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Original Article

Experiences of Female Scientists in Research Networks in STEM fields in Public Universities in Uganda

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ABSTRACT

Research networks are inevitable for female scientists in STEM fields, where research is carried out in teams in higher education. They promote privileged access to relevant knowledge and support from peers due to social connections. This qualitative study set out to explore the experiences of female scientists in research networks in STEM fields in public universities in Uganda. The study's population encompassed female scientists in research networks in STEM fields in public universities in Uganda that included Makerere University, Mbarara University of Science and Technology, Gulu University and Busitema University. In respect to this study, my participants were selected in the STEM fields in public universities in Uganda. Female scientists in research networks were selected in the hard pure and hard applied disciplines as classified by Becher and Biglan's typology of academic disciplines of 1973. From their classification of academic disciplines, the STEM fields belong to the hard pure and hard applied disciplines. This study was anchored on the existential phenomenology by Martin Heidegger in the interpretive worldview. Both semi-structured interviews and document check data collection methods were used in this study. A sample size comprising of eight female scientists in research networks in STEM fields in public universities in Uganda were interviewed. Data were thematically analysed where clustering into categories and emerging sub-themes were developed to form themes. This study concludes that those female scientists in research networks had positive experiences such as funding, networking, research skills, career growth, conferences, mentoring, and negative experiences like hectic schedules and delayed funding. The findings that emerged from the study indicated positive experiences with the research networks, which enabled them to win research grants, projects, and postdoctoral fellowships successfully. Those female scientists believed that their inter-institutional, national, regional, and international interactions and engagements spurred excellent opportunities for them in their universities. This was because they were exposed to top-notch scientists in their disciplines. This study, therefore, recommends to the management of public universities in Uganda to establish formal research networks and strengthen the existing informal research networks.

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INTRODUCTION

This study provides experiences of female scientists in research networks in STEM fields in public universities in Uganda. The experiences that female scientists encountered were related to winning research grants, projects, and postdoctoral fellowships. Collaboration is central to scientific work and organised in complex institutional forms that structure status hierarchies which increasingly involve women scientists. This article is inspired by these multiple dynamics and their interplay. This study aims at providing insights and experiences into the practical initiatives for the management of public universities in Uganda to establish formal research networks and strengthen the existing informal research networks. Increasing female scientists' contribution to knowledge generation and visibility in academia is of paramount importance. The public universities included Makerere University, Mbarara University of Science and Technology, Gulu University and Busitema University. Thus, this study provides useful suggestions and a deeper understanding of context-specific support measures for managers in public institutions of higher education, which may eventually increase the number of female scientists by creating awareness of the benefits of these research networks. Additionally, managers of public universities should provide some humble financial support to the female scientists that they need to operate the activities of their networks. More specifically, this study is expected to change the way of public university are managed is in Uganda which will make such networks more vibrant and attract more young female scientists to join. This will then lead to increased research outputs in their respective universities in Uganda, resulting in the development of Uganda as a whole.

Research Question

The study was guided by the following main research question:

What are the experiences of female scientists in research networks in STEM fields in public universities in Uganda?

RELATED LITERATURE

Theoretical Review

My study was guided by the social capital theory developed by Lin (2001). Social capital is defined as resources embedded in one's social networks, and these resources can be accessed through the ties in the networks (Lin, 2001). Lin asserts that the premise behind the notion of social capital is the investment in social relations with expected returns. Linking social capital serves to describe the ties that connect individuals to groups in positions of political and financial power and hence represents the accessible resources used for regular action (Lin, 1999; 2001). A researcher must have relationships with other researchers who are the source of her advantage (Lin, 2001).

The social capital theory by Lin (2001) was used in this study because it captures the value of relationships, representing the resources that can

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be drawn from ties, solidarity, reputation, and access to information (Lin, 2001). There are four key elements involved in Lin's theory: information, influence, social credentials, and reinforcement. Lin (2001) argues that some social ties, due to their strategic locations and positions, also carry more valued resources and exercise greater power in the decision-making process; hence, they are capable of providing added resources beyond one's personal capital. Individuals need the help and support of others, and reinforcement is essential for the entitlement to resources (Lin, 2001). Individuals are empowered through a network in which key persons who have access to resources can be included within institutions (Angervall et al., 2018; Chang & Liou (2008). This study, therefore sought to explore the experiences of female scientists in research networks.

Empirical Review

Literature shows that female scientists' experiences in research networks in STEM fields in higher education were both positive and negative. Yemini (2019) points out that positive experiences for female scientists in research networks vary depending on the objectives of the networks. Formal events such as conferences, workshops, training, awards nomination processes, ceremonies, and the establishment of databases of women scientists in research networks in STEM fields are forms of network-building avenues identified by female scientists (Gallagher et al., 2019). Premised on the above, Orozco and Orozco (2018) argue that common themes reported by female scientists in research networks in STEM fields in Columbia were peer review processes, editing, publishing research papers, politics of communication skills and conflict management. This increases the awareness of female scientists' strategies for becoming research group leaders. This view is backed up by scholars like Misra et al., (2017) who contend that female research networks in STEM fields create new opportunities for greater social legitimacy among peers. Findings from this study corroborate with scholars (Godbole & Ramaswamy, 2018) who note that interaction with senior female scientist researchers in STEM fields through the organisation for Women in Science for the Developing World provides opportunities for research training, career development, funding, grant writing, leadership skills, recognition and networking opportunities to young early-career women scientists, especially those from least-developed countries (Godbole & Ramaswamy, 2018). In addition, women scientists learn to link their research with industry and develop prototypes. Whereas these speak to common practices, I recognise that funding, training in management of emotions at the workplace and leadership promotion of young researchers are unique experiences. The opportunity to work and publish together boosts image building with a group of international scientists.

Scholars (Abramo et al., 2019[a]; Bhatia et al., 2021) indicated that young female academics received soft skills in paper writing, communication skills, grant proposal writing, and career proposals which added value to research and capacity development. Women scientists in research networks in STEM fields interacted with their colleagues locally and in the broader field (Bhatia et al., 2021). A key aspect to note was that the Geotechnical Engineering Women Faculty provided opportunities for connections with female scientists across the nation with opportunities for interacting with peers, collaborators and mentors. This enhances research productivity. One recurring theme across all women's research ranks was network-building skills (Gallagher et al., 2019).

Other findings by Barabino et al. (2020) indicate that women scientists improve their communication skills and expand their networks internationally. For example, Women in Medical Physics and Biomedical Engineering networks at major scientific conferences disseminate their experiences and good practices (Beck & Halloin, 2017). The literature here reinforces the notion that female scientists in research networks in STEM fields encounter positive experiences

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through professional workshops and meetings to develop discipline-specific connections and peer support. This is not any different from (Colley et al., 2018; Collins & Fluhr, 2019) who argue that the promotion of research networks among STEM faculty through activities like travel grants for female-led research projects and interdisciplinary knowledge exchanges were distinctive in enhancing research collaboration and academic advancement. This is kin but surely not the same as the situation with Amanda et al., (2016) who contend that personal relationships and connections are strengthened by face-to-face contact and lead to more worthwhile and meaningful experiences for their members. Likewise, the online network is at the core of the Earth Science Women's Network membership and addresses all aspects of the proposed mentoring philosophy. I agree that several studies demonstrate how technical skills like negotiating, preparation of a promotion package, and conflict management were critical positive experiences.

Lin et al., (2019) maintain that female scientists in research networks in STEM fields in Britain have opportunities to collaborate on research projects and publish peer-reviewed manuscripts because of developed relationships. Similarly, they found that these collaborations facilitate learning new skills and gaining confidence in their writing while also allowing for productive research and publication efforts. Facilitating peer support and collaborations are part of the capacity building for female scientists in research networks in the STEM field. Female scientists affirm that the research networks advance research itself not just through identifying people that the women work with but also through scholarship (Lin et al., 2019). In a similar way, more publications have emerged out of collaborations with different members of research committees and, hence, learning from them (OWISE, 2021). For example, through national conferences, connections with other people in the cardiovascular area were possible.

The International Union of Pure and Applied Physics (Avila et al., 2015) has promoted professional skills, funding, networking, sharing of experiences through life stories, and the scholarly environment. In Austria, the promotion of women in scientific research and technology encourages discussions with the goal of achieving greater equal opportunity in research and career development.

Nonetheless, opportunities have occurred at annual meetings at smaller discipline-specific conferences for building leadership skills for success in scientific organisations, developing research identity, skills networking, communication, and management skills for success (Adam et al., 2016). Consistent with other themes that emerged, female scientists in research networks in STEM fields reported that they had the opportunity as researchers to work with others at different career stages. Junior researchers are reported to have self-drive, knowledge from more recent training and a willingness to work hard at a variety of research roles, like the design of experimental apparatus or data coding (Kwiek & Roszka 2022). Senior researchers bring in hard-won wisdom, practical knowledge of research strategies, extensive social capital, or large-scale research funding (Abramo et al., 2019b). Whereas Bozeman et al., (2015) emphasised the importance of tailored workshops and seminars sponsored by women in science institutions, external funding and mentorship were common themes that emerged across all women faculty networks both in developed and developing worlds mentoring networks. Predoi-Cross et al., (2019) espouse that communicating effectively is an activity that can provide a practice platform for women. While certain themes were unique to the United States of America, Germany, Europe and France, there were common themes identified by female scientists in research networks in STEM fields across all research networks, like mentorship and funding. Not surprisingly, the European context identified themes, like understanding the different research policies and cultures across partner states, work-life balance, and family-friendly policies linked to career satisfaction as a positive experience (Gallagher et al., 2018). By contrast, countries like the United

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States of America and Europe may offer inspiration for improving female scientists in research networks in STEM fields' participation in scientific publishing.

In a distinctive way, research networks promote the use of virtual and long-distance strategies to maintain network connectivity in a bid to increase the number, quality, and frequency of connectivity of ties among Geotechnical Engineering Women Faculty members (Gaugthler, 2022). These are the skills that allow female scientists in research networks to navigate the process of publishing, identify and secure funding, establish collaborations, disseminate their research findings, and influence policymakers and peer support. I agree that in the context of France, it was striking that soft skills and informal support by senior female scientists have been a prominent experience. Through collaboration and teamwork, some faculty members have had the opportunity to conduct research, publish articles, and have secured publication contracts, collaborative research between older and younger faculty members (Curzio et al., 2020; Organisation for Women in Sciences for the Developing World, 2020; Witteman et al., 2018).

In African countries, senior female scientists provided professional support, proposal writing, mentoring, corrective feedback, and invaluable advice about how to manage the demands of a challenging professional career while maintaining work/life balance from their mentors in countries like Cameroon, Kenya, and Uganda (United Nations Educational Scientific and Cultural Organization, 2016). Yet, female scientists in research networks in STEM fields in Europe had significant common themes in research followed by teaching, publishing, and grant writing (World Health Organization, 2021). From the above, it is evident that the need to explore such observations about the positives experiences of female scientists in research networks in STEM fields in public universities in Uganda cannot be over emphasised.

Female scientists in research networks in STEM fields reported negative experiences, especially when the motives of researchers at different career stages fail to mesh, resulting in bad collaboration outcomes (Kwiek & Roszka, 2022). Some of the extant studies highlight larger societal biases that affect women negatively in their careers and reported that some female science networks have developed into unhealthy 'female camps' or enclaves, where female scientists in research networks in STEM fields bring each other down and emphasise 'sameness' and 'common experiences' in the wrong and oppressive way that embraces a certain kind of individualism. Many women in atmospheric science, for example, felt isolated across career phases (Adam et al., 2016).

Bozeman et al., (2016) who investigated the typology of bad research collaborations, reported that limited communication, the presence of free riders, power differentials, and difficult personalities were common. This is in tandem with findings by Ovseiko et al., (2017) who affirm that senior women often bear the burden of preparing activities of the association, like in Athena SWAN network lamented. Senior women scientists feel really stretched because they are asked to do lots of work on committees and other panels. For example, reviewing applications, moderating conferences and spending time on too many committees was a time-consuming activity especially for the principal investigator activities. Maddi et al., (2019) succinctly sums up this point by observing that senior women science researchers feel they lack time to identify appropriate resources to support collaborations. Witteman et al., (2019) highlight the fact female scientists in research networks in STEM fields bear the burden of discriminatory reviewer biases that identify them as being less competent than their male counterparts, even if all other indices, such as their skill sets, are considered equal. This is complemented by Sato et al., (2021), who affirm that female scientists in research networks in STEM fields face systemic disadvantages resulting into negative experiences that lower productivity levels, promote disharmony and mistrust.

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Female scientists in research networks in STEM fields place themselves at a disadvantage when collaborating disproportionately with other women because women tend to be part of less resource-rich and influential networks, limiting career progress (Lerchenmueller et al., 2019). Witteman et al., (2018) assert that female scientists in research networks in STEM fields are less likely to be offered tenure, are judged to be less competent, receive less payment and research facilities, and are less likely to be awarded research grants. Negative collaboration experiences may arise when collaborations lack management strategies for problems. Improving collaboration experiences by developing management strategies for harnessing collaborator differences, establishing collaboration boundaries, and balancing needs for both research support and independence.

Given that many studies (Aksnes et al., 2019; Dı´az-Faes et al., 2019; Kwiek & Roszka, 2022) have used the quantitative approach that limits the in-depth appreciative inquiry into female scientists in research networks in STEM fields lived experiences and more, so the perspective is from the global north (Angervall et al., 2018; Ehido et al., 2019). The current study, therefore, seeks to close the methodological and contextual gap by examining the female scientist's negative experiences in research networks in STEM fields in public universities in Uganda.

METHODOLOGY

This study was anchored on the interpretative paradigm, which aimed at gaining an in-depth understanding of varied and multiple realities that were context bound. Eight female scientists were identified through purposive sampling. A semi-structured interview technique was adopted, and face-to-face interviews were deemed important to get an in-depth understanding of female scientists' experiences in STEM fields in research networks in public universities in Uganda.

Major themes developed included: Positive experiences that included funding, networking, research skills, career growth, conferences, and mentoring. While the negative experiences comprised of hectic schedules and financial constraints. Secondary data were generated from the United Nations Sustainable Development Goals, African Union Agenda 2063, Uganda Vision 2040, National Development Plan III, Makerere University College of Health Sciences Annual Reports, and strategic plans of some public universities in Uganda for purposes of triangulation of findings. Data was thematically analysed.

FINDINGS

Using semi-structured interviews and document checks, the following sub-themes emerged from the experiences of female scientists in research networks in STEM fields in public universities in Uganda. Funding, networking, research skills, career growth, conferences, mentoring, and hectic schedules.

Funding

This was a very important experience that motivated female scientists to join research networks at public universities in Uganda. Most of the funding came in the form of grants, projects, fellowships, and postdoctoral studies. For instance, participants 2 shared that:

> *International networks prepared me to get funding, and this was done on a merit-based system. I received funding from SIDA through the International Science Program, and I have so far done three post-doctorates honestly just because of funding.*

Relatedly, participant 1 revealed that:

> *I think one of the biggest achievements in my research network was being handsomely funded for my first project. I think it is the best payment I have ever got.*

Along similar lines, participant 3 reported that:

> *I got a call for a post-doctorate in my research network. I applied for it, and I was successful. I got that fellowship and went for further studies in the United States of America. My network continued to support*

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me, and this has motivated me to complete my studies in time.

Networking

Female scientists acknowledged that networking was a key experience that propelled immeasurable opportunities to their institutions. They specifically noted that they were able to benefit from the interdisciplinary collaborations because they were part of the relevant research networks. In support, participant 1 confessed that:

> *There are instances where I had to write to people. I say you are working on this, and we are working on this, and we have something in common. Can we engage and see how we can work together? And there are times we have scientific meetings and you hear someone presenting something that sounds like what you do and what you like. You can engage with them and speak with them to see that you can navigate opportunities together.*

All participants concurred that inter-institutional, national, regional, and international interactions and engagements spurred excellent opportunities for them in their universities. For instance, participant 2 shared that:

> *I got exposed to the bigger world because large networks transcend the boundaries of institutions, which leads to exposure to international research and top-notch scientists.*

Research Skills

Research skills were viewed in terms of publishing, supervising, proposal writing and impact of research. Evidence from participant 1 revealed that:

> *For me, it is not just your ability to produce science but the impact of science. The change that I create with what I do should not be underestimated.*

Similarly, participant 4 shared that:

> *My research findings and insights have contributed to the collective advancement of knowledge, pushing the boundaries of scientific inquiry and reinforcing the importance of gender inclusion and diversity in academia.*

Likewise, participant 7 reported that:

> *I have experience in writing proposals. I have learnt how to write for all types of purposes, whether academia or consultancy, because I was well trained on how to do it in one of my research networks.*

Career Growth

Female scientists shared that they experienced career growth at different sessions attended within their networks in the STEM fields in public universities in Uganda. They acquired new skills related to leadership, communication, and negotiation. Those skills empowered them not only to stay relevant but also to thrive in their professional journeys. In agreement, participant 7 shared that:

> *I have attained several skills from research network members, especially presentation, public speaking, and writing. I have improved a lot in my presentations, and this was not the case before. I always make very good presentations because I learnt how to do them from my networks.*

Conferences

They agreed that attending training, seminars, and presentations enhanced their skills. For example, participant 2 said that:

> *During Covid-19, I was nominated as the lead researcher on the Modelling group on the Uganda Covid-19 Scientific Advisory Committee. These research networks have helped me to initiate other women's networks that are helping women to contribute more to sciences.*

Relatedly, participant 4 revealed that:

> *I have attended international conferences because of belonging to a network in our field. That international conference was organised*

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by the International European Erasmus project. Given that collaborations are a requirement to foster science, I have benefitted from the networks through staff exchange programs, and my students have benefitted as visiting students, and this is very good for us in this University.

Mentoring

Some female scientists experienced mentoring in their research networks in STEM fields in public universities in Uganda. Whereas some participants mentored other female scientists, others agreed that their research networks gave them the opportunity to be mentored in their disciplines. The participants agreed that the mentors and mentees all benefitted from the mentor-mentee relationships that had been established in their research networks in the STEM fields. For instance, participant 1 revealed that:

I am what I am because I had good mentors who were very well-established scientists. The easier way is when people intentionally mentor and pick up smart scientists and support them to move on. So, people intentionally mentor to move on.

However, some participants shared negative experiences in the research networks in STEM fields in public universities in Uganda. They shared that they experienced inadequate financial resources, delays in funding, and difficulty accessing the funds sent, which delayed their research. For instance, a participant 5 stated that:

General delays in funding are a really bad experience. My research is experiment-based in nature, and I need funds at every level to buy consumables to be able to progress. The delay in funds really affects the results.

Hectic Schedules

All the participants described the above as being loaded, burdened, having difficulty connecting three universities, and highly competitive skills needed. In respect, participant 3 noted that:

There is a lot of tension and conflict. I must do a lot of hustling. I need to teach 10 hours of lectures and must prepare for those lectures and, at the same time, give attention and time to the activities of my research network.

In a similar vein, participant 4 commented that:

My worst experience was that in mixed research networks. Our male members often steal my ideas, and yet I fear to antagonise. So, sometimes, this makes some of the research networks lose out on funding, and there is no unity or trust.

On a slightly a different note, participant 1 intimated that:

Sometimes, I see very frustrated researchers. They feel excluded, and they are not involved. They do not have the opportunity, and they have not been apparently invited, or the doors are closed. They may seem like open networks, but they are literally closed! So, for me, that is one of the worst experiences, and that is why I stressed the issue of networking, which helps.

DISCUSSION OF FINDINGS

Positive experiences in research networks related to successfully winning research grants, projects, and postdoctoral fellowships. Those female scientists believed that their inter-institutional, national, regional, and international interactions and engagements spurred excellent opportunities for them in their universities. These themes are discussed below:

Career Growth

The findings reflect that career growth was viewed as a valuable experience by all female scientists in research networks in STEM fields in public universities in Uganda. They agreed that capacity development programs were critical in enhancing their skills and capabilities in the different public universities in Uganda. They highlighted the transformative impact of a range of complementary skills they had acquired that

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contributed to their professional advancement. Participants further shared that they had encountered experiences related to attending conferences to cultivate project management abilities, preparing grant proposals, conducting joint research, and writing joint scholarly publications. In support, scholars emphasised that researchers in international networks encountered experiences related to sharing resources and costs between institutions (Abramo et al., 2019; Bogle, 2020; Niederkrotenthaler et al., 2020).This finding resonates with debates raised by several scholars (Abramo et al., 2019a; Ovseiko et al., 2017; Bhatia et al., 2021) who affirm that younger female scientists received soft skills in paper writing, communication skills, grant proposal writing, career proposals added value and research goals as the most useful for their capacity development. These findings collectively emphasise the synergy of capacity development programs, urging research networks in public universities in Uganda to integrate formal training initiatives to contribute valuable insights for universities that are aiming to enhance adaptive capacities among female scientists in an ever-evolving landscape. This is consistent with the tenets of the social capital theory of resources being embedded in social connections, where a researcher must have relationships with other researchers who are the source of her advantage (Lin, 2001). It is on this basis that Gallagher (2019) also acknowledged that formal events such as conferences, workshops, trainings, awards nomination processes, ceremonies, and the establishment of databases of women scientists in research networks in STEM fields were forms of network building avenues that were identified by female scientists.

Research Skills

Female scientists in research networks in STEM fields in public universities in Uganda also revealed that research skills were yet another critical experience. Most of them shared their experiences related to publishing and supervising postgraduate students. According to the literature, Hajibabaei et al., (2023) stressed that research collaboration activities are mainly driven by the need for sharing knowledge, expertise, and pooled resources. This is in line with the tenets of the social capital theory that individuals access resources possessed by their associates through relationships with other researchers. Scholars (Al-Maadeed et al., 2021; Huang & Brown, 2019) agree that collaborating in research is essential to higher education, student experiences and institutional processes and performance. They highlighted the deep assimilation of knowledge resulting from multiple participants across disciplines working towards a collective goal. Related studies highlighted the experiences of researchers in research networks that included researcher reputation, higher visibility, opportunities for multidisciplinary research, access to research funds, and mentoring of younger researchers.

The above findings cohere with observations that research collaborations have objectives based on mutual research interests, funding and infrastructure (Shih et al., 2023; Wagner, 2018). This is not any different from scholars who argue that research networks expose female scientist's to collaborative engagement, academic advancement, female-led research projects, interdisciplinary knowledge exchanges, and cross-sector research showcases (Colley et al., 2018; Collins & Fluhr, 2019). This is kin, but surely not the same as the situation by Lin et al., (2019), who maintain that female scientists in research networks in STEM fields have opportunities to collaborate on research projects and publish peer-reviewed manuscripts because of the relationships developed. Some participants found out that these collaborations helped them learn new skills and gain confidence in their writing while also allowing for productive research and publication efforts. Facilitating peer support and collaborations are part of the capacity building for female scientists in research networks in STEM fields. Female scientists affirm that the research networks advance research itself not just through identifying people that the women work with but also through scholarship (Lin, 2019).

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Publications

In a similar way, more publications have come out of collaborations with different members of research committees and, hence learning from them. Learning from other female scientists in research networks in STEM fields on how they organise their work and their writing has been made easier (OWISE, 2021). Indeed, participants in this study concurred that research skills were a valuable experience, which they stressed. For instance, 3 corroborated that I have over 20 publications from esteemed peer-reviewed journals. These act as your profile; better still, co-authored publications in prestigious international journals are an exceptional contribution in fostering research skills and have leveraged my scientific world. These findings from this study provide contrary results from other studies that show that there is need to have established relationships to promote intellectual synergies that can be integral to durable international research network collaboration. Universities have often advocated for innovative ways for academic staff and students to collaborate in research and to expand the horizons of knowledge beyond their subject or profession (Maybee et al., 2022; Woolhouse et al., 2020).

Study findings revealed that international research networks allow female scientists to collaborate. This could be based on the reasons that international and culturally diverse research networks provide valuable opportunities to advance scientific knowledge production for female scientists. This is consistent with the theory tenets that, according to Lin (2001), argues that some social ties, due to their strategic locations and positions, also carry more valued resources and exercise greater power in decision making processes, hence capable of providing added resources beyond one's personal capital. Individuals need help and the support of others and reinforcement is essential for the entitlement to resources (Lin, 2001). Limited involvement of female scientists in research networks makes it hard to access network resources, especially funding and research skills. Moreover, their achievements remain invisible and this negatively impacts their productivity and recognition. Hajibabaei et al., (2023) underscores opportunities that research networks present like funding, social capital, publishing, fellowships, skills development and multidisciplinary research.

CONCLUSIONS

This study, therefore, concludes that those female scientists had positive and negative experiences with their research networks in their respective disciplines in the public universities. They agreed that their positive experiences with the research networks enabled them to successfully win research grants, projects, and postdoctoral fellowships. Those female scientists believed that their inter-institutional, national, regional, and international interactions and engagements spurred excellent opportunities for them in their universities. This was because they were exposed to top-notch scientists in their disciplines. Those participants also believed that their participation in their research networks exposed them to better practices in publishing, supervising, and proposal writing, which positively impacted on their research outputs in their fields in their universities in Uganda.

Besides, those female scientists had negative experiences with their research networks in STEM fields in public universities in Uganda. Some participants experienced hectic schedules, inadequate financial resources, delays in funding, and difficulty accessing the funds sent. They did not have funds to buy the equipment and consumables that were needed to conduct research on time, which delayed and affected their research outputs at their universities in Uganda.

Recommendations

This study recommends to the management of public universities in Uganda to establish formal research networks for female scientists in STEM fields as well as strengthen the existing informal research networks. Management may do this by creating awareness on the benefits of these networks and provide some humble financial

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support that they may need to operate the activities of their networks. This will make such networks more vibrant and attract more young female scientists to join. This will then lead to increased research outputs in their respective universities in Uganda, resulting in the development of Uganda as a whole.

Areas for Further Research

There is need to extend the scope of the study to other public or private universities in Uganda. Thus, there are still many opportunities to expand this research to a wider range of research fields, especially the soft applied and soft pure fields.

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