

ANALYZING THE SHIFTING AGE STRUCTURE OF INDIA AND ITS IMPACT ON ECONOMIC GROWTH: A MIXED METHODS RESEARCH APPROACH

Abstract

This paper analyzes the effects of India's changing age structure, particularly the working-age population, on its economic growth. Employing a mixed methods research design, both quantitative and qualitative data are collected, analyzed, and interpreted. Quantitative analyses such as correlation and regression are conducted to investigate the relationship between age structure and economic growth. Additionally, a minor qualitative analysis, supported by a questionnaire, is employed to validate and confirm the quantitative findings. The chosen sequential mixed method design provides comprehensive insights into the subject matter and facilitates a thorough examination of the phenomenon.

Keywords: Working Age Population, Gross Domestic Product, Quantitative Analysis, Qualitative Analysis, Mixed Method Research.

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I. INTRODUCTION

The debate surrounding population and its growth has long been a pivotal discussion in macroeconomics, given its profound implications for a country's development and growth. Understanding this contribution necessitates the division of the population into two key categories: the dependent population and the working-age population. According to the World Bank, individuals aged 15-64 fall into the working-age cohort, and India has earned the distinction of being one of the world's youngest nations due to the increasing size of this segment. Among various macroeconomic factors, the working-age population stands out as a significant contributor to a country's growth performance.

This research paper aims to analyze the consequences of India's shifting age structure, particularly the working-age population, on its economic growth, using a mixed methods research approach. Mixed methods research involves the collection, analysis, and interpretation of both quantitative and qualitative data within a single study or a series of studies investigating the same underlying phenomenon. This approach is driven by the understanding that combining quantitative and qualitative methodologies yields a more comprehensive comprehension of research problems than either approach alone.

In this study, we will utilize mixed methods to examine economic phenomena, specifically exploring the linkages between population dynamics and a country's economic growth. By integrating quantitative analyses, such as correlation and regression with qualitative investigations, we aim to provide a comprehensive and nuanced understanding of the relationship between India's age structure and its economic performance. This research seeks to shed light on the critical role played by the working-age population in India's economic growth trajectory and contribute valuable insights to the broader field of economic development studies.

II. LITERATURE REVIEW

The literature review encompasses a range of studies exploring the interplay between population dynamics, economic growth, and development. Basu et al. (2007) presented a comprehensive analysis of India's economic growth post-independence and its comparison with other nations, while Agarwal (2014) emphasized the need to control population growth for sustained economic development. Koduru (2016) investigated the impact of rapid population growth on India's economic development through regression analysis. Peterson (2017) drew on historical data to examine the links between population growth and overall economic growth globally. Kamarudin et al. (2018) explored the effects of population growth on economic development in both developed and developing countries, highlighting the importance of human capital policies for addressing poverty. Additionally, Johnson (2007) provided insights into the use and descriptions of mixed research methods, while Isabel Leal (2016) and Julie Lucero (2016) showcased the benefits of employing mixed methods in exploring clinical outcomes and community-based participatory research practices, respectively. These studies contribute valuable insights to the complex relationship between population, economic growth, and development, aiding policymakers and researchers in understanding this intricate nexus.

III. OBJECTIVE OF THE RESEARCH

The primary objective of this paper is to assess the variations and relationships between two key variables: Population ages 15-64 (% of total population) and GDP growth (annual %). The study aims to inform stakeholders and relevant constituencies about the dynamics of these variables and their potential impact on the economy.

IV. RESEARCH QUESTION

1. How does demographic transition influence the age structure of India and its impact on economic growth?
2. What are the key demographic factors affecting the age structure of India, and how do they correlate with the country's economic growth?

V. RESEARCH DESIGN

The chosen research design for this study is the Sequential Mixed Methods Design, which involves conducting a major quantitative study using correlation and regression methods along with a questionnaire. This quantitative phase focuses on collecting structured data to examine relationships between variables and identify predictive factors. Subsequently, the study proceeds to the qualitative phase, where qualitative data is gathered through interviews or focus groups to provide context and deeper insights into the quantitative findings. Integrating both types of data, the Sequential Mixed Methods Design aims to offer a comprehensive and well-rounded perspective on the research topic, enhancing the overall quality and depth of the research by triangulating and enriching the results from both quantitative and qualitative data sources.

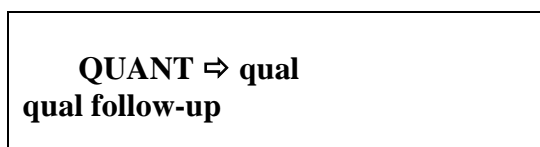


Figure 1

VI. THEORETICAL FRAMEWORK

Thomas Robert Malthus outlined his perspective on population growth in his renowned book, "An Essay on the Principle of Population as it affects the Future Improvement of Society," published in 1798. His theory suggested that population growth would outpace the growth in food supply, leading to dire consequences if not addressed. In today's context, the food supply could be considered synonymous with all the country's resources necessary for sustaining life. According to Malthus's theory, the rate of population growth and resource availability should be harmonious. However, he argued that while the population grows geometrically, food supply (or resources) increase arithmetically. This disparity potentially results in a growing gap between population size and available resources, underscoring the significance of population control.

VII. EMPIRICAL RESULTS**Table 1:** Shows Population Ages 15-64 (% of Total Population) and Gdp Growth (Annual %)**Table 1: Population Ages % and GDP %**

Year	Population ages 15-64 (% of total population)	GDP growth (annual %)	Year	Population ages 15-64 (% of total population)	GDP growth (annual %)	Year	Population ages 15-64 (% of total population)	GDP growth (annual %)
1961	56.18	3.72	1980	57.14	6.74	1999	60.54	8.85
1962	55.81	2.93	1981	57.18	6.01	2000	60.91	3.84
1963	55.46	5.99	1982	57.23	3.48	2001	61.19	4.82
1964	55.25	7.45	1983	57.29	7.29	2002	61.5	3.8
1965	55.21	-2.64	1984	57.39	3.82	2003	61.83	7.86
1966	55.09	-0.06	1985	57.54	5.25	2004	62.17	7.92
1967	55.16	7.83	1986	57.55	4.78	2005	62.52	7.92
1968	55.35	3.39	1987	57.65	3.97	2006	62.81	8.06
1969	55.57	6.54	1988	57.82	9.63	2007	63.1	7.66
1970	55.78	5.16	1989	58.02	5.95	2008	63.41	3.09
1971	55.86	1.64	1990	58.23	5.53	2009	63.74	7.86
1972	55.95	-0.55	1991	58.37	1.06	2010	64.11	8.5
1973	56.07	3.3	1992	58.55	5.48	2011	64.43	5.24
1974	56.23	1.19	1993	58.76	4.75	2012	64.81	5.46
1975	56.44	9.15	1994	59.01	6.66	2013	65.21	6.39
1976	56.5	1.66	1995	59.32	7.57	2014	65.6	7.41
1977	56.62	7.25	1996	59.57	7.55	2015	65.94	8
1978	56.79	5.71	1997	59.86	4.05	2016	66.27	8.17
1979	56.97	-5.24	1998	60.19	6.18	2017	66.54	7.17
						2018	66.77	6.81

Table 2: Correlation between Population Ages 15-64 (% of Total Population) and GDP Growth (Annual %)

Correlation	Population ages 15-64 (% of total population)	GDP growth (annual %)
Population ages 15-64 (% of total population)	1	0.431**
GDP growth (annual %)	0.431**	1

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

Table-2 shows correlation between working age population and GDP growth. It shows that there is weak positive correlation between working age population and GDP growth

Table 3

Model	R	R square	Adjusted R Square	Std. Error of the Estimate
1	0.431	0.186	0.171	2.67887

The table 3, model summary shows the results of a simple linear regression analysis with "Population ages 15-64 (% of total population)" as the predictor and "GDP Growth (Annual %)" as the outcome variable. The correlation coefficient (R) of 0.431 indicates a positive but moderate relationship between these variables. The coefficient of determination (R Square) is 0.186, indicating that about 18.6% of the variance in GDP growth can be explained by variations in the working-age population. The adjusted R Square is slightly lower at 0.171 due to the inclusion of only one predictor. The standard error of the estimate (2.67887) represents the accuracy of the regression model in predicting GDP growth based on the working-age population. While this analysis suggests a moderate association between the two variables, additional factors may also influence GDP growth. Further research is necessary for a comprehensive understanding of this relationship.

Table 4: Analysis of Variance (ANOVA)

	Sum of Squares	df	Mean Square	F	Sig.
Regression	91.529	1	91.529	12.754	0.001
Residual	401.876	56	7.176		
Total	493.405	57			

The ANOVA table-4 presents the results of the regression analysis between "Population ages 15-64 (% of total population)" and "GDP Growth (Annual %)." The regression model significantly explains a portion of the variability in GDP growth, as indicated by the significant F-statistic ($F = 12.754$, $p = 0.001$). The predictor variable, "Population ages 15-64 (% of total population)," contributes to the explained variability with a sum of squares of 91.529. The residual sum of squares, representing the unexplained variability, is 401.876. Overall, the regression model provides valuable insights into the relationship between the working-age population and GDP growth, suggesting that variations in the working-age population are statistically linked to fluctuations in economic growth.

Table 5: Regression Coefficients

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
(Constant)	-15.926	5.943		-2.680	.010
Population ages 15-64 (% of total population)	0.357	0.100	0.431	3.571	0.001

The "Coefficients" table-5 presents the results of the regression analysis between "Population ages 15-64 (% of total population)" and "GDP Growth (Annual %)." The

analysis shows that the working-age population percentage has a statistically significant and positive impact on GDP growth. For every one-unit increase in the working-age population percentage, GDP growth is expected to increase by 0.357 units. The findings highlight the importance of the working-age population as a significant driver of economic growth, offering valuable insights into the relationship between population dynamics and economic performance.

$$\text{GDP Growth} = -15.926 + 0.357(\text{Working Age Population})$$

VIII. VALIDATION OF THEORY

Throughout the preceding discussion, there are indications of exploring the relevance of the Malthusian theory of Population growth and its potential impact on the current context of India. This theory posits that a rapidly growing population eventually becomes a burden in its later stages due to its growth rate outpacing the availability of resources needed for sustenance.

In the context of India, the Malthusian theory suggests that the country's population growth could present challenges in the future as the demand for resources like food, water, energy, and healthcare may surpass the rate at which these resources can be provided. The increasing population could strain existing infrastructure, social services, and the environment, leading to potential socio-economic and environmental issues. As a result, it becomes imperative for policymakers to consider effective strategies and policies to manage the population growth and ensure sustainable development for the well-being of the nation.

IX. DISCUSSION ON METHODOLOGICAL FRAMEWORK

In our current study working age population's contribution in India's economic growth is analyzed with the help of statistical tools and the results showed insignificant relationship. Here in the present case if only quantitative analysis would have to be used, though the quant is justifying its efforts and analysis but it is leaving many important questions unanswered. Therefore, using the mixed methods Research technique and applying Sequential Design 'qual' is used in order to get full justification about the research problem.

The gap, that is arising between the two variables under study ie. Working age population and economic growth may be because of Employment factor. In the absence of suitable / perfect employment opportunities the gap will become even wider. In order to gain better insight about the situation Qualitative analysis is done on employability and its sustainability. Data collection is done with the help of simple questionnaire filled from 77 respondents. This Sequential Design is helping in tracing the right and complete answer of the research question.

The Details of Qualitative Analysis ss Given ss under

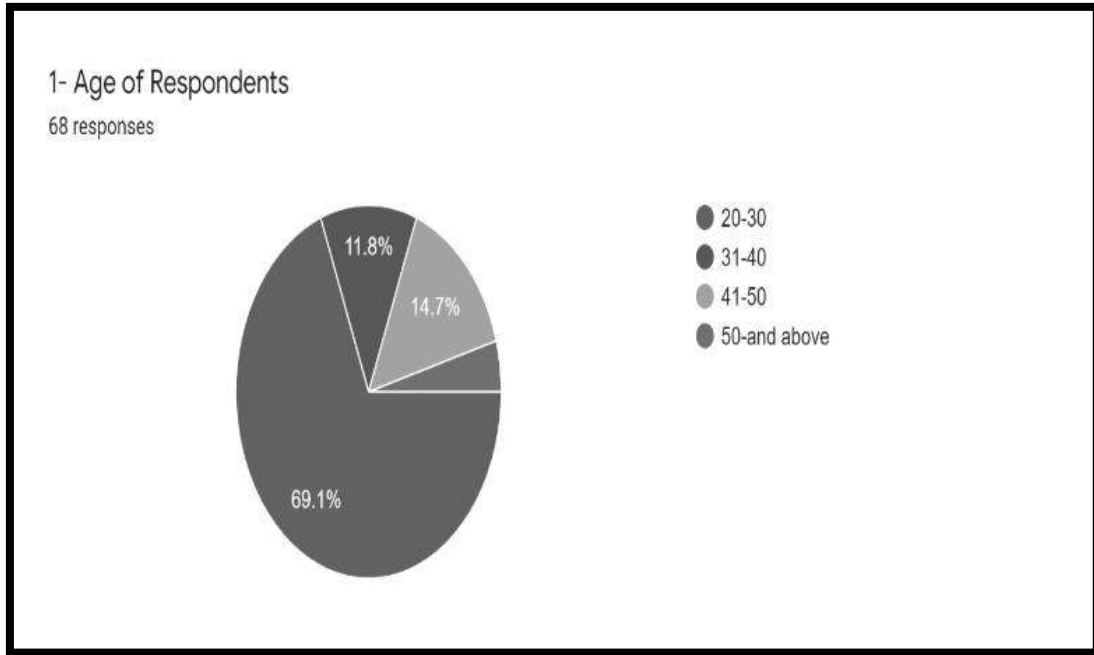


Figure 2: The above figure shows the age of respondents. The highest percentage is 69.1 which belongs to the age group of 20-30 years

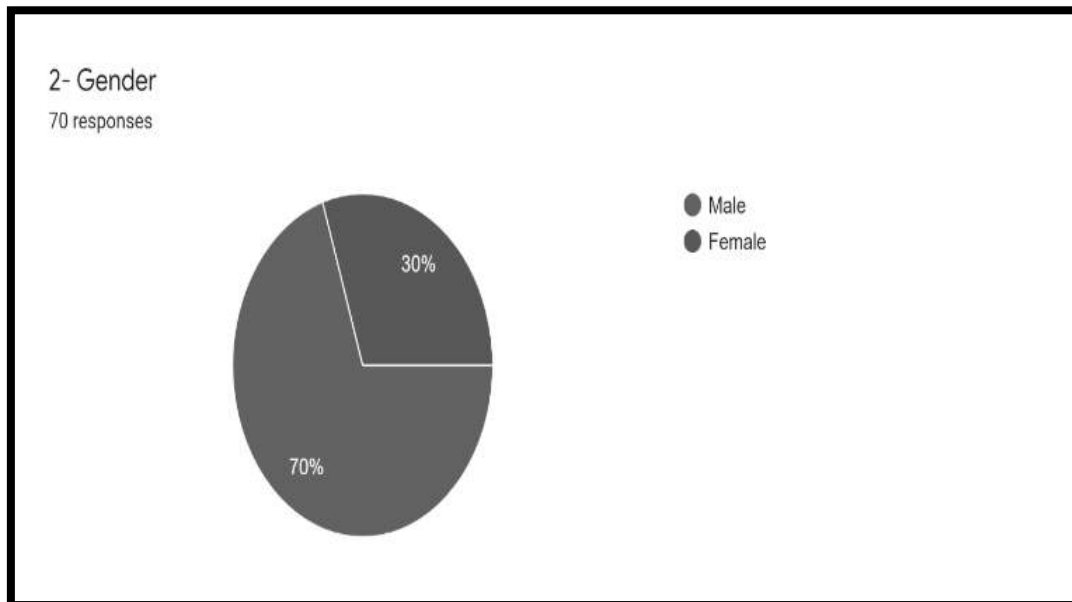


Figure 3: The above figure shows there are 70% male and 30% female respondents

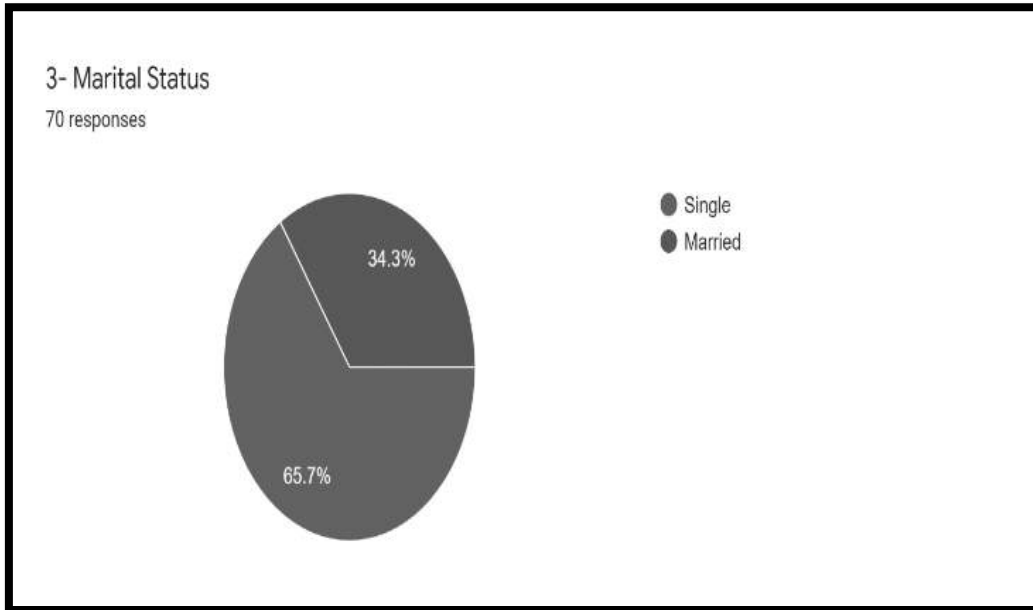


Figure 4: The above figure shows 65.7% are single and 34.3% are married respondents

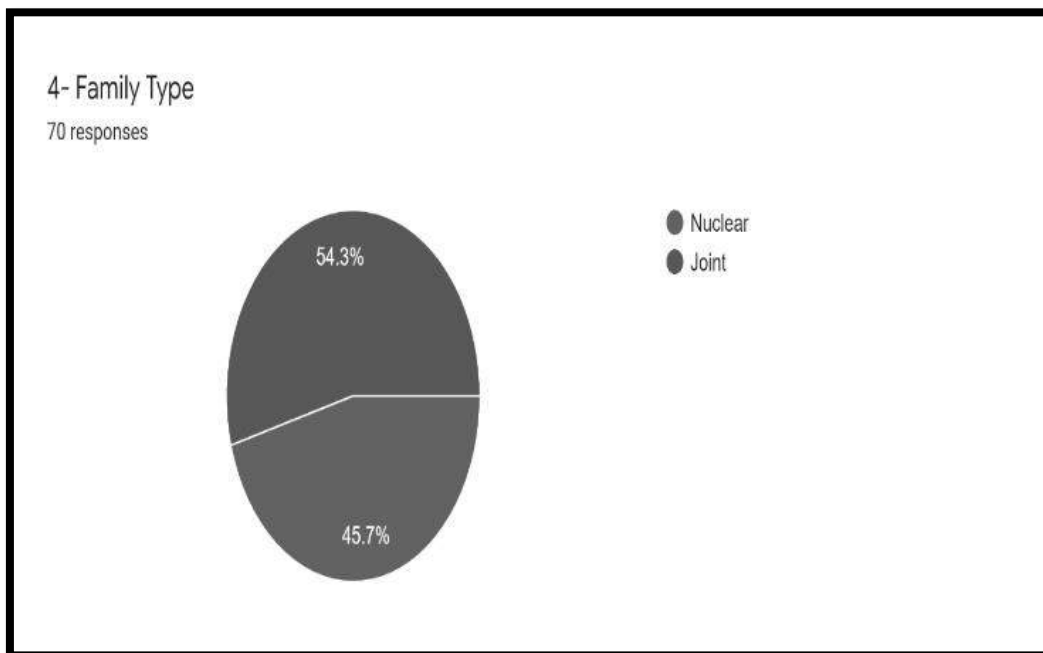


Figure 5: The above figure shows 54.3% are joint and 45.7% are nuclear family

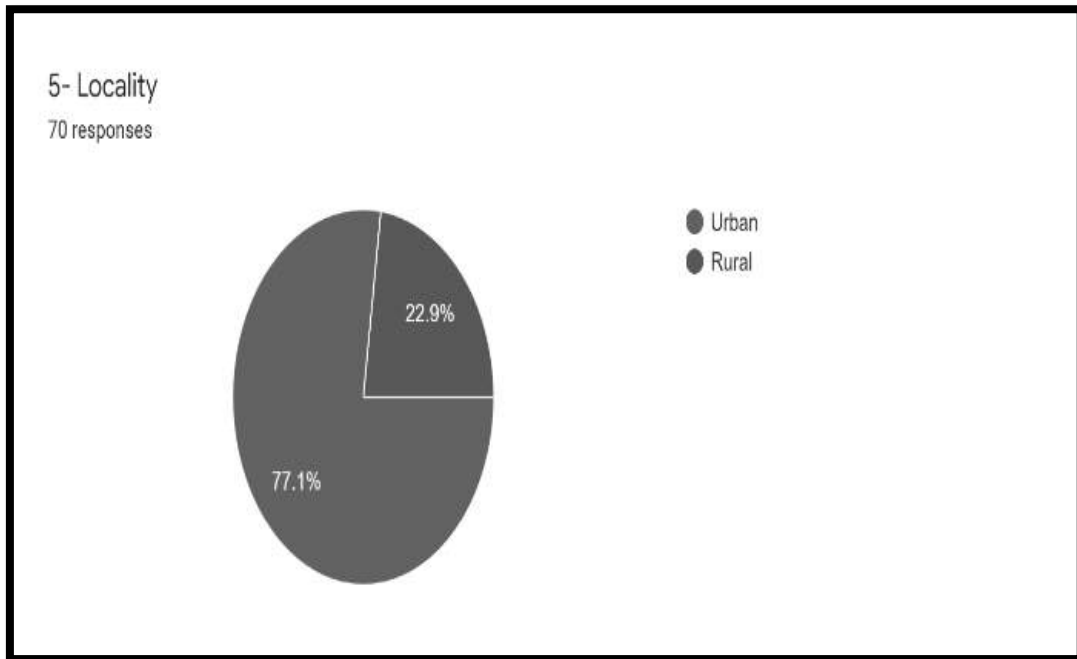


Figure 6: The above figure shows 77.1% are urban and 22.9% are rural

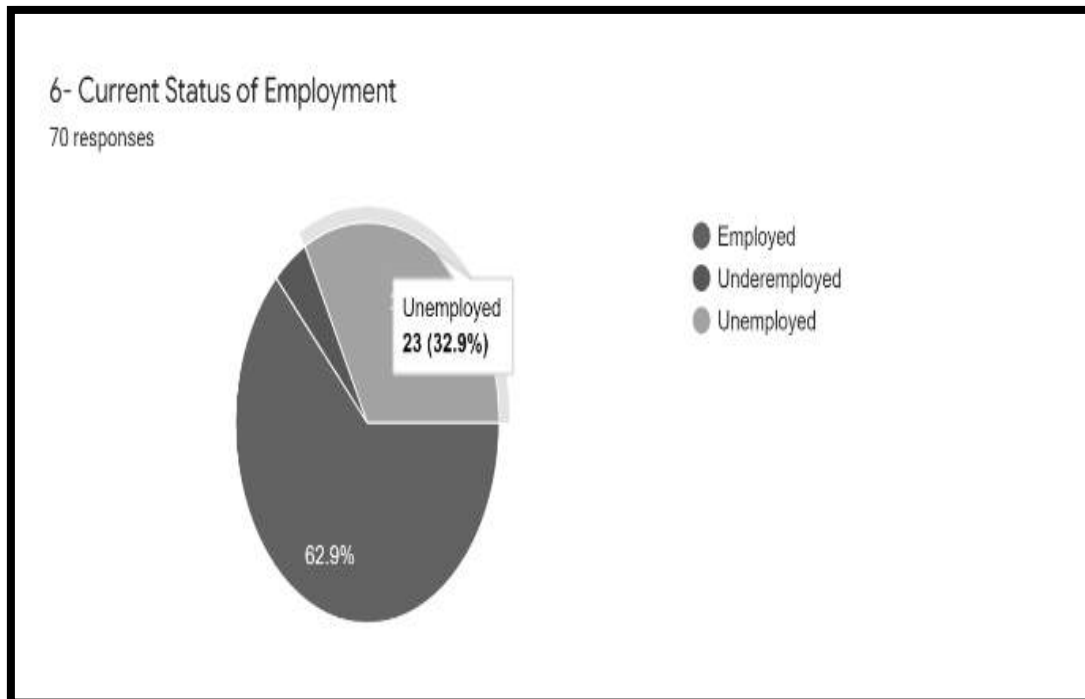


Figure 7: The above figure current status of employment. Under the survey unemployed were 32% and those employed were mainly related with non-technical field

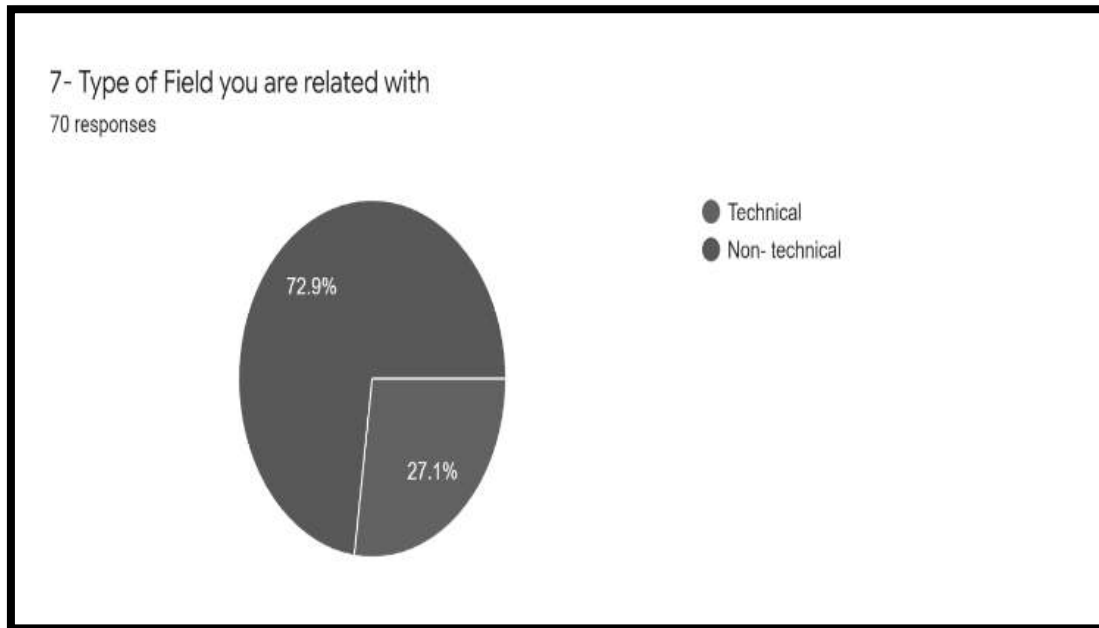


Figure 8: The above figure shows type of field. There are 72.9% are non-technical and 27.1% are related to technical field

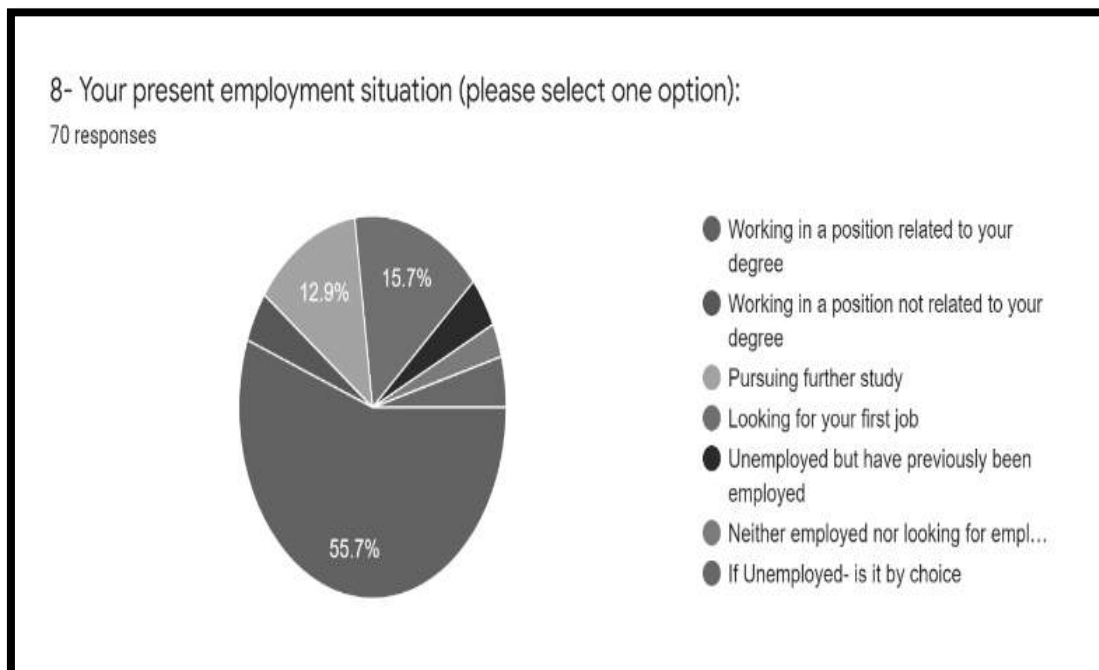


Figure 9: The above figure shows present employment situation. From the survey it is found that the respondents had the clear choice of job field as they have chosen the right course and they got their job there. But greater portion are also of unemployed persons

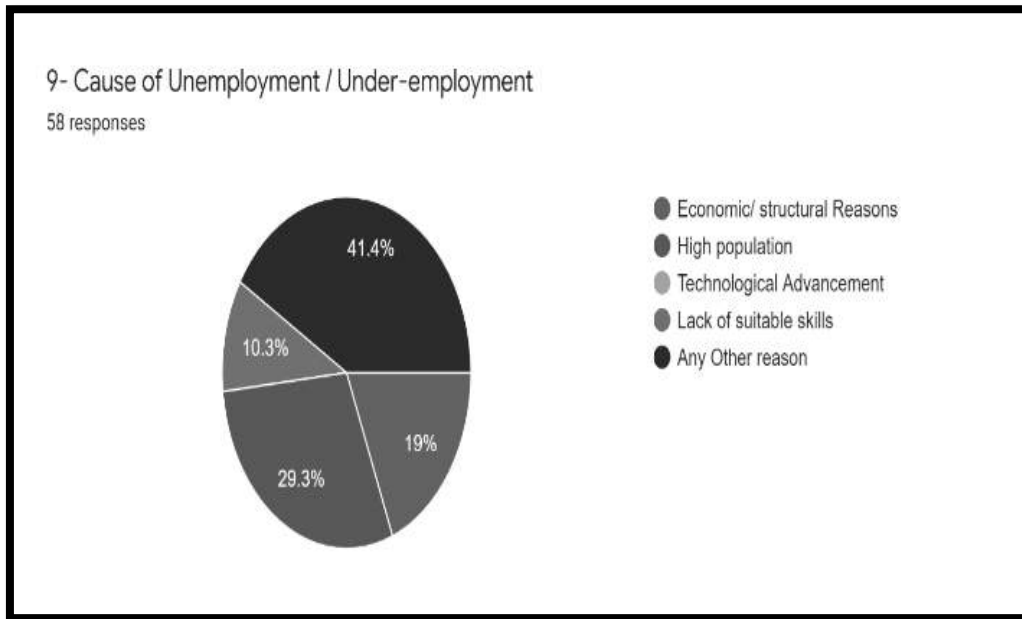


Figure 10: The above figure show cause of unemployment. With respect to unemployment major proportion don't know the reasons for unemployment but many of them says because of many chasers and few employment availabilities there is unemployment and few says it is lack of suitable skills

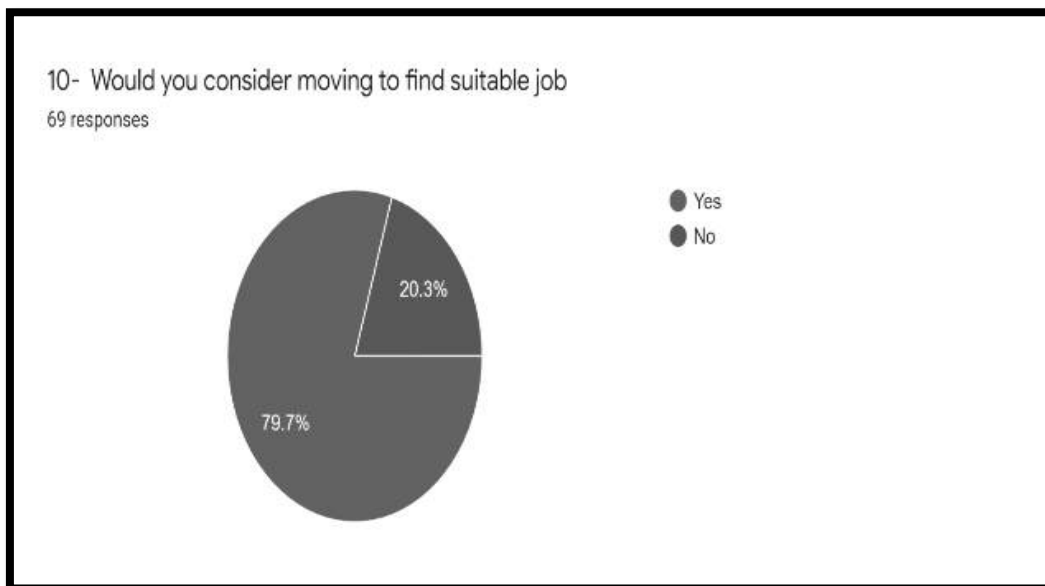


Figure 11: The above figure shows responses of moving to find suitable job. It is interesting to know under survey that majority of respondents want to change their job may be because of dissatisfaction that means they are not getting sustainably. Majority found that it is communication skill that is utmost important for job sustainability and second most Important factor is technological upgradation

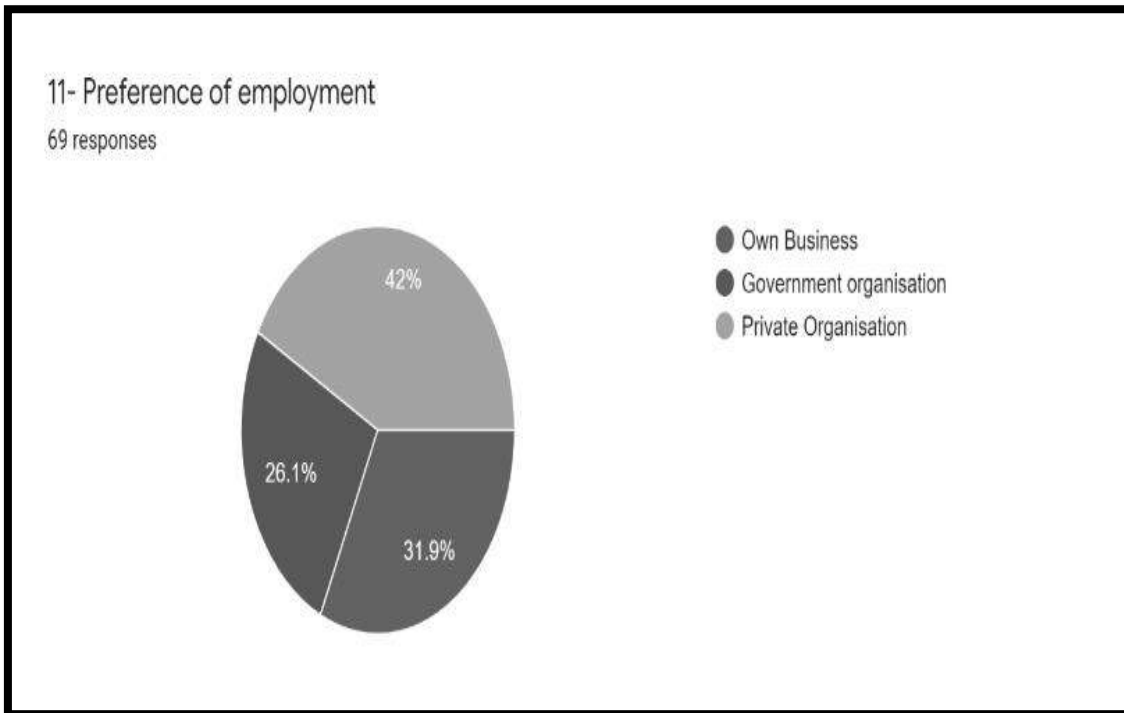


Figure 12: The above figure shows preference of employment. It was found that 42% are in private organization. 31.9% are in their own business and 26.1% are in Government organization

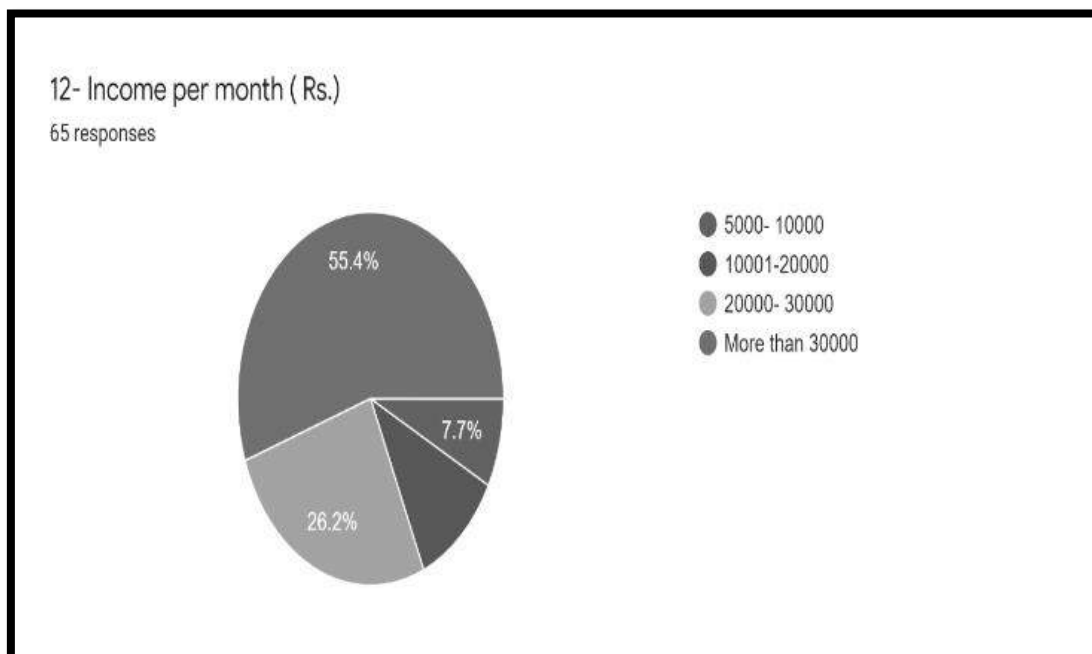


Figure 13: The above figure shows income per month in rupees. 55.4% having more than 30,000 income per month

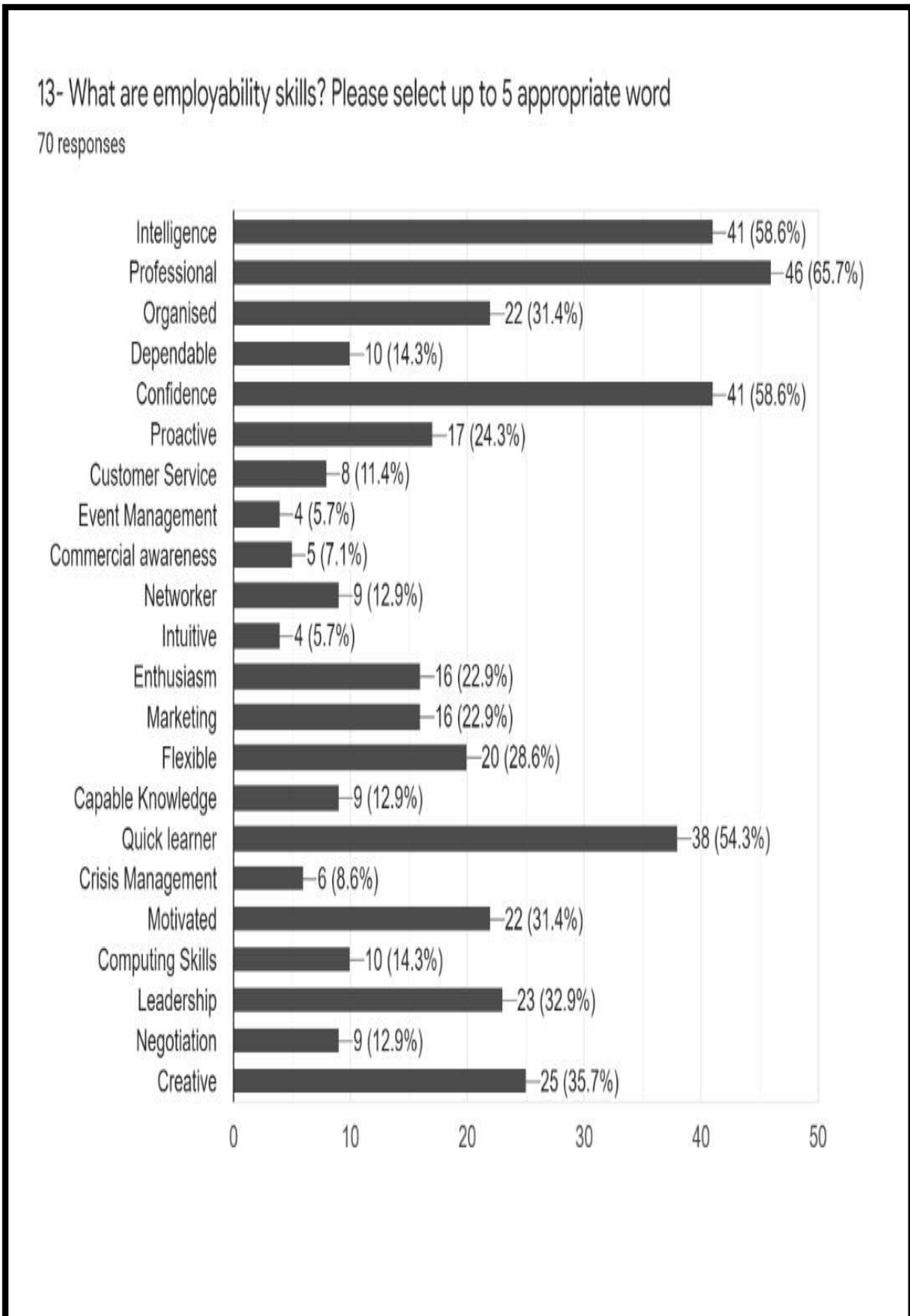


Figure 14

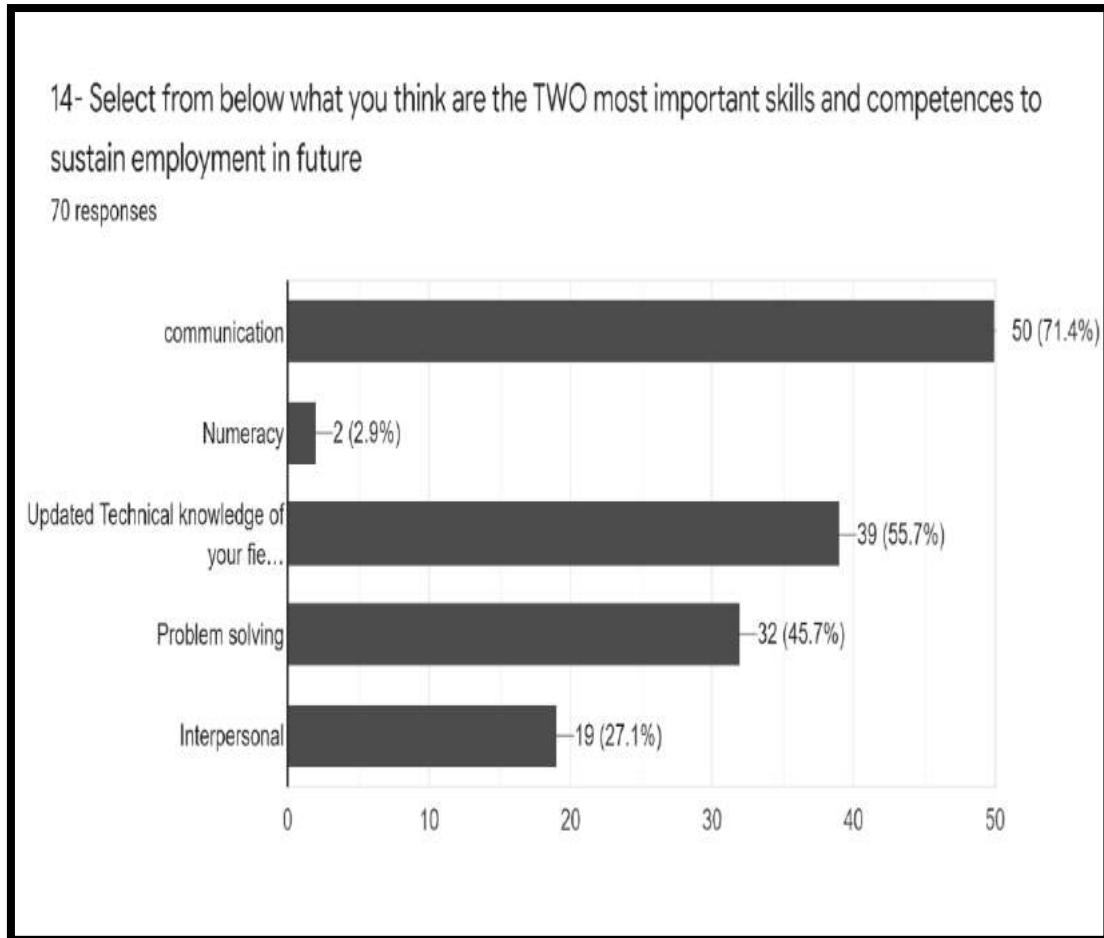


Figure 15

X. CONCLUSION

In conclusion, the research employed a Sequential Mixed Methods Research Design to gain a comprehensive understanding of the characteristics of respondents and their employment status, as well as the sustainability factors in their respective fields. The findings revealed that updated technological knowledge and communication skills are crucial skill traits for job sustainability. This approach allowed us to not only answer the "WHAT" (Quantitative) aspect of the research but also address the "HOW" (Qualitative) aspect effectively. The Sequential Mixed Methods Research Design proved valuable in providing a better insight into the scenario, offering a more holistic view of the research topic. By combining quantitative and qualitative data, this study successfully explored the intricacies of employment dynamics and sustainability factors, contributing valuable insights for policymakers and researchers alike.

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