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Women in ICT: Barriers to Career Advancement and Strategies for Improvement

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Abstract: Women are generally under-represented in the technology, or ICT, industry. Their numbers dwindle as they advance to senior management, with only 19% of senior posts assumed by women [1]. This paper looked at barriers to career advancement of women in ICT, strategies to bridge them and the strategies seen as the most effective by study participants. Data was collected through online questionnaire from 50 women occupying ICT posts in Gauteng Province, South Africa. We analysed the data using a combination of descriptive statistics and coding. The most prevalent career advancement barriers identified were the male-dominated nature of the sector, lack of empowerment and work-life imbalance. Participants believe that the use of quota systems for gender diversity, transparent performance reviews and opportunities for women, will be effective to bridge these barriers. Our findings mirror typical trends in the male-dominated ICT industries across the globe.

Keywords: Barriers, diversity, gender stereotypes, under-representation, women in ICT, work-life balance.

1. Introduction

The history of women as part of global workforce dates back to the start of capitalism. Although women were not often acknowledged as workers in their own right and their contributions to social reproduction generally do not attract commensurate remuneration, they remained vital to the functioning of society [2].

Women are workers, whether they are recognised as such or not.The responsibility of household activities, e.g. cooking, cleaning, child care, caring for the sick and elderly etc., often fall on women. This is especially the case in developing countries. Even when women engage in work outside their homes, the trend of unpaid or underpaid work often persists [3]. It took a long time for women's efforts to be accepted as legitimate part of the working class to yield fruitful results [2]. Today, women occupy less than 40% of the workforce [3] and gender diversity in the workforce has largely remained stagnant [4]. The slow pace of worplace gender diversity could be due to a decline in the retention of women, especially in technical occupations, senior management positions and other traditionally male-dominated industries [5]. Gender diversity, especially at senior management, is beneficial to an organisation's overall performance [6], since it allows the firm to draw from a broader pool of talent and skill sets [7].

Women are generally under-represented in the Information, Communication and Technology (ICT) sector. Their number dwindle as one examine senior management levels, with only 19% of senior posts occupied by women [1]. Although female graduates enter the

job market in the same numbers as their male counterparts [8], men are nine times more likely to reach senior management positions than female [7]. Under-representation of women in senior management positions is a global phenomenon, especially in male-dominated sectors like engineering and ICT [9].

The purpose of our research is to determine the extent to which barriers to career advancements of women in ICT identified globally are also applicable in South Africa. Another aim of the study is to identify different strategies being used by organisations to bridge these barriers.

According to the South African Employment Equity Act No. 55 [10], organisations are required to ensure a diverse workforce, representative of the country's population. More than half of South African workforce consists of women. However, a 2014 survey of ICT workforce indicates that employment figures in ICT sector is skewed more favourably towards men [11].

The remainder of this section provides an overview of current status of women in ICT, status of women in senior management positions, and barriers to career advancement of women in ICT.

1.1 Current Status of Women in the ICT

According to the Council of European Professional Informatics Society (CEPIS) [12], the number of ICT-related vacancies in Europe is over 700 000, with less than one fifth of ICT professionals being females. Also, the number of women enrolling for ICT-related courses in Europe is lower than their male counterparts [12]. Although total number of students enrolling for ICT degrees in South African universities has declined over the years, [13] anecdotal evidence showed that more men are graduating with ICT degrees than women [14].

The level of unemployment in South Africa currently stands at 25%. This is due to continued increase in the number of people seeking jobs and the low rate of job creation. However, the number of vacant posistions in the South African ICT sector is greater than the number of available professionals. South African women dominate traditionally female occupations (e.g. teaching and nursing). The number of women holding ICT positions are generally lower than men [11].

1.2 Current Status of Women in Senior Management Positions

Over the years, advancement of women to senior management positions have been slow and irregular. In most developed countries, similar numbers of women enrol for university education as their male counterparts [15], with some reports showing that more women enrol at tertiary institutions than men [16]. In Europe, although women constituted 45% of PhD graduates in 2006, a mere 18% of them were in senior management positions in the same year [17]. Fair representation of women in the senior management of an organisation gives other women and men within and outside the organisation the impression that both are treated equally [15].

Similar to global trends, a limited number (26%) South African women are represented in senior management positions [8]. Although it was legislated that South African organisations should have 50% of women at senior management positions, only 58% of organisations complied in 2014. This is a decline from the 60% number in 2013 [8].

Under-representation of women creates a waste or loss of management and leadership skills, which could threaten an organisation's ability to respond to market changes and undermine its position. Providing opportunities to qualified and talented women enables many of the vacant senior positions to be filled with talented individuals [18].

1.3 Barriers to Career Advancement of Women in ICT

Some of the primitive mind-sets, where men are considered as providers and women the caregivers still persist today. However, these primitive gender roles are not the only barriers to career advancement of women. Other barriers include:

1. The "glass ceiling" phenomenon: This refers to invincible barriers that prevent women from ascending to high positions in an organisation [19]. According to a United Kingdom (UK) study [20], 73 % of women surveyed believe the glass ceiling phenomenon is a major barrier to advancement of women to senior management positions, while 38% of their male counterparts supported their view.
2. Lack of work-life balance: Work-life balance refers to the attainment of functional balance between professional obligations and personal responsibilities [21]. Women do not actively choose careers in ICT, and many of those employed in the sector leave mid-career. This is mainly because the industry is seen as being incompatible with family life [22]. ICT sector is known for its high stress and aggressive environment [5]. A study of women who left their work in the UK showed inability to maintain a family/work/life balance as one of the reasons for their departure. A participant reported feeling out of place following her return from maternity leave [23].
3. Gender discrimination and stereotypes: Gender stereotypes are sometimes perpetuated early on in life. Girls are groomed to pursue a more feminine subjects while boys are encouraged to study subjects in engineering, ICT, etc. [24]. Later in their career life, it is not uncommon for women to continue experiencing gender-based discriminations in the workplace. There has been reports of women being given token management positions, with little or no accompanying power or influence [25].
4. Lack of mentoring: A number of authors, including [26] and [27] have identified lack of mentorship as one of the perceived barriers to career advancement of women. Women sometimes struggle to get mentoring from their male chief executive officers or senior directors. Without mentorship, women or men for that matter, can mistakes, which give the impression of their incompetence just because they are misinformed and not properly trained [28].
5. The so-called "queen bee syndrome": This refers to female senior managers that have broken the glass ceiling but reluctant to assist other females that aspire to senior management positions [29], Although authors like [30] argue that it is the duty of organisations, not women managers to give promotions, some participants in a South Africa study reported the reluctance of female executives in their organisations to share information that could assist them to advance their own careers [29].

Having provided a general overview of some of the barriers to career advancement of women in ICT, section 2 of this paper gives the objectives of the current study.

2. Objectives

The purpose of our research was to determine the extent to which barriers faced by women in ICT in their aspiration to advance to senior management positions, mirrors those reported in other parts of the world. Our primary research question was "*What are the barriers to career advancement of women to senior management positions in the ICT sector of Gauteng Province*?"

The research objectives were:

1. To determine the barriers faced by women in ICT in order to advance to senior positions.
2. To identify the response strategies currently being implemented to bridge barriers to career advancement of women in the ICT sector.

3. To identify the most effective response strategies to bridge barriers to career advancement of women in ICT.

This research is significant in that the findings can be used by organisations as the basis for the development of policies to promote gender diversity in their organisations.

3. Methodology

The research presented in this paper used both qualitative and quantitative data collection methods. Fifty women occupying ICT-related positions in Gauteng Province (South Africa) participated in the research. Gauteng is the main economic hub and contributes 36% of the country's gross domestic product (GDP) and 10% of Africa's GDP [31]. Based on the position of the province, our assumptions is that the research results will be fairly representative of the entire country.

Data was collected through online self-administered questionnaire. The questionnaire consisted three sections, with closed and open-ended questions. The first section was used collect demographic information of respondents. The second section was closed questions and included statements that participants responded to by selecting from one of the pre-defined answers using a five-point Likert scale. The last section of the questionnaire consisted open-ended questions. These questions provided our participants the freedom to answer as briefly or as detailed as they want.

Data collected from the study were mainly text-based, with demographic data of participants in numerical form. We analysed participants' demographic information using descriptive statistics. Descriptive statistics are typically used to summarise the basic features of research data [32]. We then analysed the remaining research data firstly through open coding. This involved sorting research data to identify themes and assigning codes to each category [33]. This was followed by axial coding [33], where we examined the assigned codes to identify the key concepts in them. Finally, we used selective coding [33] by scanning through research data and codes to identify new themes and determine any relationships between the categories. Our research findings are presented in section 4.

4. Research Results

In this section, we present the results obtained from our study. As stated in section 3, 50 women currently employed in different positions in the ICT sector participated in our study.

Section one of the questionnaire mainly obtained demographic information of participants. Of the 50 participants, 72% were between 21 – 30 years (see figure 1), while 24% were between 31 – 39 years. Only 2% of respondents were between the ages of 40 – 49. None of our respondents were 50 years or above.

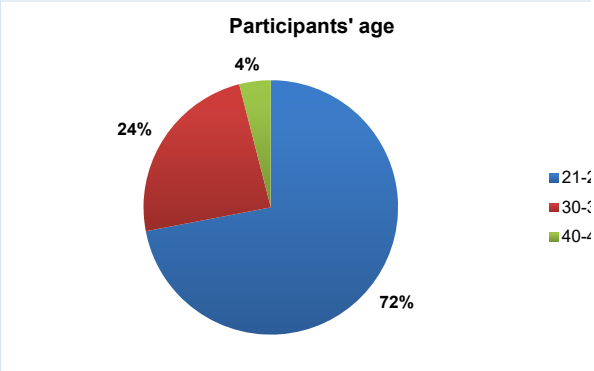

Figure 1: Age of participants

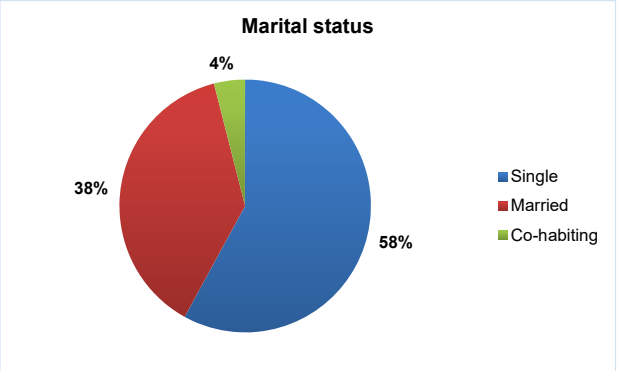

Figure 2: Marital status of participants

As shown in figure 2, more than half of the participants (58%) were single, 38% were married and 4% co-habiting. None of the participants were divorced.

We also asked our participants to indicate the number of children they have. This is to enable us determine their level of parental responsibility. As illustrated in figure 3, more than half participants (54%) have no children, 20% had one child each, 18% have two children, while the remaining 8% have three children each.

Of the 50 participants, more than half (52%) have undergraduate qualifications (see figure 4), 40% have post-graduate degrees, with only 8% holding diplomas. Eliciting participants' qualification is important, since this could invariable influence the positions occupied by participants in their respective organisations.

The current job title of participants is listed alphabetically in table 1. Majority of participants hold different forms of entry level positions (e.g. business analysts, data entry clerk, technical assistant, etc.). Participants that are currently in senior management positions have postgraduate qualifications. We did not find any other correlation between job title and qualification of participants.

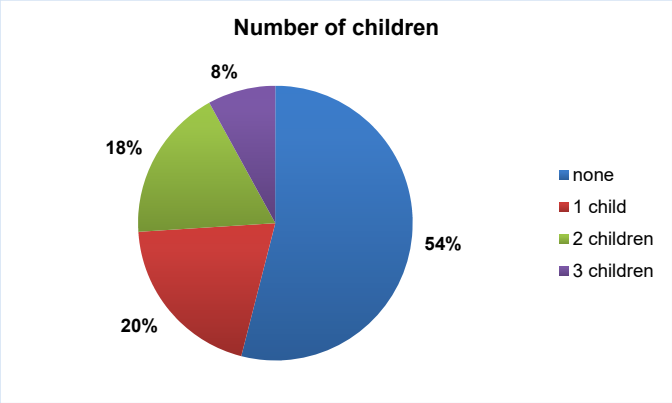

Figure 3: Participants' number of children

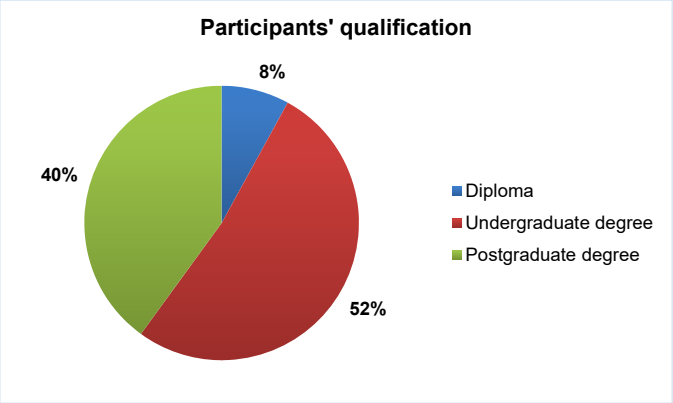

Figure 4: Participants' highest level of qualification

Table 1: Participants' job title

Job title	No of participants	Job title	No of participants
#C developer	2	Junior business analyst	3
Business analyst	3	Middle Management	1
Business analyst intern	1	Online Marketing Specialist	1
Business process analyst	1	Programme manager (scrum & agile)	1
Chief information officer	1	Programmer	1
Computer science tutor	1	SAP consultant	1
Data administrator	1	SAS consultant	2
Data entry clerk	2	Senior business analyst	2
Data miner	1	Senior management	1
Database administrator	1	Senior systems analyst	1
Developer	1	Senior systems developer	1
Entry level	7	Systems analyst	1
ePub quality assurer and developer	1	Systems developer	1
HCI specialist	1	Technical assistant	1
Head in IT	1	Tutor	1
Information assurance analyst	1	Web developing intern	1
Intermediate	1	Web marketing manager	1
IT support consultant	2		

As stated in section 3, the second section of our questionnaire were statements that participants responded to by selecting from pre-defined answers using a five-point Likert scale.

The first statement, *"I aspire to assume an ICT-related senior management position in future"*, was aimed at reflecting the desire of women in the sector to advance from current positions to senior management levels. As shown in Figure 5, 63% strongly agreed with the statement and were actively pursuing senior management positions, 25% agreed with statement but not actively seeking such position at the time of the study. A small number (8%) were neutral and have not given the idea of advancement to senior positions much thought, while 4% were not interested or taking any action intended at advancing their career to senior management.

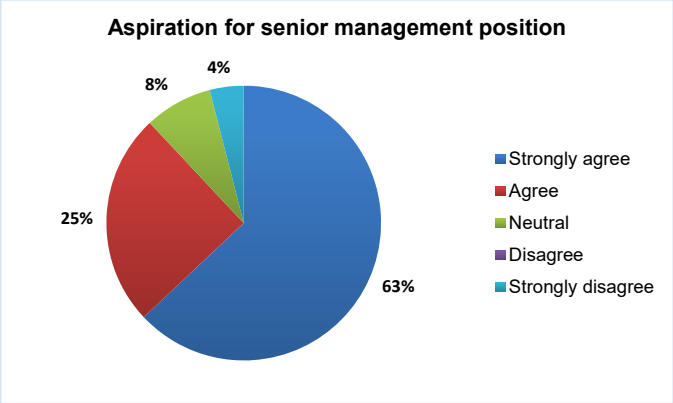

Figure 5: Level of participants' aspirations for senior management positions

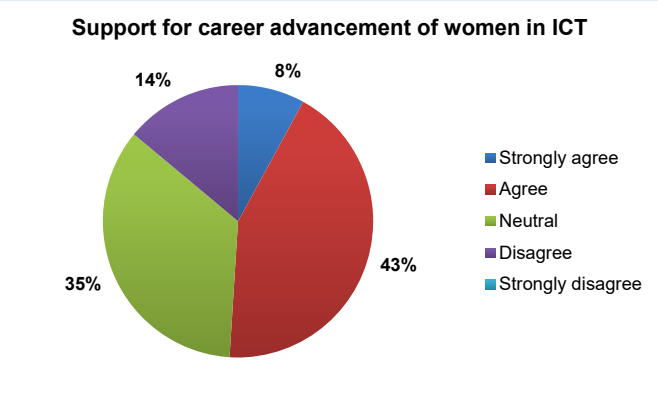

Figure 6: General support for women in ICT

Participants were also asked to indicate the extent to which they are convinced that there is general support for carrier advancement of women in ICT sector using the statement "*there is adequate support for career advancement of women in ICT*". As illustrated in figure 6, just over half of the respondents believe that there is support for carrier advancement of women in the ICT sector (43% agree and 8% strongly agree with the statement). However, nearly half the respondents are not convinced there is sufficient support for carrier advancement of women in the ICT sector (14% disagreed with the statement and 35% neutral or not aware of the existence of any support).

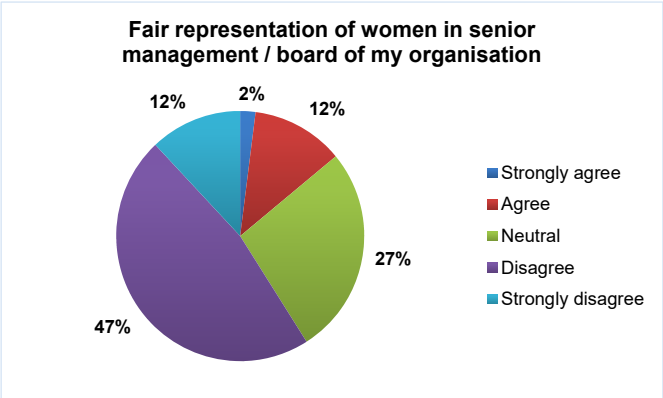

Figure 7: General support for women in ICT

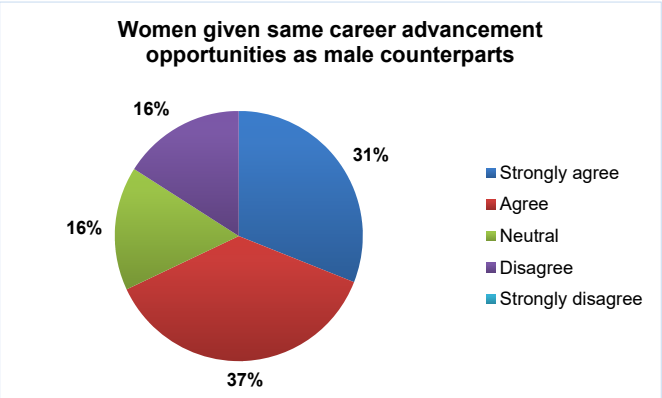

Figure 8: Opportunities for women career advancement as men

Response of participants to the statement, "*there is a fair representation of women in ICT senior management or board positions in my organisation*", somewhat contradict the ones to general support for women in ICT. Nearly 60% of respondents (see figure 7) do not believe that women are fairly represented at senior management levels in their respective organisations (47% disagreed and 12% strongly disagreed). A mere 14% believe that women are fairly represented at senior levels in their organisations (12% agree and 2% strongly agree) while 27% were neutral to the statement).

Participants were asked to rate their level of agreement with the statement *"women are given the same career advancement opportunities as their male counterparts"*. As illustrated in Figure 8, nearly 70% of respondents believe that women have the same opportunities as men to advance to senior management positions (37% agree and 31% strongly agree). 16% of respondents disagreed with the statement and were of the view that women don't have similar opportunities as men to advance to senior management positions. A similar number (16%) were neutral.

In terms of organisational policies to support gender diversity, about one third of respondents (see figure 9) believed that their organisations have policies that support gender diversity (6% strongly agree and 27% agree). A staggering 67% of respondents do not believe that their organisations have policies to support gender diversity (51% were neutral and unaware of such policies, 14% disagree and 2% strongly disagree).

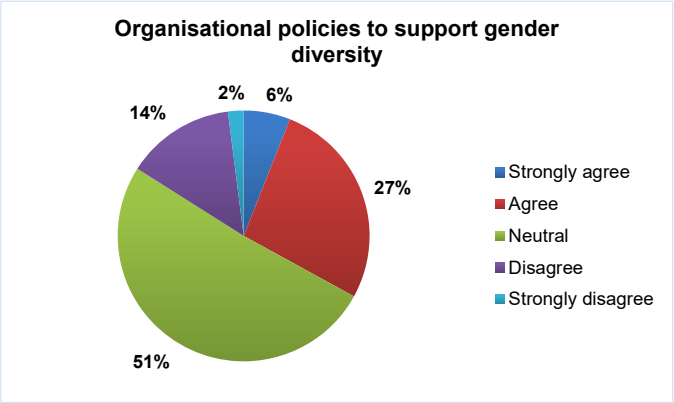

Figure 9: Level of organisational support for gender diversity

Section 3 of our questionnaire was open-ended and aimed at obtaining information from respondents regarding barriers to career advancement of women in ICT and what could be done to address the problem.

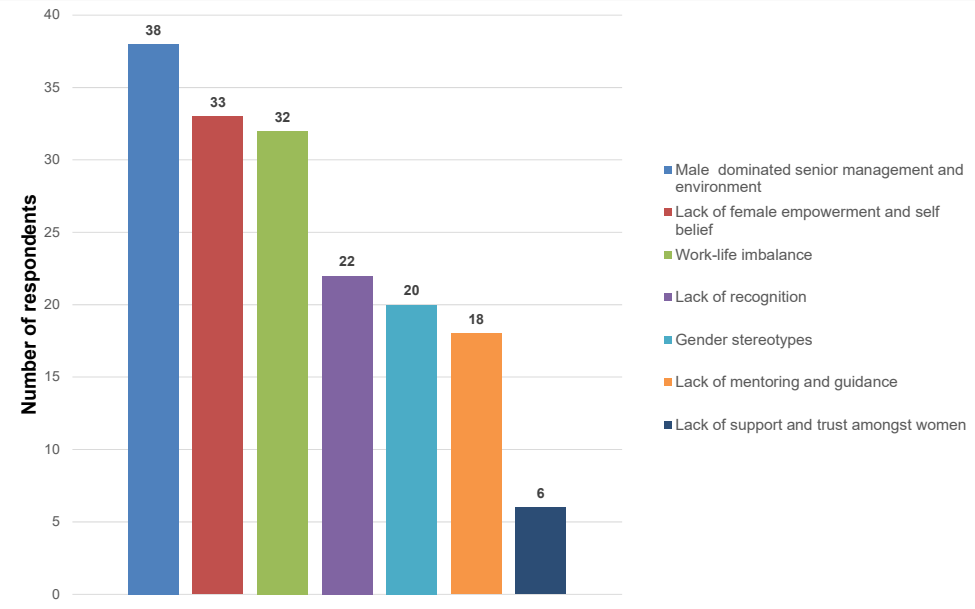

Figure 10: Barriers to career advancement of women

Participants were asked to provide at least three barriers to career advancement of women in ICT. A total of 169 responses were generated for this question. As shown in figure 10, the three prominent barriers identified were male-dominated senior management

and environment (38 responses), lack of women empowerment and self-belief (33) and work-life imbalance (32).

Participants were also asked to list a minimum of three career advancement opportunities available for women in ICT. A total of 150 responses were generated from the 50 participants. The responses were categorised into various logical groupings (e.g. flexible working hours, networking, training, etc.). As shown in figure 11, majority of respondents (33) were of the opinion that availability of similar career opportunities for men and women is vital. Equal number of respondents (22) listed flexible working hours and mentoring as important. Other career advancement opportunities identified by respondents includes networking, training and development programs.

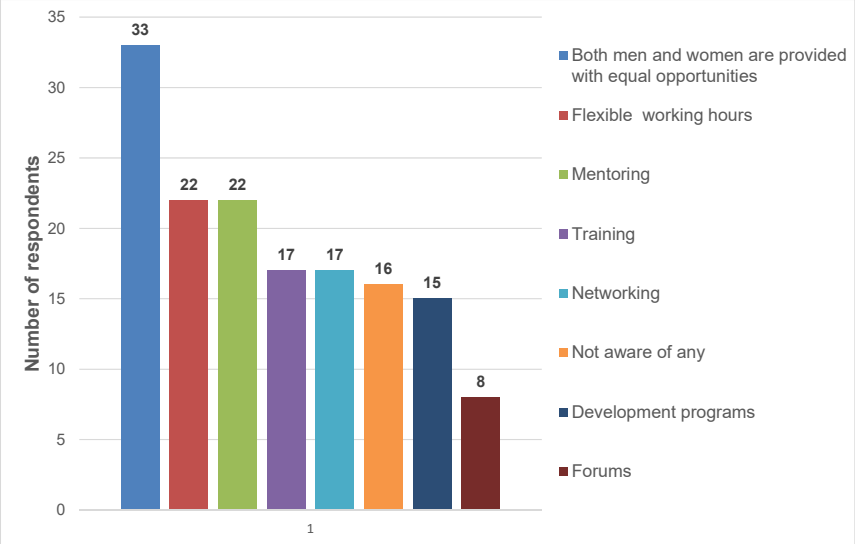

Figure 11: Career advancement opportunities for women in ICT

Participants were asked to provide the types of strategies currently in place at their organisations to enable women advance to senior management positions. A total of 99 responses were generated for this question.

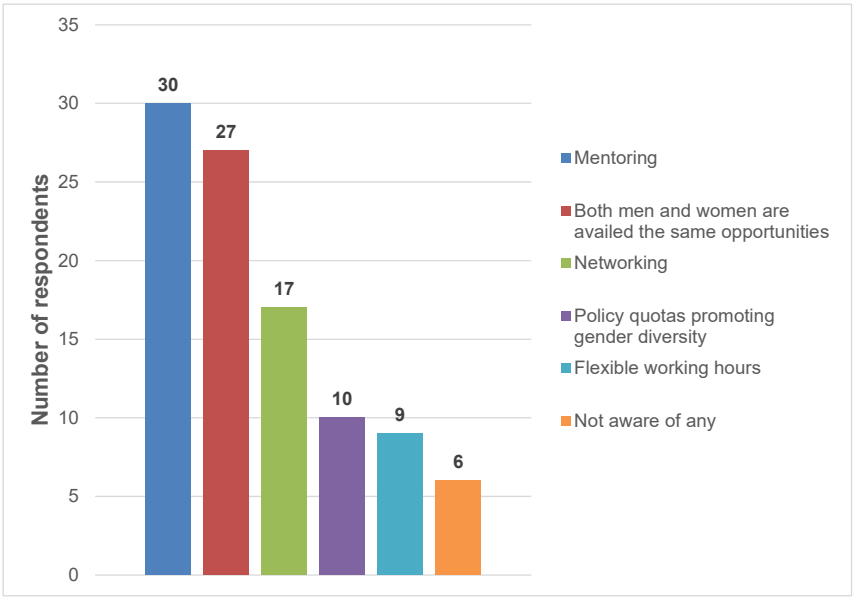

Figure 12: Organisational strategies for career advancement of women

As shown in figure 12, 30 respondents listed mentoring as part of their organisation's strategies, followed by provision of similar opportunities for men and women (27

respondents). Other strategies being used includes policy quotas, networking and flexible working hours.

We also sought to find out from respondents the types of strategies they believe should be used by organisations to effectively bridge barriers to career advancement of women in ICT. A total of 156 responses were generated to this question. As shown in figure 13, majority of respondents (37) believe that one of the most effective strategies to remove barriers to carrier advancement of women is the use of quota systems to promote gender diversity. This is followed by transparent performance reviews (35 respondents). The provision of opportunities specifically targeted at women was listed by 31 respondents, followed by flexible working hours (25 respondents).

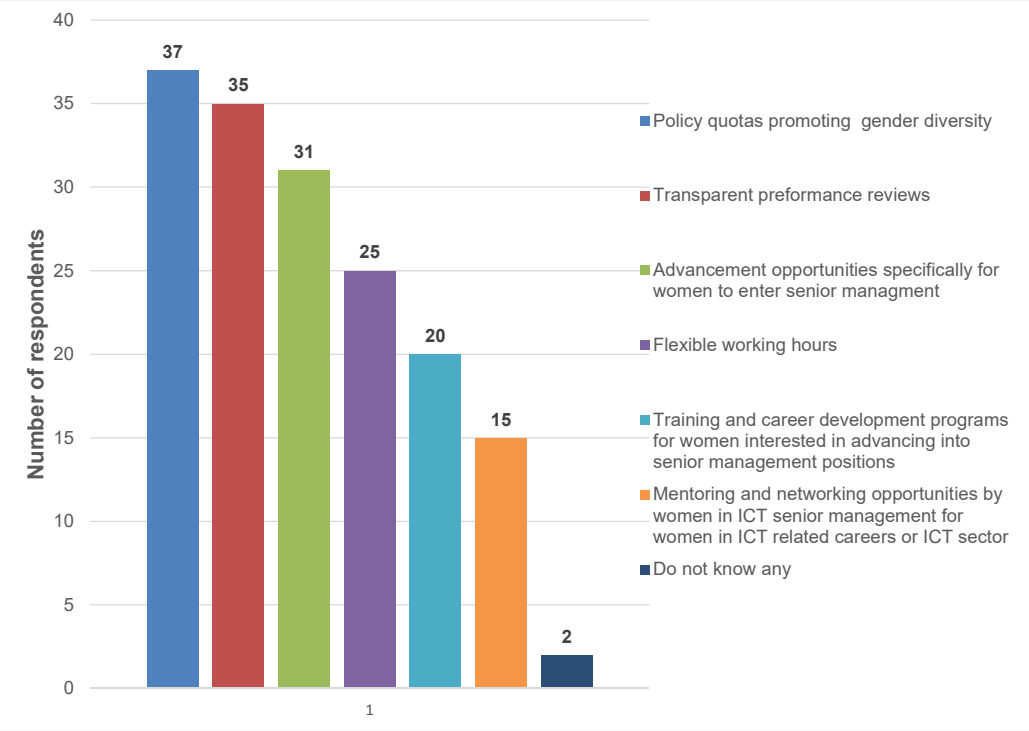

Figure 13: Strategies to effectively bridge barriers to career advancement of women in ICT

5. Discussion of Results

This section provides highlights of our research findings. The majority of study participants (72%) fall within the age 21 – 30, and all respondents in the age group were single with no children. This could be an indication that more young South African women are choosing careers in the ICT sector. We also found some correlation between educational qualification and positions occupied by respondents. As shown in figure 4, 52% of respondents hold undergraduate degrees while 40% have post-graduate qualifications. Incidentally, all respondents occupying senior positions hold post-graduate qualifications.

We also found that nearly 90% of our respondents have some form of aspirations to occupy senior management positions. The 4% that do not have such aspirations are currently occupying senior management positions. This results showed that women in the ICT sector are generally interested in occupying senior management positions if they are given the opportunity and necessary supports.

Although about 70% of respondents believed that women and men have the same opportunities to advance to senior management, 67% do not believe that their organisations have policies to support gender diversity (51% were neutral and unaware of such policies, 14% disagree and 2% strongly disagree). This could be an indication that many organisations do not consider gender diversity as a high enough priority to include in

organisational strategies. However, it is difficult to conclude that this is the case for all organisations because the research respondents were only from Gauteng Province.

According to our research findings, the most prominent barriers to carrier advancement of women in ICT are the male-dominated senior management and environment, lack of women empowerment and self-belief, as well as work-life imbalance. This corroborates what has been found in the literature. Barriers faced by women in ICT are many and complex, the commonest being gender-based [6].

Some of the strategies that have been implemented by ICT companies in Gauteng to bridge barriers to carrier advancement of women in ICT include mentoring, flexible working hours and provision of equal opportunities to women and men. Of great concern is that some organisations are doing little or nothing to address this challenge.

Respondents to this research were of the view that the use of policy quotas is one of the most effective ways to promote gender diversity in the ICT sector. This could imply that these women feel that ICT organisations are not be willing to address this challenge and need to be compelled through government regulations.

6. Conclusions and Recommendations

This study looked at the barriers faced by women in ICT in relation to career advancements. We explored the obstacles women in ICT content with, from the perspectives of our research participants. The different approaches that could be used to bridge these barriers were also identified. Our research findings indicate that barriers to carrier advancements are not unique to South Africa. Other countries, e.g. the UK, Canada and Unites States face similar challenges. In a country like South Africa, where many women have borne the brunt of apartheid marginalisation, ICT companies have to play more active role in providing opportunities for career advancement of women and increase their visibility in senior management positions. This study is thus valuable, as the findings could be used by organisations as the basis for the development of their policies on promotion of gender diversity in their organisations.

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