Factors influencing research and innovation in Papua New Guinea: A study of cultural, educational, economic, and institutional dimensions.

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Abstract

Papua New Guinea continues to face challenges in developing a strong culture of research and innovation despite its rich cultural diversity and natural resources. Compared to regional neighbour's, PNG has limited research publications, slow adoption of new technologies, and minimal investment in innovation-driven industries. This research investigates barriers influencing research and innovation in PNG based on a survey response of 26 participants. The survey results indicates that 80% of the respondents considered research and innovation to be 'Very Important for the development in PNG, yet only a small proportion of 46% of the respondents have participated in any research related activities. The most frequently cited barriers rated by the respondents were lack of funding, poor research facilities, cultural attitudes and limited training and skills. Other factors such as access to technology varied between the age group and employment status. And priority areas for investment identified by the respondents were, agriculture which as the highest rate, education, environment and climate action, health and technology. From these findings, there is a clear need for urgent improvement in funding, infrastructure, skills development and more cultural awareness needs to take place within the country to strengthen Papua New Guinea's research and innovation abilities.

Keywords: cultural, funding, awareness, innovation, research, investment, diverse, adaptation.

1.0 Introduction

Research and innovation are key drivers of national development, improved livelihoods, and competitiveness in a knowledge-based global economy. For Papua New Guinea (PNG), a country rich in natural resources and cultural diversity, the advancement of research and innovation is important to tackle complex challenges, however, the capacity of the research environment to drive development is constrained by ongoing issues. Papua New Guinea still faces institutional, cultural, and structural barriers that continue to delay research engagement and the adoption of innovation.

The country's unique socio-economic landscape, and diverse cultures, isolated geographic, and depending on third world countries for industrial resources, present both

opportunities and challenges for research driven development within the country. While innovation can contribute to transformative role in sectors such as agriculture, health, education and technology. Furthermore, the absence of adequate funding, infrastructure and policy support contributed to the slowed progress in research and innovation. Moreover, the on-going issue of limited access to technology and research tools, along with skip gaps and cultural attitudes, exacerbate these challenges. Thus, this study aims to investigates these factors influencing research and innovation through a survey exploring, cultural, educational, economic and institutional dimensions.

This research paper identifies key challenges and enablers, with that the research paper aims to inform strategies that strengthen Papua New Guinea's capacity to research and innovation. And above all, fostering a robust research culture that will be vital for achieving sustainable development which will lead to improving livelihoods, and placing PNG in a position to compete in an ever-increasing knowledge driven global economy.

2.0 Literature review

Globally, research and innovation are influence by correlated by cultural, educational, economic and institutional factors. According to the Hofstede's cultural dimension framework, cultural values like openness to risk and collaboration strongly influence capacity for innovation. The framework shows that societies open to risk and uncertainty are more likely to innovate successfully (Nickerson, 2025). Education systems are pivotal, and UNESCO highlights that the expansion of higher education and digital transformation form the foundation for developing global research capacity (UNESCO, 2023). Economically, the Global Innovation Index demonstrates that market complexity, entrepreneurship, and financial availability all influence innovation performance globally (WIPO, 2025). On the other hand, Stanford academics highlights that innovation policies need to strike a balance between social equity and productivity. Institutional Support is just as important, in the UK, more than 60% of research publications have international co-authors (UKRI's, 2024). When institutions fund research and innovation projects these motivations more researchers to publish papers. When these aspects are put together it indicates that innovation flourishes when cultural openness, solid education systems, healthy economic environment, and institutional framework all align. This provides a comparative position to examine Papua New Guinea's potential and challenges.

In the Pacific Region, research and innovation highlight both the opportunities and challenges. Culturally, the societies in the pacific place a strong stress on shared well-being and indigenous knowledge that also maintains customs (Pacific Island Forum, 2017). This can hinder innovation and new research concept when societies stick to their traditional knowledge. Programs like the Tree of Opportunity framework, which advocates for curriculum that are in line with local realities and resilience needs showing that education plays a crucial role in the pacific (Pene, et al., 2021). Economically, small island nations face challenges like limited resources limited industries, however, entrepreneurship ecosystems are becoming accepted and acknowledged as approaches to expand economies and reach global markets (Hunter, et al., 2024). Institutionally, the pacific region needs more support from organizations such as Pacific Islands Forum and programs like EU-funded RERIPA initiative, although previous cooperation through these organization that have strengthen academia, policy frameworks and fostered collaboration among governments for sustainable development ((UNCTAD, 2025). The Pacific region demonstrates a gap in research and innovation that will help sustain the

region and lead the way for faster and clear development. This will help areas that need more attention such innovation rooted in culture, and education.

Just like the smaller islands in the pacific research and innovation in Papua New Guinea, possess both prospects and constraints, formed by country's diverse traditions, weak education system, unstable economy and developing institutional frameworks. Traditional knowledge systems and community practices provide a rich foundation for innovation, particularly in agriculture yet, these are often undervalued in formal research systems, which creates a gap between traditional perception and up-to-date scientific approaches. Due to narrow access to higher educations and infrastructure continues to hamper the development of a solid research culture. Furthermore, scholars have stressed the importance of improving local research competence in PNG through better training, funding and publishing possibilities (Baje & Itaki, 2022). Moreover, business capacity to capitalize on innovation is restricted by economic issues such as resource dependency, and insufficient funding for small and medium businesses, that leads to many entrepreneurial endeavours undeveloped (Kavan, 2024).New legal frameworks concerning research governance, intellectual property and ethics have begun to address these concerns through institutional changes. These frameworks try to improve partnership between institutions, government, and industry and align research with nation interest (Forsyth, 2021).

Although existing articles in Papua New Guinea have studied aspects of research ability, entrepreneurship, and regulatory reforms, there is still a lack of combined analysis that considers how cultural, educational, economic and institutional dimensions together influence innovation. Limited studies take a comprehensive approach, and the majority of the literature focuses on specific issues, such as enhancing local researcher's ability through training and publishing opportunities, the challenges small and medium-sized businesses face in gaining funding and infrastructure, or changing regulatory structures for research governance and intellectual property (Baje & Itaki, 2022). Equally, there is little empirical data on how PNG's formal innovation systems systematically integrated these cultural assets, notwithstanding regional publications stressing the significance of culture and traditional knowledge in encouraging sustainable development. Beyond cultural knowledge systems, educational improvements remain underexplored.

These gaps support the use of a conceptual framework that combines cultural, educational, and economic and institutional aspects, allowing for a multifaceted examination of how these factors interrelate to either support or hamper research and innovation. This study seeks to bridge the gap between fragmented literature and practice by using this framework and gathering empirical data through survey questionnaires, providing a thorough grasp of the elements driving PNG's innovation.

3.0 Conceptual framework

A conceptual framework that incorporates four interconnected dimensions guides this study; cultural, educational, economics, institutional as the main elements affecting research and innovation in Papua New Guinea, which serves as the foundation for this investigation. The framework serves as the basis for both the theoretical analysis and the empirical survey part of this study. It is anticipated to show how these factors interact to either assist or impede innovation results.

- Cultural Dimension: Papua New Guinea is known for its various indigenous knowledge systems, customs and community practices have the potential to spur innovation, especially in the areas of sustainable development, resource management and the agriculture. However, adaptation and spread of innovations are hindered by the integration of cultural assets into official research frameworks (Island, 2017)

- Educational Dimension: Building researching capabilities is mostly dependent on education. Organizations like Divine Word University along with University of South Pacific emphasized the need for better funding, skill training, and more publishing possibilities. Researcher's capacity to effectively contribute to innovation is also hindered by inadequate infrastructure and limited access to higher education opportunities (Baje & Itaki, 2022)

- Economic Dimension: Small and medium-sized businesses (SMEs) in PNG encounter difficulties such as limited access to infrastructure and the lack of funding due to the country's high resource dependent economy. The development of innovation is reduced by these limitations, which restrict company's ability to invest in research and innovation, diversifying economic activities (Kavan, 2024).

- Institutional Dimension: Research governance and intellectual property rights, and ethical norms are examples of institutional frameworks that are varying yet are still scattered. Though recent advances seek to improve cooperation between academia, government, and business and match research with the national priorities, implementation gaps still limit the ability for innovation (Forsyth, 2021)
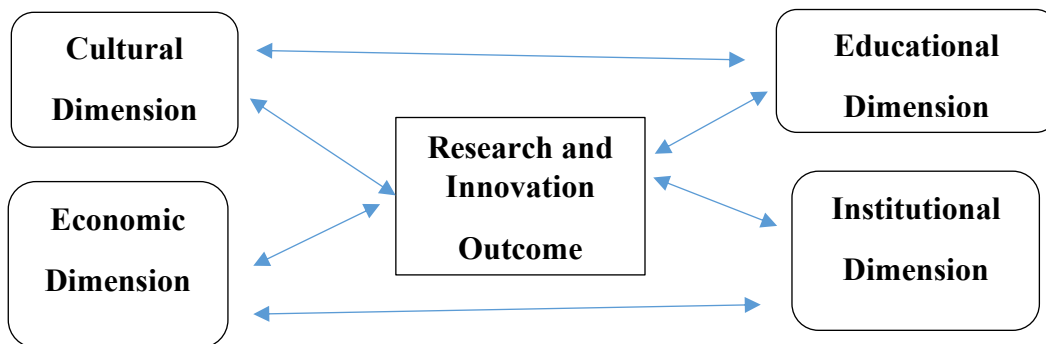

Figure 1: Conceptual Framework-Factors Influencing Research and Innovation in Papua New Guinea.

According to the conceptual framework, cultural, educational, economic and institution factors have an impact on the dependent variable, which is research and innovation results. It is anticipated that the overall strength of PNG's innovation setting is determined by how these dimensions interact. To validate the framework and highlight priority areas for policy and practice the study will use survey questionnaires to empirically examine how participants observe these factors.

4.0 Methodology

This study investigates how cultural, educational, economic and institutional factors disturb research and innovation in Papua New Guinea by using a descriptive and explanatory research methodology that combines qualitative and quantitative methods. Moreover, the design is

suitable because it makes it possible to find correlations between variables while using survey questionnaires to record participant's opinions and experiences. The conceptual framework that directs the study places research and innovation outcomes as the dependent variable impacted by the four independent dimensions: cultural, educational, economic and institutional. The framework depicts how these four factors work together to either support or hinder research and innovation. The target population involves academics, researchers, policymakers and students.

Primary data will be composed using structured survey questionnaires that is centred on the four dimensions to collect quantitative and qualitative data because the questionnaires have both closed-ended questions and Likert scale. Furthermore, secondary data will be collected from existing reports, and literature review to give context and triangulate results.

5.0 Results/ Findings

The results of the survey carried out is presented in this section. The four dimension of the conceptual framework, cultural, educational, economic and institutional is used to arrange the results. To provide a comprehensive picture of the elements influencing research an innovation, both quantitative and qualitative are studied. The analysis is based on the 26 respondents who participated in the survey.

5.1 Respondent profile

The group of tables below shows the demographic characteristics of all respondents, including age group, educational status and occupation.

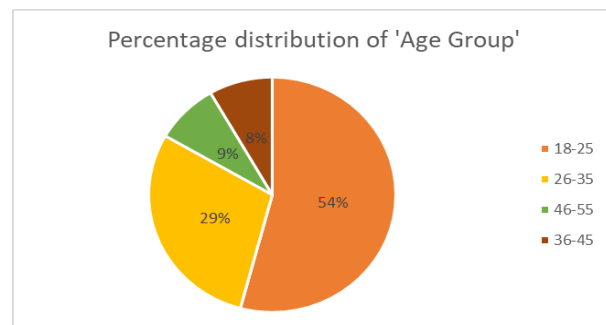| Age Group	Count of Age Group
18-25	54.17%
26-35	29.17%
46-55	8.33%
36-45	8.33%
Grand Total	**100.00%**

Table 1: Age group distribution

Figure 1: Age group distribution

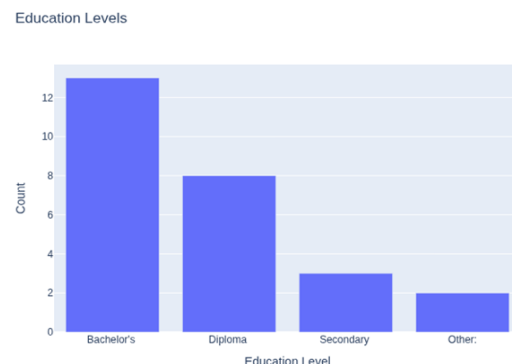| Highest level education?	Count of Highest-level education?
Bachelor's	50.00%
Diploma	30.77%
Secondary	11.54%
Other:	7.69%
Grand Total	**100.00%**

Table 2: Level of Education

Figure 2: Level of Education

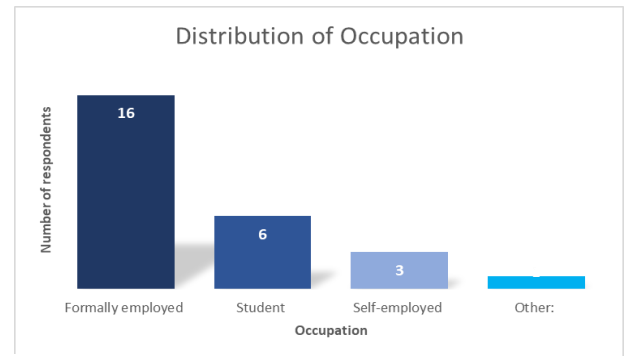| Occupation?	Count of Occupation?
Formally employed	61.54%
Student	23.08%
Self-employed	11.54%
Other:	3.85%
Grand Total	**100.00%**

Table 3: Occupation Distribution

Figure 3: Occupation Distribution

Table 1 and Figure 1, shows that most of the respondents are between the age of 18-25 (54.17%), followed by those between 26-35 age with a (29.17%), with lesser percentage of (8.33%) for both ages 36-45 and 46 to 55 (8.33%). Table 2 and Figure 2, shows that out of the respondents (50%) have a bachelor's degree, (30.77%) has a diploma, followed by (11.54%) possessing a secondary education other qualification accounted for (7.69%). Table 3 Figure 3. From the respondents (61.54%) are formally employed, (23.08%) are students, (11.54%) are self-employed, leaving others with (3.85%).

Analysing the demographics of the respondents will give a clear standpoint of the different views on the factors affecting research and innovation in PNG.

5.2 Perceptions on research and innovation

The survey results reveal that majority of the respondents have a strong belief that research and innovation (R&I) is important for PNG's development.

Despite the positive outlook, familiarity with research activities differs, (50%) of the respondents reported limited familiarity to research activities, while (37.50%) reported 'Very familiar' and (12.50%) admitted they were not familiar with research activities. An overwhelming 80% of participants rated R&I as 'Very Important' 16% rated it 'Important,' and only 4% were 'Neutral. The almost common agreement highlights the understanding that R&I is an important force behind social change and national development. Participants in research projects and activities were relatively low, however, participants reported that innovation can create jobs and economic opportunities in PNG. This implies that despite the high perceived importance of R&I, an important segment of the public still has little practical exposure and hands-on experience in any research activities.

Participation in research and innovation projects highlights this gap: respondents who have never participated in any research activities reported (53.8%), compared to (46.2%) of the respondents who have participated in research activities. This gap draws attention to a critical issue: transforming positive views into active participation in research activities. The capacity for research and innovation to lower unemployment and promote entrepreneurship was reinforced by the respondents vast rated that innovation may provide job opportunities and economic development possibilities.

The results shows that the public support for research and innovation activities is positive given the overwhelming respondent. However, to turn favourable views into real results, systemic barrier including limited training, limited funding, and institutional support must be addressed. This is showed by the lack of familiarity and low engagement.

5.3 Economic

According to the results from the survey, lack of funding was rated (57.7%. Most mentioned barrier to research and innovation in PNG. Respondents shows that improved funding would encourage greater involvement in research activities. Other challenges included inadequate research facilities (38.5%) and limited training and skills (34.6%), often linked to resource constraints. When asked what would encourage involvement in research related activities participants rated 'better funding/grants with (34.6%), followed by improved facilities and equipment with a (30.8%).
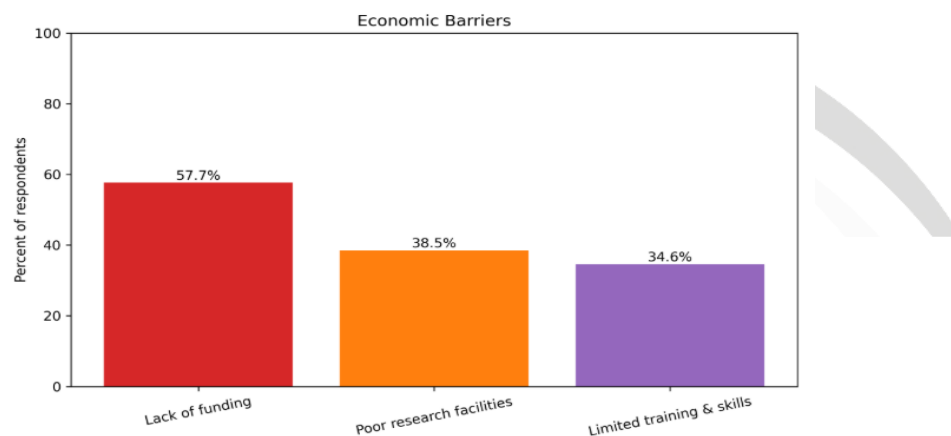

Figure 4: Economic barriers

Analysing this results, one major barrier is financial limitations. With out adequate funding and proper infrastructure even driven individuals who are passionate about doing research cannot effectively participate in any research related activities without sufficient funds.

5.4 Institutional

From the survey institutional challenges includes poor research facilities (38.5%) and limited access to technology (26.9%).
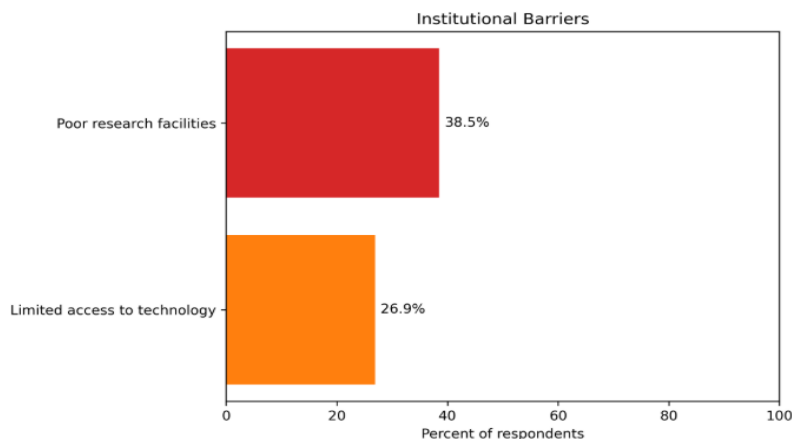
Figure 5: Institutional barriers

While majority of the participants believe that educational institutions support research, gaps remain in infrastructure and policy support. According to the results from the survey, having access to technology and research tools varied: Participants rated having access to technology and research tools (30.8%) Good, Average (26.9 %), Poor (19.2%), Very good (15.4%), and very poor (7.7%). Participants also rated a high (65.4%) Yes for educational institutions encouragement, (23.1%) somewhat, followed by a (11.5%). Follow by key institutional barriers included poor research facilities (38.5%) and limited access to technology (26.9%). and community awareness programs (30.8%), has enablers for research activities in PNG.

Although majority of the participants believed that institutions support and encourage research, actual engagement is hindered by infrastructural weaknesses and the unequal access to technology.

5.5 Educational

Limited training and skills were categorized as key barriers. Access to training and mentorship was the most frequent mentioned.
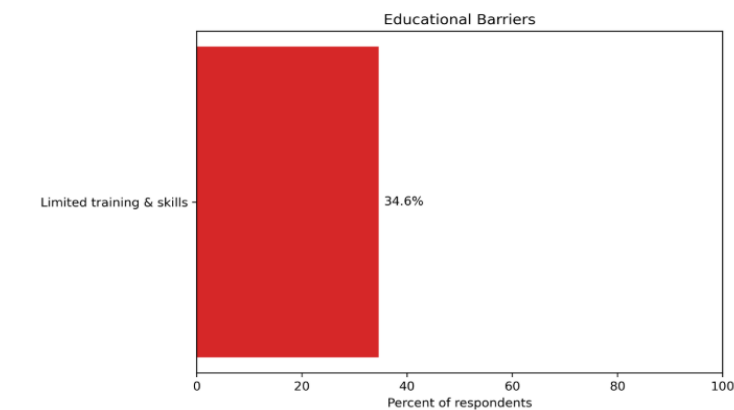

Figure 6: Educational barriers

Familiarity with research activities varied by education level. Education related challenges such as training and mentorship are prominent. Limited training and skills (34.6%) were cited as a major barrier. Access to training and mentorship (57.7%), which is the highest enabler, followed by education opportunities at (26.9%). Furthermore, familiarity with research activities and projects correlated with education level. The respondents with bachelor's degree rated (38.5%) 'Very familiar, (53.8%) 'Somewhat familiar, and (7.7%) Not familiar. Diploma holders rated (37.5%) 'Very familiar, (37.5% 'Somewhat familiar and 'Not familiar' (25%).

Based on these results, there is a strong demand for capacity building programs, having that said training and mentorship initiatives could also be vital to increasing participants and competency amongst the motivated individuals in doing research.

5.6 Cultural

PNG's cultural diversity makes culture an important factor to consider in this research. According to the survey results, cultural attitudes and resistance to change were mentioned as

significant barriers. And community awareness programs were suggested to overcome these challenges. Cultural factors influence research engagement in PNG. Respondents rated cultural attitudes a (34.6%) and a (23.1%) resisting changes, these two factors were cited as barriers to research engagement. And Community awareness programs rated (30.8%) as a suggestion as key enabler to tackling these challenges.
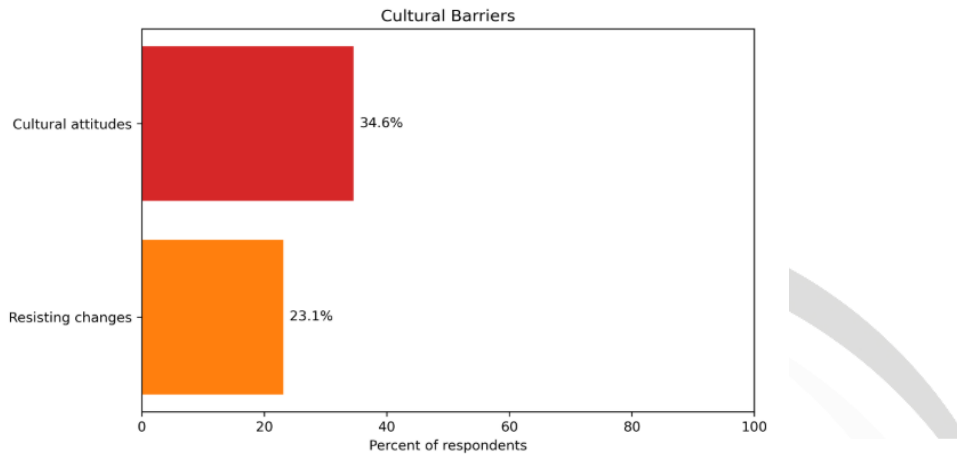
Considering the culturally diverse environment in PNG coupled with the results from the survey. Cultural resistance and norms can slow the adaptation of innovation and limit participation in research activities. To help tackle this issue awareness campaigns and displaying success stories can help shift perceptions.

5.7 Areas of innovation priority

The survey results also highlighted investment areas the respondents recommended. The respondents identified several areas: agriculture, education, health, environment and climate action, and technology as areas of priority for innovation. Respondents rated Agriculture (46.2%), Education (42.3%), Environment and Climate action (38.5%), (38.5%) Health, and Technology/ICT and Business & entrepreneurship both rated (30.8%), followed by the least priority area rated cultural/ creative industries (7.7%).
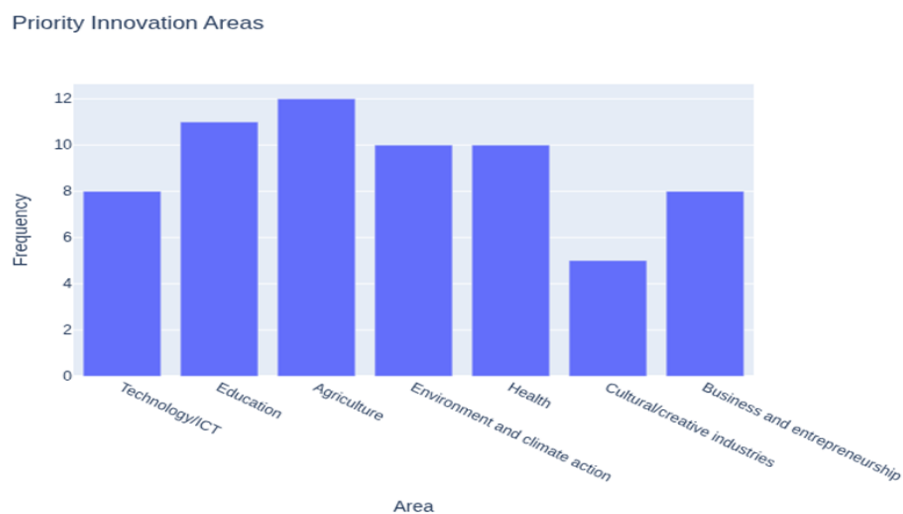
These priorities associate with PNG's development needs and suggest where innovation efforts should be concentrated.

Even though the value of research and innovation in PNG is acknowledged, participating in research activities remains low due to barriers such as limited funding and infrastructure along with cultural resistance and access to technology differ greatly by occupation.

5. 8 Summary of key findings

According to the survey results.
- ✓ lack of funding is the most significant barrier to research and innovation.
- ✓ Training and mentorship are critical enablers.
- ✓ Institutional support exists but infrastructure gaps persist.
- ✓ Cultural attitudes and resistance to change hinder participation. agriculture, education, and health, and environment climate action are top priority areas for innovation.

The findings from the survey have helped provide a solid foundation for the discussion on strategies and methods to strengthen research and innovation in Papua New Guinea.

6.0 Discussion

The findings from the survey showed persistent barriers to research and innovation in Papua New Guinea. The most frequently cited challenge that appeared across all age groups and education levels was lack of funding. This shows a general challenge where financial limitations affect both individual and institutional research and innovation efforts in PNG. Other barriers included poor research facilities, limited technology access, and inadequate training. With that these factors collectively point to infrastructural and capacity building gaps that need to be addressed.

Cultural attitudes and resistance to change were also mentioned, this suggests that beyond technical limitations, socio-cultural factors affect research participation. Aligning with previous studies stressing on the role of societal views in shaping innovation in PNG (Island, 2017). Interestingly, while most respondents rated research and innovation as 'very important' (80%) for development in Papua New Guinea, actual engagement in research related projects and activity was low according to the results. There is a gap between observed importance and engagement may be attributed to the barriers that was identified, mainly the lack of mentorship and supportive policies in the country to motivate individual engagement.

When asked what would encourage more participation in research activities, the respondents consistently suggested that access to mentorship and training. Followed by better funding, and improved facilities and equipment. Moreover, supportive government policies and multiple community awareness programs were viewed as essential enablers. The recommendations underscore the need for a multi-faceted approach combining financial, infrastructural, and policy intervention.

Technology/ICT, agriculture, health, education and environmental/climate action were rated top areas for priority for investing in. This indicates that if innovation is focused on these areas, it could stimulate socioeconomic growth as well as creating job opportunities since it reflects both local and global trends.

6.1 Policy and practice implications

According to the survey evidence, data reveals the following actionable implications that must take place:

- ✓ Target financial tools: Provide micro-grants and seed capital for students and local early career researchers who are motivated in doing research, and community innovators. And avoid the administrative barriers by lowering application procedures.
- ✓ Mentorship and training programs: Develop mentorship network by pairing universities, research institution and industries to create module for short courses, and summer classes to train basic research skills, data analysis and proposal writing.
- ✓ Facility upgrade: Build or upgrade shared labs, digital research hubs to be accessible across institutions and even in other provinces.
- ✓ Awareness and cultural programs: provide funding for outreach programs that make awareness about the benefits of research and communicate the reward research and innovation can contribute to our country.
- ✓ Strong supportive environment policy: Existing environment incentives should be monitored and maintain to avoid oversight corruption by collecting tax credits, public procurement preferences for research and innovation. Data governance processes and maintaining standard.
- ✓ Innovation agendas with a Sector focused: Aligning mentorships and grants with the identified areas of priority by respondents using prizes.

6.2 Limitations and directions for future research

This survey is small n=26 and non-statistical, which in turn limit generalization. Furthermore, responses from the participants may reflect the experiences of younger, formally employed and those with Bachelor's educated respondents more than other groups. Therefore, future studies should aim for larger samples and include the different regions to compare the results. Keeping in the longitudinal designs and track changes in the factors over time.

7.0 Conclusion

To conclude, the result of this study shows a disconnect between the actual engagement in related activities and the supposed significance of research and innovation in PNG. Only (46.2%) of respondents said that were involved in any research related activities, even though (80%) of the respondents rated research and innovation 'Very Important'. The biggest barriers identified were lack of funding (57.7%), inadequate research facilities (38.5%), and insufficient skills and training (34.6%). These challenges are further exacerbated by cultural attitudes and resistance to change. On the other hand, respondents identified actionable enablers such as, training and mentoring (57.7%), (34.6%), better funding, and improved facilities and equipment (30.8%).

These insights highlight the importance of a multifaceted strategy that promotes policies and capacity -building programs all while addressing, cultural, financial limitations and infrastructure. To fully understand the potential for innovation, important areas like, agriculture, education, health, and technology must be funded. Moreover, developing a research and innovation culture necessitates concerted efforts by the government, academic

institutions, and local communities to establish an environment that is conducive to innovation and knowledge creation in PNG.

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