attitude, working hours, remote working hours and income.

For statistical analysis SPSS and Partial Least Square technique is used to find the effect of responses or data collected with the help of questionnaire. To sensing out the effect of one category on another category we used Smart Partial Least Square which is the extended version of SPSS software.

4.2 Variables Description and Questionnaire

In this study we evaluate the impact of Covid-19 on self-employed females in service sector of Pakistan for this purpose our main focus is on the income

(gross earnings), working hour and remote working hours (remote working hours represents the working done from home) due to pandemic. The data is collected with the help of telephonic questionnaire and questionnaire is researcher administered which is based on three categories; first one is demographics which includes Gender, Age, Household size, Marital Status, education and in which income group they fall. The second category is psychology behavior in which we found out about the Big-5 personality traits which are (Extraversion), (Agreeableness), (Conscientiousness), (Neuroticism) and (Openness to experience) for this ten item personality inventory is used which have total of ten questions each personality trait consist of two questions with likert scale (1 is equal to disagree strongly, 2 is equal to disagree moderately, 3 is equal to neutral, 4 is equal to agree moderately and 5 is equal to agree strongly) (Gosling et.al., 2003). And in third category we found about the impact of Covid-19 on Economic activities which is based upon different questions like source of income or business type, monthly average income, working hours and remote working hours and other questions related to what type of difficulties faced by them and to what extent they face losses in terms of supply demand. Questions related to income loss and working hours reduction and remote working hours are framed informally. Income and working hour's related questions were categorized into lower to higher income groups and lower to higher working hours respectively. For income group we start the category from Less than 20,000, 21,000-30,000, 31,000-40,000, 41,000-50,000, 51,000-60,000 to More than 61,000. And for working hours we categorized them from less than 10 hours, 11-20 hours, 21-30 hours, and 31-40 hours to More than 40 hours. While the other questions taken from the study of china showing the impact of Covid-19 on firms and then modified the questionnaire with the help of supervisor. (Zou, P., Huo, D., & Li, M. (2020). The third category consists of eleven questions. All the respondents are willing to respond. Description of main variables is as following

Table 2. Dependent Variables

Income (gross monthly)	Pointer imitating reduction of monthly gross income due to covid-19.
Working hour	Pointer imitating reduction of weekly working hours due to covid-19.
Remote work	Pointer presenting working from home due to covid-19.

	0=not working remotely
	1= working remotely from home
Profession	Types of Professions
	1=
	2=
	3=
Psychological behavior	Big-5 personality traits Extroversion, Agreeableness, Conscientiousness, Neuroticism, Openness to experience.
<hr/>	
Independent Variable	
Covid-19 Pandemic	0= before Pandemic
	1= after pandemic

5: Data Analysis and Results

5.1 Descriptive Analysis

Descriptive analysis and econometric model is used to analyze the collected data. Questionnaire is based upon three sections demographics, Psychological behavior big-5 personality traits and effect of Covid-19 on economic activities of self-employed females during Covid-19. Descriptive statistics of all study variables demographics, Economic situation, Profession and Psychological behavior (Big-5 personality trait) are also checked. In descriptive statistics mean, standard deviation, skewness and kurtosis are checked for each item and given below in Table 3.

Table 3: Descriptive statistics of all items

Variable	Mean	Median	Standard deviation	Skewness	Kurtosis	No. of observation
Age	2.38	2.00	0.778	-0.006	-0.436	250

House hold size	4.88	5.00	1.191	-0.909	-0.107	250
Marital status	1.91	1.00	1.427	1.334	0.176	250
Education level	2.96	2.00	1.181	0.426	-0.777	250
Income group	4.15	4.00	1.287	-0.093	-0.847	250
Eco. Impact	8.42	18.00	4.224	-0.198	-0.238	250
Profession	2.56	10.00	0.984	0.999	0.276	250
Psychology	31.80	32.00	6.993	-0.726	0.008	250
Covid-19	24.88	25.00	4.098	0.398	-0.167	250

In Psychological factor to interpret the big-5 personality traits extroversion, agreeableness, conscientiousness, neuroticism and openness to experience, firstly transform and compute the variables according to formula each trait consists of two questions and total of ten questions because of ten item personality inventories. Each trait has a reversed order question so that's why we interpret the results between the range of negative and positive numbers according to it if more values are negative, they respondents are less extrovert while if more values are positive then the respondents are more extroverts. For this we use histogram graph for each trait if the bars on negative site is high the respondents contain less characteristics of that trait and if the bars on positive site are high then the respondents contain more characteristics of that personality trait. In Fig 2 the results of big-5 personality trait extroversion are given:

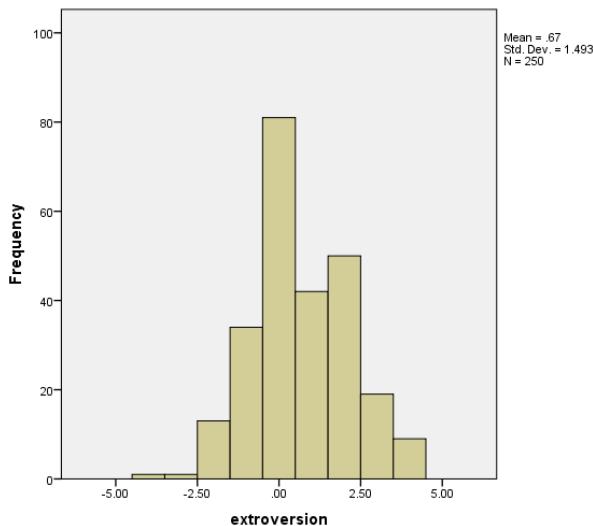


Fig 2: Graphical presentation of big-5 personality trait Extroversion

As in graph it's showed that the ratio of negative numbers is less as compare to positive number so more respondents are extroverts means that they are talkative, assertive, socially active and make more friends while some are shy, less talkative and they are not socially active and also introvert.

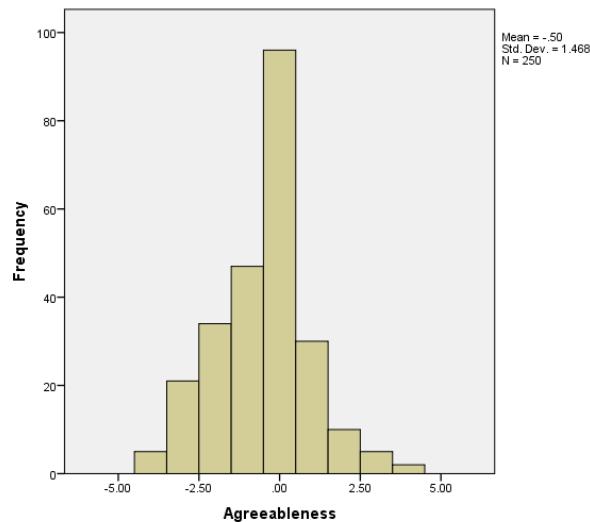


Fig 3: Graphical presentation of big-5 personality trait Agreeableness

From the graph we can see that the number of negative values is high as compared to positive numbers which depict that characteristic of agreeableness occurred less in respondents. More respondents have characteristics of less

agreeableness. The respondents which have positive numbers have trait of agreeableness which mean they are friendly, cooperative and compassionate. And they love to help others. And respondents with negative numbers showed that they are self-centered, didn't care about others and less cooperative.

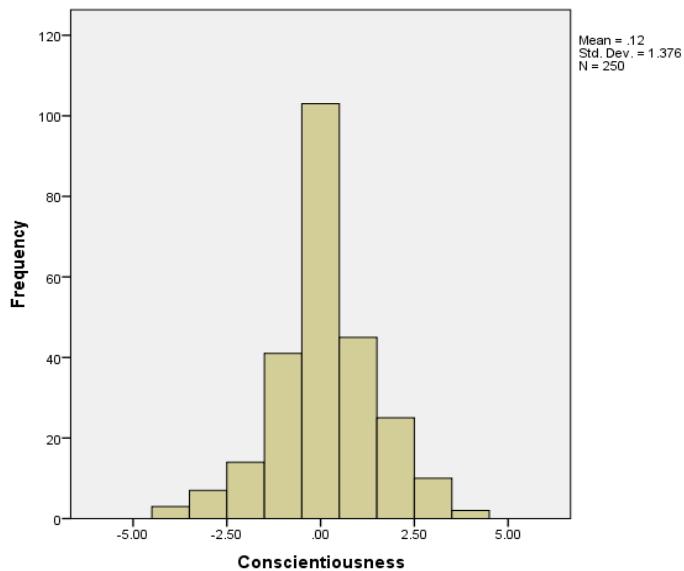


Fig 4: Graphical presentation of big-5 personality trait Conscientiousness

The Figure 4 showed that more respondents have positive numbers mean they are having the characteristics of conscientiousness. These are responsible, hardworking and well-organized persons. They work hard to achieve their goals and they are self-controlled peoples. While the respondents with negative numbers having opposite characteristics, they are impulsive.

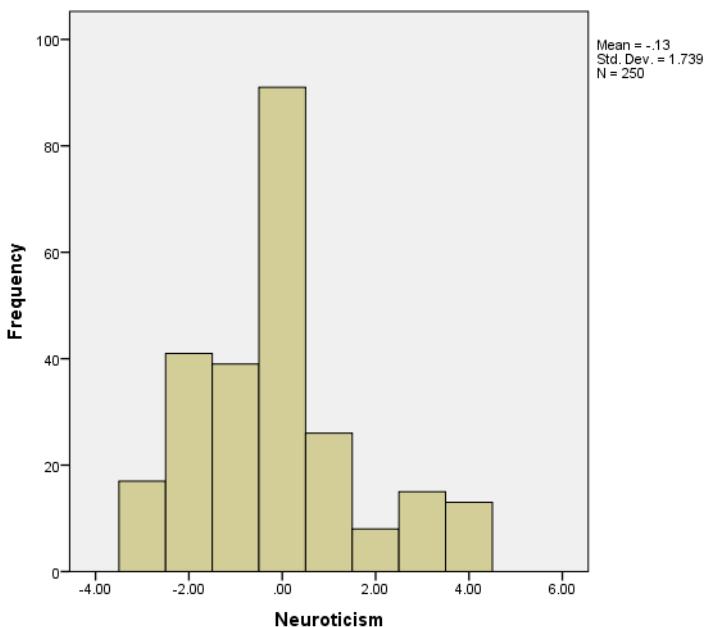


Fig 5: Graphical presentation of big-5 personality trait Neuroticism

Fig 5 showed the big-5 trait neuroticism. Neuroticism represents those people who are emotionally unstable, anxious, become easily distressed and worried persons. People with low scores are stable one with more negative numbers' persons showed they are stable and how to behave with others and adjust the situation. They are calm and composed persons. While other people with more positive and high numbers are emotionally unstable persons. They become frightened and worried easily.

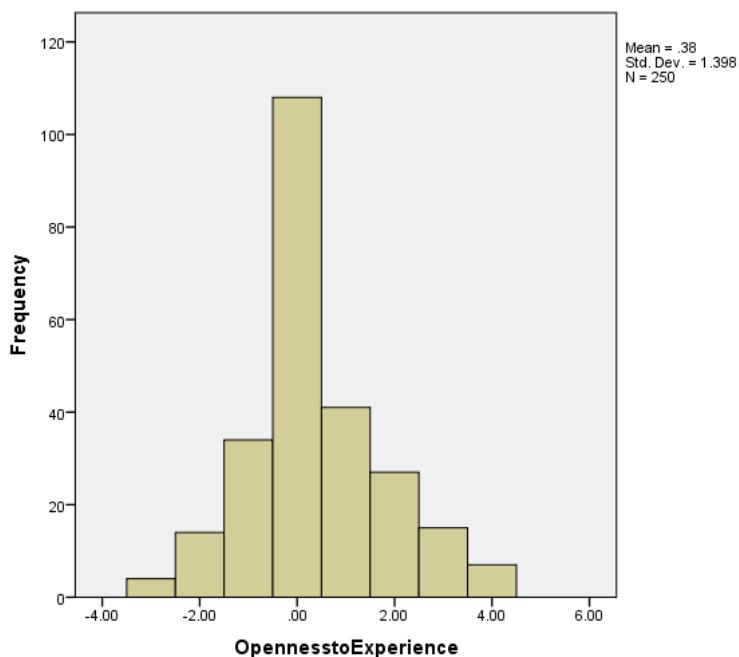


Fig 6: Graphical presentation of big-5 personality trait Openness to experience

The above Fig 6 showed the big-5 personality trait openness to experience. These people love to learn new things and adoptive to new things while the opposite are rigid. That respondents with low score means more negative numbers are rigid in nature, they feel hesitant in adopting new things and environment. The respondents with more positive numbers and high values have the personality trait of openness to experience. They like to learn new things and easily adapt the new culture and environment.

Table 4 shows correlations and point 1 indicating Covid-19 pandemic which effects the financial situation of respondents their monthly income, working hours and remote working hours and all these factors collectively influence the

personality attitude of respondents and the relation between them can be shown with bivariate correlation in the table given below.

Table 4: Correlations

	1	2	3	4	5	6
1. Covid-19 factors	1					
2. Extroversion		-.155*	1			
3. Agreeableness		.048	-.159*	1		
4. Conscientiousness		-.166**	.075	-.174**	1	
5. Neuroticism		.071	-.023	.064	-.003	1
6. Openness to experience		-.001	.075	-.180**	.226**	-.009 1

Point 2. is showing extraversion trait, 3. Indicating agreeableness trait, 4 indicating conscientiousness trait while point 5 showing neuroticism trait and point 6 indicating openness to experience trait. And the results indicate that Covid-19 factor have negative and significantly very low correlation with personality trait extraversion. Covid-19 pandemic factors have positive, not significant and almost negligible relation with agreeableness trait. Pandemic factors have negative and significantly very low relation with conscientiousness. While the Covid-19 factors have not significant and positively negligible relation with neuroticism. Moreover, these pandemic factors have markedly low, insignificant positive relation with openness to experience.

The crosstabulation provided in Table 5 presents a comprehensive analysis of the impact of the covid-19 pandemic on businesses' production and operations across different income groups.

Table 5: Analysis of the impact of Covid on production and operation by income group

	To what extent does has production and operations of your business/ firm been affected by this pandemic(COVID-19)?				Total
	Very serious impact	Great Impact	Small Impact	No significant impact	

income_group	less than 20,000	4	0	0	0	4
	21000-30000	6	6	4	0	16
	31000-40000	37	23	8	1	69
	41000-50000	32	22	5	0	59
	51000-60000	23	21	7	2	53
	more than 60000	20	18	10	1	49
	Total	122	90	34	4	250

Notably, businesses with lower incomes have reported the more pronounced impact, with a significant number noting a “very serious impact”. As income increases, there is a gradual decline in the severity of reported impacts. The highest income group observes a relatively lower count of business reporting severe impacts. Overall, the data underscores the disproportionate effects of the pandemic on businesses depending on their income levels, highlighting the need for targeted support measures, particularly for those in lower income brackets.

The crosstabulation Table 6 shows the factors influencing the suspension of production and operations across different income groups due to the Covid-19 pandemic.

Table 6: Factors influencing suspension of production and operations by income group

income_group	What are the reasons for suspension of production and operations of your business?			Total
	Shortage of production materials	Government restrictions to prevent the spread of COVID-19)	Difficulty in developing the market	
less than 20,000	0	4	0	4
21000-30000	0	12	4	16
31000-40000	11	50	8	69

41000-50000	6	44	9	59
51000-60000	10	40	3	53
more than 60000	3	38	8	49
Total	30	188	32	250

Noteworthy trends include a shortage of production materials being a significant factor, particularly for businesses in the income range of 31000-40000 and 41000-50000. Government precautions and restrictions, such as lockdown, heavily impact businesses across all the income groups, with the highest count in the 31000-40000 income bracket. Difficulty in developing the market is also cited as a factor affecting production suspension, with varying degrees across income categories. The data underscores the multifaceted challenges faced by businesses, providing valuable insights for customizing the support measures based on income-specific needs.

Table 7: Main operating pressures during the covid-19 pandemic by income group

	What are the main operating pressure your business was facing during pandemic (COVID-19)?				Total
	Employee's salary	Rent (building, equipment's)	Repayment of loans	Cancellation of orders	
income_group	less than 20,000	1	0	1	4
	21000-30000	1	3	6	16
	31000-40000	5	7	29	69
	41000-50000	6	13	23	59
	51000-60000	4	16	19	53
	more than 60000	9	11	14	49
Total		26	50	92	250

Table 7 provides an overview of the main operating pressures faced by the businesses during the covid-19 pandemic, categorized by income groups. The data indicated that repayment of loans and cancellation of orders emerged as prominent challenges for businesses across all income brackets. Businesses in the income group of 31000-40000 faced the highest pressure in terms of loan repayments and cancellations, with a total count of 69. Employee salaries and rent were also significant concerns, with varying intensities across income groups. The table illustrates the diverse set of challenges experienced by businesses, shedding light on key areas that demand attention and targeted support amid the ongoing pandemic.

5.2 Econometric model: Smart Partial Least Square Structural Equation Modeling

In this section we analyze the data in parametric way and for this we use partial least square structural model equation for dependent and independent variables. In PLS structural equation modelling technique, two models were used; measurement model and structural model.

5.2.1 Measurement Model

In measurement model, two analysis common factor analysis and confirmatory factor analysis were performed. The results of these performed analysis were given below in detail.

5.2.1.1 Common Factor Analysis:

Common factor analysis was used for normal structure modeling and it is the initial step of measurement model. First of all the observed variables of the study are verified and for this purpose outer loadings are checked. Outer loadings showed the correlation between observed variables with their respective latent¹ construct. As per criterion, if the resultant value of outer loading is below 0.50 then the item is dropped (Hair et al., 2013). The common factor analysis of variables (Psychological behavior Big-5 personality traits, economic impact, Professions, covid-19) is given below.

a) Psychological behavior (Big-5 personality traits)

The first variable of the study is Psychological behavior which is investigated through Big-5 personality traits. Big-5 personality trait consist on Extroversion, Agreeableness, Conscientiousness, Neuroticism and Openness to experience and denoted by (E=extroversion, A-agreeableness, C=conscientiousness, N=neuroticism, and O=openness to experience). The items whose resultant values are below 0.50 must be dropped out because of poor outer loadings. The results of psychological behavior outer loadings is given below in following Table 8.

Table 8: Outer Loadings of Psychological Behavior

Item	Outer Loadings
E	0.756
A	0.706
C	0.502

N	-0.012
O	0.691

The range of outer loadings of these items is 0.691-0.756 and one items (N) dropped out because of poor outer loadings. And examine the psychological behavior from remaining items.

b) Economic Impact:

Economic impact is the second and main variable which investigate about the monthly income, working hours per week and remote working hours per week. These are denoted by impact 1, impact 2, and impact 3 respectively. An also different professions include. The range of outer loadings is 0.817-0.871. One item dropped out because of poor outer loadings and economic impact examined by the remaining items. The results are shown in Table 9.

Table 9: Outer Loadings of Economic Impact

Items	Outer Loading
Impact 1(Income)	0.871
Impact 2 (Working Hours)	0.817
Impact 3 (Remote Working Hours)	-0.205 1.000
Profession	

a) Covid-19 Impact

The third variable is covid-19 in which different questions include to investigate about the effects of covid-19 and denoted by Covid-1, Covid-2, Covid-3, Covid-4, Covid-6 and Covid-8. Some of items (Covid-1, Covid-2, Covid-3, and Covid-4) dropped out due to poor outer loadings. And remaining items 2 items used to examine Covid-19 impacts. The range of the outer loadings is 0.714-0.773. The results are presented in following Table 10.

Table 10: Outer Loadings of Covid-19 impact

Items	Outer Loadings
Covid-1	-0.052

Covid-2	-0.189
Covid-3	-0.178
Covid-4	-0.353
Covid-6	0.773
Covid-8	0.714

¹Latent variables are underlying variables that cannot be observed directly, they are also known as constructs or factors.

5.2.1.2 Confirmatory Factor Analysis

The second step of measurement model is confirmatory factor analysis which is used to examine discriminant validity of all variables (Psychological behavior, Economic impact and Covid-19 impact). 6 items dropped out due to poor outer loadings and remaining 14 items (outer loading > 0.50) included in study for examination. Confirmatory factor analysis is as follow.

A) Discriminant Validity

Finally, discriminant validity concerns with degree of difference among measures of different constructs. To test the discriminant validity, Fornell and Larcker method is employed. In this method, square root of average extracted variance (AVE) of variables is compared with correlation values of variables. Results showed that square root of AVE are above correlations values of research variables. Bold values on the diagonal represent the square root of AVE of respective variable. Diagonal values show square root of AVE. Results were shown in Table 11.

b) Fornell and Larcker Method

The bold values showed the square root of the average variance extracted (AVE) and off-diagonal values indicating the correlations among constructs.

Table 11: Results of Fornell and Larcker Method

Construct	Economic Impact	Profession	Covid-19	Psychology
Economic Impact	0.700			
Profession	-0.158		1.000	

Covid-	0.678	-0.172	0.466	
Psychology	-0.167	0.053	-0.063	0.598

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

c) Heterotrait - Monotrait Ratio (HTMT)

Heterotrait – Monotrait Ratio is ratio of correlations. The values of HTMT must be less than 0.90 threshold (Gold et al., 2001). The results of HTMT ratio given below in Table 12.

Table 12: Results of HTMT

Constructs	Economic Impact	Profession	Covid -	Psychology
Economic Impact	-			
Profession	0.379	-		
Covid-	0.819	0.268	-	
Psychology	0.257	1.187	0.283	-

The bold value indicate the problem of discriminant validity according to criterions of HTMT (0.90). And the result of HTMT ratio of all constructs are listed below in Table 13.

Table 13: Heterotrait-Monotrait Ratio (HTMT) Results List

Construct	HTMT Ratio
Profession→Economic Impact	0.379
Covid→Economic Impact	0.819
Covid→Profession	0.268
Psychology→Economic Impact	0.257
Psychology→Profession	0.056
Psychology→Covid	1.187

Our results indicate that our data is discriminately valid except the one value. The bold value indicate that there is lack of discriminant validity among the constructs.

d) Outer model Collinearity Statistics (VIF)

The outer VIF report indicate the VIF of measurement model. It showed the collinearity among the pointers of constructs. The variables whose values are less than 5 are included in the model. The results showed in Table 14.

Table 14: Outer model Collinearity Statistics (VIF)

Construct	VIF
A	1.410
C	1.269
E	1.262
N	1.142
O	1.343
Impact 1	1.250
Impact 2	1.231
Impact 3	1.030
Profession	1.000
Covid-1	1.089
Covid-2	1.050
Covid-3	1.109
Covid-4	1.032
Covid-6	1.120
Covid-8	1.140

5.2.2 Structural Model

After meeting all the requirements of pre-estimation tests in above section, now for hypothesis testing structural model is used. Remembering the objective of study here again, first was to find the impact of Covid-19 on economic situation of self-employed females in service sector of Pakistan and second was to find

out the impact of Covid-19 on psychological behavior on self-employed females in service sector of Pakistan. Graphical representation of structural model is presented in Figure 7 given below.

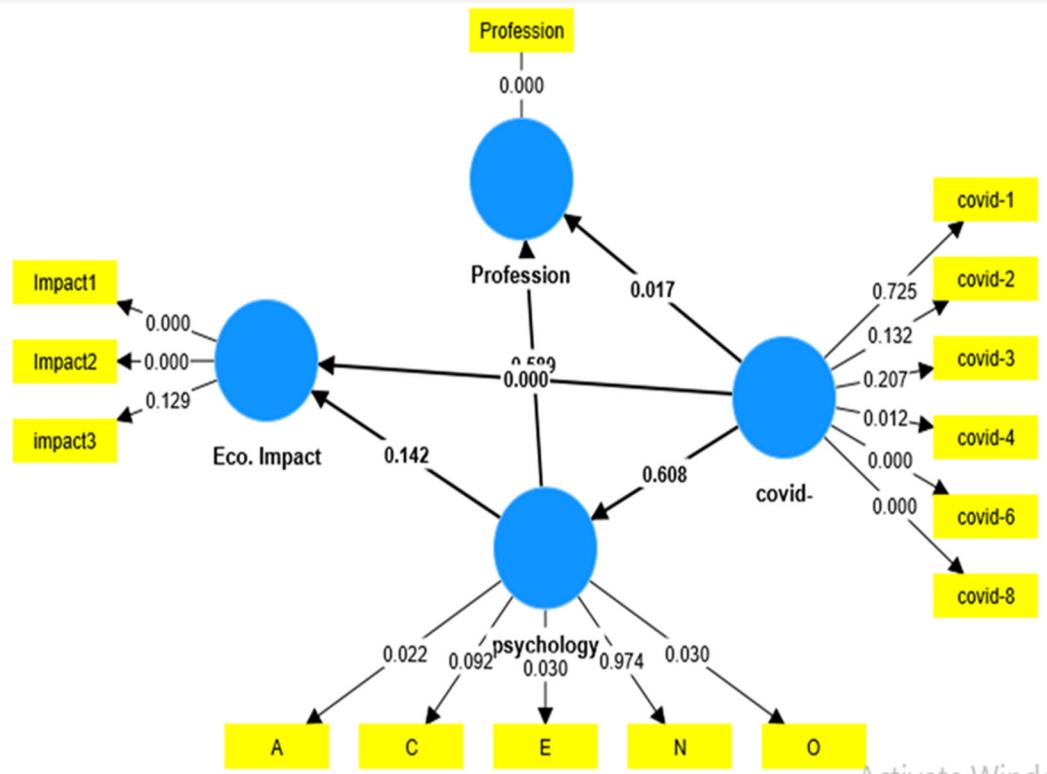


Figure 7: Graphical representation of Structural Model

The structural model is presenting the p- values of all variables. Among these variables Psychological behavior (Big-5 personality traits A, E, N, C, O), Economic Impact (income gross monthly, working hours per week, remote working hours per week), (professions) are endogenous variables (dependent variable). While Covid-19 is exogenous variable (independent variable).

This study has three main endogenous variables income (monthly gross), working hours per week, remote working hours per week indicating the Economic Impact or situation of self-employed females in service sector of Pakistan and also includes Professions. Psychological behavior (which is measured through Big-5 personality trait A, E, N, C, O) is also endogenous variable. Covid-19 is exogenous variable which is measured by 6 items and denoted as Covid. Now with the help of these variables model is estimated in Table 15. The coefficients reporting direct effects of these variables.

5.2.2.1 Hypothesis testing:

H1: Covid-19 has negative impact on economic situation (income monthly gross, working hours per week, remote working hours per week) of self-employed females in service sector of Pakistan. It is hypothesized that covid-19 has significant relation with Economic situation and the results showed that $\beta=0.670$, $p<0.00$ which depict that Covid-19 has negative impact on Economic situation (income monthly gross, working hours per week, remote working hours per week).

H2: Covid-19 has negative impact on Professions of self-employed females in service sector of Pakistan. It is hypothesized that covid-19 has significant relation with profession and results showed that $\beta=0.168$, $p<0.017$ which depict that Covid-19 has negative impact on Profession.

H3: Covid-19 has negative impact on psychological behavior of self-employed females in service sector of Pakistan. It is hypothesized that covid-19 has not significant relation with Psychological behavior and results showed that $\beta= -0.066$, $p<0.608$ which depict that Covid-19 has no impact on Psychological behavior.

Table 15: Hypothesis results

Hypothesis	Path	Path coefficients	Standard Errors	t Statistics	p Values	Decision
H1	Covid→Eco. Impact	0.670	0.042	15.974	0.000	Not-Rejected
H2	Covid→Profession	0.168	0.070	2.398	0.017	Not-Rejected
H3	Covid→Psychology	-0.066	0.123	0.513	0.608	Rejected

Table 15 showed the results of each designed hypothesis. When economic impact, profession and psychology regressed for Covid the results indicate that 67% of the Economic Impact affected by Covid-19 and by the remaining factors which were found reliable and valid with the help of common factor analysis, confirmatory factor analysis and discriminant validity test for the variable Covid. As it is hypothesized that covid-19 have negative impact on economic situation and the results depict the significant relation between covid-19 and economic impact. Covid-19 precautionary measurements such as lockdown

affecting the business of self-employed females as decrease in working hours reducing their monthly average incomes. The p-values is 0.000, which showed the significant relation and the hypothesis is not rejected. The relation between Covid-19 and Profession is also significant and Covid-19 have negative impact on Professions the p value is 0.017 so the hypothesis not-rejected. 16% impact Covid has on Professions. While the relation of Covid-19 with psychological behavior is not significant (p-value is 0.608) from this we depict that Covid-19 has 6% almost meager or no impact on psychological behavior of female self-employed in service sector of Pakistan.

6. Conclusion

The purpose of this study is to find out the effect of Covid-19 on self-employed females in service sector of Pakistan. Their economic (financial) situation, personality trait and attitude affected by Covid-19 pandemic. Their income, working hours and remote working hours before and after pandemic to analyze the impact of Covid-19. How badly the pandemic hit them. For this purpose, we select those females who started their ventures by taking some financial assistance from microfinance institutions. We contact to the private microfinance institution Akhuwat which provide loans and have a vast geographical spread and it covers that largest districts of Punjab and get the list of those females who are active borrowers. And the analysis covers the six major cities of Punjab Gujarat, Gujranwala, Sialkot, Sargodha, Faisalabad and Lahore. Sample is drawn according to proportion allocation principal in each city and the selected sample is 250. For statistical analysis SPSS is used with Smart Partial Least Square extension to find out the impact of Covid-19 on self-employed females in service sector of Pakistan. Results showed descriptively and also construct the measurement and structural model through PLS. Finding of model confirmed that Covid-19 have negative impact on income (monthly gross), working hours per week and remote working hour per week. It worsened the economic situation of female self-employed in service sector of Pakistan. Covid-19 also showed negative impact on the Profession of self-employed females and in both these case alternative hypothesis are accepted. But in case of Psychological behavior (big-5 traits Extroversion, Agreeableness, Conscientiousness, Neuroticism, Openness to experience) the results are not significant which depict that Covid-19 has no impact on Psychological behavior of self-employed females in service sector of Pakistan. In this case the alternative hypothesis is not accepted. The descriptive analysis showed that the ratio of females with low income group raises after Covid-19 pandemic. Also their working hours reduces after Covid-19 which affect them badly.

Covid-19 has negative impact on economic situation (income monthly gross, working hours per week, remote working hours per week) of self-employed females in service sector of Pakistan. It is hypothesized that Covid-19 has significant relation with Economic situation and the results showed that $\beta=0.670$, $p<0.00$ which depict that covid-19 has negative impact on economic situation (income monthly gross, working hours per week, remote working hours per week). Also Covid-19 has negative impact on Professions of self-employed females in service sector of Pakistan. It is hypothesized that Covid-19 has significant relation with profession and results showed that $\beta=0.168$, $p<0.017$ which depict that Covid-19 has negative impact on profession.

While it is hypothesized that Covid-19 has negative impact on Psychological behavior of self-employed females in service sector of Pakistan. But the results showed that Covid-19 has not significant relation with psychological behavior and the $\beta= -0.066$, $p<0.608$ which depict that Covid-19 has no impact on psychological behavior. Covid-19 didn't affect the Psychological behavior of self-employed females in service sector of Pakistan.

7. Policy Implications:

On the basis of these findings, here are the few analysis-based recommendations which can be helpful in promoting the economic well-being of self-employed females in service sector of Pakistan. These are following

- To form financial policies in such a way for self-employed females that can support the production functions of small ventures and provide them loans on easy terms in times of crises. Also launch the training programs for self-employed females and provide easy access to information.
- Government also play role in providing loans through banks without the conditions of securities and to launch such a system for self-employed females so at the time of crises it is possible to access them and help them.
- Self-employed females must keep an eye on varying requirements of market structure. Also developed and enhanced communication skills to maintain a good relation with customers and to build the trust. And they also need to get professional training to tackle the risk and crisis.
- Only government can play significant role in time of crisis to eradicate the issue properly so they should make such policy which protect the customers from crisis and took measures and implement them immediately.

Compliance with Ethical Standards

- **Conflict of Interest:** There is no conflict of interest.
- **Informed consent:** NA
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- **Ethical approval:** Not Required
- **Data Availability Statement:** The data will be provided upon request anytime.

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