JOB STATUS OF WOMEN IN SCIENCE, ENGINEERING AND TECHNOLOGY: A SUSTAINABILITY PERSPECTIVE

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ABSTRACT

Objective: This study aims at exploring the relationship between the job status of female engineers and the lack of development opportunities in the workplace considering the United Nation’s Social Development Goal number 5 (Gender Equality) and amid severe low representation of women in science, engineering, and technology (SET) industries worldwide. A discussion of the leaky pipeline, a term used by scholars to indicate the progressive decline in the number of women opting the field of SET in the professional practice, is presented (Berry et al., 2022; Kemp, 2021).

Method: Quantitative approach was administered in one of the leading universities in Dubai, targeting graduate and postgraduate female students in SET majors. Data analysis was conducted using ANOVA testing.

Results: The findings of the research suggest that the job status of female engineers and the lack of development opportunities at the workplace are not related with positive inferences about the progressive evolution that the United Arab Emirates (UAE) is witnessing in terms of gender diversity and inclusion (Alblooshi & May, 2018).

Originality/Value: Major governmental initiatives regarding gender equality are represented and discussed. The study provides positive insights related to the under-representation of females in SET sectors and a gateway for future research amid lack of literature pertaining to this subject in the Arab world.

Keywords: United Arab Emirates, women engineers, gender diversity, SET women, leaky pipeline, job status.

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SITUAÇÃO PROFISSIONAL DAS MULHERES NA CIÊNCIA, ENGENHARIA E TECNOLOGIA: UMA PERSPECTIVA DE SUSTENTABILIDADE

RESUMO

Objetivo: Este estudo visa explorar a relação entre o status profissional das engenheiras e a falta de oportunidades de desenvolvimento no local de trabalho, considerando o Objetivo de
Desenvolvimento Social nº 5 (Igualdade de Gênero) da ONU e em meio à baixa representação de mulheres nas indústrias de Ciência, Engenharia e Tecnologia (SET) em todo o mundo. Uma discussão sobre o oleoduto vazado, um termo usado pelos estudiosos para indicar o declínio progressivo no número de mulheres que optam pelo campo de SET na prática profissional, é apresentada (Berry et al., 2022; Kemp, 2021).

Método: Abordagem quantitativa foi administrada em uma das principais universidades de Dubai, visando estudantes de pós-graduação e pós-graduação do sexo feminino em cursos de SET. A análise dos dados foi realizada por meio de testes ANOVA.

Resultados: Os resultados da pesquisa sugerem que o status de trabalho das engenheiras e a falta de oportunidades de desenvolvimento no local de trabalho não estão relacionados com inferências positivas sobre a evolução progressiva que os Emirados Árabes Unidos (EAU) estão testemunhando em termos de diversidade e inclusão de gênero (Alblooshi & May, 2018).

Originalidade/valor: As principais iniciativas governamentais relacionadas à igualdade de gênero estão representadas e discutidas. O estudo oferece uma visão positiva sobre a sub-representação das mulheres nos setores de SET e uma porta de entrada para futuras pesquisas em meio à falta de literatura sobre o assunto no mundo árabe.

Palavras-chave: Emirados Árabes Unidos, engenheiras, diversidade de gênero, mulheres SET, oleoduto vazado, status do trabalho.

SITUACIÓN LABORAL DE LAS MUJERES EN CIENCIA, INGENIERÍA Y TECNOLOGÍA: UNA PERSPECTIVA DE SOSTENIBILIDAD

RESUMEN

Objetivo: Este estudio tiene como objetivo explorar la relación entre la condición laboral de las ingenieras y la falta de oportunidades de desarrollo en el lugar de trabajo, considerando el Objetivo de Desarrollo Social número 5 (Igualdad de Género) de las Naciones Unidas y en medio de una representación muy baja de las mujeres en las industrias de ciencia, ingeniería y tecnología (SET) en todo el mundo. Se presenta una discusión sobre el oleoducto permeable, un término utilizado por los académicos para indicar la disminución progresiva en el número de mujeres que optan por el campo de SET en la práctica profesional (Berry et al., 2022; Kemp, 2021).

Método: Se aplicó un enfoque cuantitativo en una de las principales universidades de Dubái, dirigido a estudiantes de posgrado y posgrado en carreras SET. El análisis de los datos se realizó mediante pruebas ANOVA.

Resultados: Los hallazgos de la investigación sugieren que el estatus laboral de las ingenieras y la falta de oportunidades de desarrollo en el lugar de trabajo no están relacionados con inferencias positivas sobre la evolución progresiva que los Emirados Árabes Unidos (EAU) están presenciando en términos de diversidad e inclusión de género (Alblooshi & May, 2018).

Originalidad/Valor: Se representan y discuten las principales iniciativas gubernamentales con respecto a la igualdad de género. El estudio proporciona ideas positivas relacionadas con la infrarrepresentación de las mujeres en los sectores de SET y una puerta de entrada para futuras investigaciones en medio de la falta de literatura relacionada con este tema en el mundo árabe.

Palabras clave: Emirados Árabes Unidos, mujeres ingenieras, diversidad de género, SET mujeres, tubería con fugas, situación laboral.
1 INTRODUCTION

Male-dominated industries such as Science, Technology, Engineering and Mathematics, are major limitations for sustainable opportunities and career growth for women. The importance of this topic partially stems from the challenges that women face in advancing their careers. Past studies site factors related to lack of recognition, limited learning opportunities for career growth, educational barriers, work and life balance, and career advancement as being major challenges compromising the achievement of the United Nation’s sustainable development goal (SDG) 5, gender equality (Noor et al., 2024).

According to several studies, in addition to the sever reduction in the number of female students selecting Science, Engineering and Technology (SET) in elementary and higher education studies, only few of them advance into the workforce (Blaique & Pinnington, 2022). Recent statistics show that men fill 74% of science, technology, engineering and mathematics job positions while females fill 26% of these jobs in the USA with similar representations in Europe (Eurostat, 2021; Munoz-Boudet, 2017). An UNESCO report (2019) showed similar representations where women constitute less than 21% of student body majoring in engineering, manufacturing and construction in many Midde East (ME) countries. The term leaky pipeline has been used by several scholars as an indication of the progressive shrink in the number of women opting the fields of SET in education and professional practice (Berry et al., 2022). Although extensive past studies have examined the low representation of women in STEM fields at school and university levels, additional research is required to investigate women’s underrepresentation in STEM occupations (Blaique, Pinnington and Aldabbas, 2023; Duguet et al., 2018). This study aims at investigating organizational factors that may be hindering women in SET industries. Therefore, this study attempts to test job status as an antecedent of women’s work development in SET domains in the United Arab Emirates (UAE).

Various studies have been initiated in an effort to understand the reasons behind the lagging number of women in SET fields. Some studies focused on the recruitment and retention of females in the education sector in both high schools, universities, and the professional fields (Cech et al., 2011). Powell et al. (2009) studied the different strategies used by female engineering students to gain acceptance among male peers. Other scholars
tried to study the different career trajectories of minority women in senior positions in SET industries (Charles & Grusky, 2005). By empirically examining the experiences and challenges of females in SET industries using ANOVA testing, this study aims at presenting an understanding of the occupational antecedents and consequences of these females amid sever reductions in numbers of females joining the field worldwide (Joshi & Diekman, 2022). Therefore, the research question of this paper is as follows:

Does the job status of women in SET relate to lack of career development opportunities in their workforce?

This study attempts to contribute to the literature on women in STEM fields where additional research is deemed necessary especially in the Middle East region.

The paper will first present an overview of women in SET fields. It will discuss the theoretical framework as well as the main question under study. The second part will explain the methodology adopted. Then the next part will discuss the sampling technique and sample size followed by the results section. Finally, the discussion, managerial implications and limitations of the study are presented.

2 LITERATURE REVIEW

Various researchers and feminist theorists have revealed that organizational workplaces are influenced by gender and that the latter plays a pivotal role in the ways the workplace is labelled as gendered (Fagan & Teasdale, 2021). The elimination of gender inequality and enhancement of empowerment, and equal participation of both sexes in all aspects of public life is a global concern as expressed under Goal 5 of the United Nation’s (UN) Social Development Goals (SDG) which highlights the promotion of gender equity and women’s empowerment aligned with the NHRD standards (Abadi et al, 2022). Overwhelming explanations have been added to the literature from various scholars in the attempt to understand women’s underrepresentation in STEM fields. Research have scrutinized different aspects of gender equality such as motivation, different management styles, organizational and cultural dynamics (Ismail & Elnakkache, 2016; Moss-Racusin et al., 2021; Starr, 2018), and organizational proportional representations (Ely, 1994). Despite all these efforts, a pressuring need still exists to further explore additional clarifications so that gender inequality in organizations can be further comprehended and addressed (Davila Dos Santos et al., 2022). The literature cites
that women face many barriers to succeed in SET professions. Women attempting to succeed in male dominated industries have to either act like men, exit the profession, or stay in the industry undertaking minimal roles (Bennet et al. 1999). A fundamental bias against women is still ongoing in science, engineering and technology (Hill et al. 2010). Between the periods of 1970 and 2010 the number of working women has been on the rise with 51% of professional occupations being held by women. However, only 24% of those are employed in architecture and 10% in engineering (BSL, 2011).

3 THEORETICAL FRAMEWORK:

In 1977 Kanter introduced her classical tokenism theory where a token or a subgroup representing the minority in numbers is considered different from other subgroups within the organization. Kanter mainly referred to a token in her research as women (Kanter, 1977). The Tokenism theory postulates that the major reason behind the negative work experiences of a minority group within an organization is their numerical under-representation (Yoder, 1991). The concept of tokenism refers to the difficulties and barriers women face when entering traditionally male jobs. The theory suggests that such barriers to women’s full equality in the workplace can be alleviated if more women are hired in a highly skewed male workplace (Kanter, 1977).

The tokenism theory addresses several consequences of being a minority female in a male dominated industry. Boundary heightening is one of these consequences where the members of the dominant group, male co-workers, portray, assert, and accentuate the differences between them and their female peers. In such a situation, the dominant group tends to magnify the differences between themselves and the tokens. Women’s reactions would either be to accept being an outsider or to attempt to become an insider (De Welde & Laursen, 2011). Female employees end up being outside the group and are excluded from the informal networking which can be crucial for their career advancement (Blaique et al., 2023). The engineering profession has been described by many scholars as male dominated and hostile causing women to be secluded and unvalued (Hewlett et al., 2008). The engineering cultural image has been portrayed as masculine due to the dominant male workforce as well as the predominating philosophies and beliefs that tend to be tremendously male oriented (Gale, 1994). Such burgeoning cultural images have aided the recreation of the belief that engineering is not appropriate for females (Evetts, 1998).
These male-dominated professions have experienced remarkable gender imbalance. Women fill 24% of STEM jobs in the USA (NSB, 2020), 17% in European Union (European Commission, 2019), 14% in India (NSTMIS, 2019) and 16% in Japan ((MoECSST, 2020). Similar representations can be found in different countries throughout the Middle East and North African region (MENA) (Blaique & Pinnington, 2022).

Women in SET professions may feel inadequate person-environment fit to their organizations because they don’t have access to training schemes, growth and advancement experiences, coaching, and mentoring. This may also hinder them from reaching senior positions. This in turn may explain the term leaky pipeline discussed earlier (Brue, 2019).

Heightened visibility, the second aspect of the Tokenism theory, takes place due to the obvious contrast between the tokens and the dominant party. Their pronounced contrast to the dominant male party is hugely noticeable and closely examined. According to Dryburgh (1999), for women to attain the cultural adaptation, they may have to work hard to prove their unity with male co-workers and show acceptance of the dominant masculine culture. This heightened visibility creates overwhelming pressure to perform successfully, and women tend to respond by either overachieving or underachieving (Mim, 2019).

Through assimilation, the third aspect discussed in the Tokenism Theory, female workers are trapped by certain stereotypical roles that has been made up by the dominant members. Assimilation has also been termed by some researchers as a purification process (Cohen & Tyler, 2007). It has also been thought of as a process of professionalization by SET students that entails adjustment to the professional culture, personalization of the professional identity and unity with other members of the profession (Faulkner, 2006). This stereotypical encapsulation may result in remoteness of the female workers within the organization. The susceptibility of the dominants to change the tokens’ characteristics and behaviors to fit their stereotype perceptions also has its repercussions on the working women through the organization. In such a case, women have either the choice to fight such stereotypes or accept them and take in a form of role encapsulation. As a result, female employees might suffer from missed opportunities for career advancement. Various searches have studied the obstacles facing women in their career advancements. Some researchers studied the organizational impediments founded through policies,
practices, and management hierarchies. Such policies pertain to recruitment, retention, and promotion that may be gender biased especially concerning jobs that may lead to senior management positions (Schuyler, 2021). The lack of diversity policies promoting women’s progression in some organizations as well is another example (Ellemers et al., 2012). Gender discrepancies in promotions across organizations and SET professions has been declared as being clearly demonstrated (Evetts, 1997). Therefore, the research question in this study is as follows: Does the job status of women in SET fields relates to lack of career development opportunities in the workforce?

This study is crucial at a point where scholars are attempting to understand the reasons behind women’s under-representation in SET despite the increase demand for these occupations.

4 CONTEXT OF THE STUDY

The United Arab Emirates (UAE) has taken several steps to support the United Nation’s Sustainable Development Goals (SDGs) (Blaique, Nazmi, Aldabbas et al., 2023). The major initiative was hosting the COP28 UN Climate Change Conference. This conference included around 85,000 participants, including 150 Heads of State and Government, and representatives of national delegations, civil society, business, philanthropy, and international organizations. COP28 was particularly momentous as it marked the conclusion of the first ‘global stocktake’ of the world’s efforts to address climate change under the Paris Agreement (UNFCC, 2024). The country has also made substantial investments in renewable energy, particularly through the development of the Mohammed bin Rashid Al Maktoum Solar Park in Dubai, one of the largest solar parks in the world (Hill, 2023). This initiative aligns with SDG 7 (Affordable and Clean Energy). Dubai's Sustainable City project is a notable example of sustainable urban development, incorporating green building practices, renewable energy sources, and environmentally friendly transportation. This project contributes to SDG 11 (Sustainable Cities and Communities). In terms of gender equality, the UAE has taken steps to promote gender equality, including the establishment of the Gender Balance Council and the appointment of women to key leadership positions where 23% of seats were held by women in parliament in 2016. These efforts support SDG 5 (Gender Equality). According to the World Economic Forum’s Global Gender Gap Report 2021, the UAE ranks 120th
out of 156 countries in terms of gender equality. While there is room for improvement, the UAE has made progress in closing the gender gap in recent years. Women make up approximately 66% of the UAE's workforce in the government sector, indicating a significant presence of women in leadership and professional roles.

The focus of this study is on women working in SET sectors in the United Arab Emirates (UAE). Recently the UAE has made commendable strides in fostering gender diversity and inclusivity within STEM fields. Government initiatives and policies have played a major role in encouraging female participation in STEM occupations. The UAE's 2021 Vision, a comprehensive development agenda, highlights the importance of empowering women across all sectors, including STEM. In addition, the UAE has made massive progress in lessening its dependence on oil and diversifying its economy into industries such as AI, space, tourism and services to say the least (Alblooshi & May, 2018). Thus, the UAE’s National Innovation Policy highlights many sectors for investment, some of which are STEM focused.

Through strategic investments in education and training programs, the UAE has sought to bridge the gender gap in STEM education, encouraging young girls to pursue careers in traditionally male-dominated fields. Additionally, various organizations and institutions within the country have implemented mentorship programs and networking opportunities specifically tailored to support women in STEM. These initiatives aim not only to attract more women to these industries but also to provide them with the tools and guidance needed to thrive in their careers. Furthermore, the UAE has witnessed an increase in the number of women holding leadership positions within STEM organizations, contributing to a more diverse and inclusive decision-making landscape. Companies are recognizing the value of diverse perspectives in driving innovation and problem-solving, prompting a shift towards more inclusive hiring practices. As a result, women in the UAE are finding increased opportunities for career advancement and professional development within STEM fields. The government's commitment to creating an environment that values and supports women in STEM is reflected in the growing numbers of female researchers, engineers, and technology professionals contributing to the nation's development. While the progress observed in the UAE serves as a testament to the transformative power of intentional policies and initiatives aimed at dismantling gender barriers and fostering a more inclusive environment for women in STEM, the challenges facing working women in these domains still exist.
Women in the Middle East (ME) make up only 25% of the workforce compared to a global average representation of 50% (World Bank, 2019). Figure 1 presents a comparison between the percentage of women enrolled in STEM majors, those graduating with STEM degrees and finally women working in STEM occupations in the ME region. The leaky pipeline is evident in these countries as well where for instance around 65% of women enrolled in STEM majors graduate, only 10% end up working in STEM fields (UNESCO, 2019).

**Figure 1**

*Women Representation STEM Education VS Labor Force*

Source: UNESCO Institute of Statistics (2019)
5 METHOD

A quantitative technique is used to test and analyze the data. Data was analyzed using ANOVA testing using SPSS software. While ANOVA is often associated with comparing means across three or more groups, it can also be adapted for comparing means across two groups, which effectively addresses the relationship between two variables. The questionnaire is made up of two parts. The first part pertains to demographic information such as marital status, age, years of occupation, nationality, educational level, and job status. The second part attempts to test the lack of development opportunities of female engineers in the workplace. The questions were adopted from the Women Workplace Culture questionnaire (WWC) (Bergman & Hallberg, 2002). The scale had nine items and uses a 4-point Likert scale ranging from 1 = “often” to 4 = “never”. Job status refers to the type of implied or written contract between the employer and employee, e.g., full-time employment, part-time employment, temporary or contract employment, or an internship or apprenticeship.

5.1 SAMPLE

The survey was conducted at a UAE based university. The university has a total of 438 students in SET majors of which 188 are females. The questionnaires targeted only master’s and doctoral female students and were filled face to face prior to the beginning of each class. Fifty-two questionnaires were completed. The 27% response rate was due to various challenges such as the minimal number of female students enrolled in SET majors. Some classes taking place simultaneously and the challenge of getting instructors’ permission to conduct the survey during class hours were also barriers to collect the data. In addition to the fact that some students would be absent, and others would arrive late after the survey was conducted. Since participation in the survey was optional, some students refrained from participating as well. The margin of error for this study has been set to be at 10%.
5.2 RESULTS

The data was analyzed through SPSS program. 61.5% of the respondents were between the age of twenty-five and thirty-five. The majority were pursuing their master’s degree, that is 82.7%. 75% were of Arab nationality, 36.5% of those were Emirati nationals and 61.5% of the respondents were unmarried. The majority of the respondents, 98%, had a full-time job status while the remaining indicated they were part-timers. To test the internal reliability of the scale used, Cronbach’s alpha was administered indicating a high level of consistency for the scale at .841 as indicated in Table 1 and 2.

Table 1
Cronbach’s Alpha-1

<table>
<thead>
<tr>
<th>Reliability Statistics</th>
<th>Cronbach’s Alpha Based on Standardized Items</th>
</tr>
</thead>
<tbody>
<tr>
<td>N of Items</td>
<td>.841</td>
</tr>
<tr>
<td></td>
<td>.846</td>
</tr>
<tr>
<td>7</td>
<td>.841</td>
</tr>
</tbody>
</table>

Source: Prepared by author.

Table 2
Cronbach’s Alpha-2

<table>
<thead>
<tr>
<th>Item</th>
<th>Scale Mean if Item Deleted</th>
<th>Scale Variance if Item Deleted</th>
<th>Corrected Item Correlation</th>
<th>Squared Multiple Correlation</th>
<th>Cronbach’s Alpha if Item Deleted</th>
</tr>
</thead>
<tbody>
<tr>
<td>Q3</td>
<td>14.37</td>
<td>11.518</td>
<td>.703</td>
<td>.603</td>
<td>.801</td>
</tr>
<tr>
<td>Q4</td>
<td>14.18</td>
<td>11.428</td>
<td>.727</td>
<td>.651</td>
<td>.797</td>
</tr>
<tr>
<td>Q5</td>
<td>14.57</td>
<td>11.130</td>
<td>.668</td>
<td>.584</td>
<td>.810</td>
</tr>
<tr>
<td>Q6</td>
<td>14.37</td>
<td>14.398</td>
<td>.498</td>
<td>.434</td>
<td>.834</td>
</tr>
<tr>
<td>Q7</td>
<td>14.20</td>
<td>13.521</td>
<td>.683</td>
<td>.533</td>
<td>.813</td>
</tr>
<tr>
<td>Q8</td>
<td>14.22</td>
<td>12.933</td>
<td>.516</td>
<td>.551</td>
<td>.832</td>
</tr>
<tr>
<td>Q9</td>
<td>14.33</td>
<td>14.667</td>
<td>.460</td>
<td>.471</td>
<td>.839</td>
</tr>
</tbody>
</table>

Source: Prepared by author.

Factor analysis was run over the data to identify clusters pertaining to the variable lack of development opportunities. The KMO value is .762 indicating that the sample size is sufficient for factor analysis. Bartlett’s test of sphericity was significant ($\chi^2$ (21) = 159.364, $p < .000$) meaning that we do have an adequate number of correlations between the variables for factor analysis as shown in Table 3.
Table 3

**KMO and Bartlett’s Test**

<table>
<thead>
<tr>
<th>Kaiser-Meyer-Olkin Measure of Sampling Adequacy.</th>
<th>Bartlett's Test of Sphericity</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>KMO</strong></td>
<td><strong>Bartlett's Test</strong></td>
</tr>
<tr>
<td>Approx. Chi-Square</td>
<td>df</td>
</tr>
<tr>
<td>0.762</td>
<td>159.364</td>
</tr>
</tbody>
</table>

Source: Prepared by author

Using both the scree plot and eigenvalues > 1 to determine the underlying components, the analysis yielded two factors explaining a total of 70% of the variance in the data. Factor 1 had high loadings for the following questions:

Do you think that women have fewer development opportunities than men for professional development at a workplace; Do you think that women receive more unfair judgements of their work performance than men; Do you think women have to be more accomplished in their work than men in order to be promoted; In general terms, do you think working life is characterized by a negative attitude toward women; In your situation, do you believe that the way you have been addressed at work by management and superiors have been influenced by a negative attitude toward you because you are a woman. Factor one explained 44% of the variance after rotation. Factor two explained 26.2% of the variance after rotation and it pertained to these two questions: Do you think it is more difficult for women than men to be themselves at work; How does it apply to your situation at work. Factor one was chosen as a better representative of the variable to be tested, lack of advancement opportunities as presented in Table 4.

Table 4

**Factor Analysis**

<table>
<thead>
<tr>
<th>Component</th>
<th>Initial Eigenvalues</th>
<th>Extraction Sums of Squared Loadings</th>
<th>Rotation Sums of Squared Loadings</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Total</td>
<td>% of Variance</td>
<td>% of Variance</td>
</tr>
<tr>
<td>1</td>
<td>3.688</td>
<td>52.683</td>
<td>52.683</td>
</tr>
<tr>
<td>2</td>
<td>1.212</td>
<td>17.308</td>
<td>69.991</td>
</tr>
<tr>
<td>3</td>
<td>0.768</td>
<td>10.977</td>
<td>80.968</td>
</tr>
<tr>
<td>4</td>
<td>0.537</td>
<td>7.676</td>
<td>88.644</td>
</tr>
<tr>
<td>5</td>
<td>0.319</td>
<td>4.561</td>
<td>93.205</td>
</tr>
<tr>
<td>6</td>
<td>0.245</td>
<td>3.506</td>
<td>96.711</td>
</tr>
<tr>
<td>7</td>
<td>0.230</td>
<td>3.289</td>
<td>100.000</td>
</tr>
</tbody>
</table>

Source: Prepared by author
More details on each of the two factors are presented in the rotated component matrix table where factor one explains the factor loading for each variable. Question 3 through Question 7 loaded strong for factor one, while Question 8 and 9 loaded strongly for factor 2. Factor one was chosen as the variable pertaining more to lack of development opportunities as indicated in Table 5.

**Table 5**

*Rotated Component Matrix*

<table>
<thead>
<tr>
<th>Rotated Component Matrixa</th>
</tr>
</thead>
<tbody>
<tr>
<td>Component</td>
</tr>
<tr>
<td>Q3</td>
</tr>
<tr>
<td>Q4</td>
</tr>
<tr>
<td>Q5</td>
</tr>
<tr>
<td>Q6</td>
</tr>
<tr>
<td>Q7</td>
</tr>
<tr>
<td>Q8</td>
</tr>
<tr>
<td>Q9</td>
</tr>
</tbody>
</table>

Source: Prepared by author

This factor was used in ANOVA testing to test whether there is a relation between the job status of female engineers and the lack of advancement opportunities at their workplace. First, we checked whether the ANOVA assumptions for normality and homogeneity hold. Leven’s test shows a p-value of .483, thus the homogeneity assumption holds as shown in Table 6.

**Table 6**

*Homogeneity of Variances*

<table>
<thead>
<tr>
<th>Test of Homogeneity of Variances</th>
</tr>
</thead>
<tbody>
<tr>
<td>REGR factor score 1 for analysis 1</td>
</tr>
<tr>
<td>Levene Statistic</td>
</tr>
<tr>
<td>--------------------</td>
</tr>
<tr>
<td>.738</td>
</tr>
</tbody>
</table>

Source: Prepared by author

A Q-Q plot showed that the normality assumption holds as well as indicated in Figure 2.
Figure 2

Normal Q-Q Plot

The ANOVA test shows a p-value of .227 which is larger than alpha at 10%. Therefore, the job status of women engineers does not relate to lack of career development opportunities in the workforce. (See Table 7).

Table 7

ANOVA Test Results

<table>
<thead>
<tr>
<th></th>
<th>Sum of Squares</th>
<th>df</th>
<th>Mean Square</th>
<th>F</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Between Groups (Combined)</td>
<td>2.998</td>
<td>2</td>
<td>1.499</td>
<td>1.531</td>
<td>.227</td>
</tr>
<tr>
<td>Linear Term Unweighted</td>
<td>.999</td>
<td>1</td>
<td>.999</td>
<td>1.020</td>
<td>.318</td>
</tr>
<tr>
<td>Weighted</td>
<td>1.091</td>
<td>1</td>
<td>1.091</td>
<td>1.114</td>
<td>.296</td>
</tr>
<tr>
<td>Deviation</td>
<td>1.907</td>
<td>1</td>
<td>1.907</td>
<td>1.947</td>
<td>.169</td>
</tr>
<tr>
<td>Within Groups</td>
<td>47.002</td>
<td>48</td>
<td>.979</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>50.000</td>
<td>50</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

6 DISCUSSION

The result of this paper may be an indication that women working in SET fields regard their organizations in general terms to be supportive and infused by positive attitudes towards women. Further investigation is deemed necessary with respect to testing organizational cultures and the psychological working environment. The sample surveyed in this study, according to the test results, appear to be satisfied in general with opportunities for career development presented in the SET industries in UAE. The findings of this study indicate that the job status of women working in SET industries does not relate to lack of career development opportunities in their work force. This may
be due to the distinctiveness of the SET sectors in UAE and the country’s efforts of inclusion and diversification. They can be associated with a pattern of amicable gender diversity that has evolved in the way of attracting and retaining women over the past several years throughout UAE.

The UAE has the second largest economy in the Arab world with KSA being the first. It recorded a gross domestic product of $570 billion in 2014. Although oil is still considered the UAE’s major economic factor constituting 77% of the country’s exports in 2011, Dubai has been able to diversify its economy (WTO, 2014). In 2013, UAE’s population mounted to 9.2 million, 1.4 million of which are Emirati citizens while the remaining 7.8 million are expatriates. In addition, the UAE acquires the highest percentage of total female labor participation in the GCC, including expatriate women (International Monetary Fund, 2012). In the business sector, the UAE has the region’s largest number of businesswomen and entrepreneurship as well. The UAE government has been actively funding numerous women’s organizations and initiatives to promote empowerment and leadership under the division of UAE Women’s Federation. In 2005, the country joined the Convention on the Elimination of all forms of Discrimination against women. It also became a member of the United Nations Convention on Women’s Rights. The country has also been actively involved in enhancing the educational sector. The availability of high-profile universities across the country has eased education access for women. According to the 2015 report from the Ministry of Labor, women make up 70% of college graduates in the UAE. This has led to various legislative changes to ensure women’s equal opportunities in the workplace. Thus, the country has been ranked 120 among 156 countries in the World Economic Forum’s Global Gender Gap Report in 2021.

The dynamics within organizational environments are not static but rather influenced by the individuals who participate in them. The trajectory of career paths is understood as a continuous process that not only shapes the frameworks of institutions but also molds individual experiences (Arthur et al., 1999). Presently, there is a growing body of research shedding light on the evolving landscape of gender dynamics within the Arab Middle East region (Afiouni and Karam, 2013; Karam and Afiouni, 2013; Karam and Jamali, 2013). The adherence to traditional gender roles and the associated norms that reinforce societal acceptance are being challenged to varying degrees across Arab communities (Karam and Jamali, 2013).
In the past three decades, Arab societies, particularly those in the Gulf region, have undergone profound transformations, with notable shifts evident in the lives of women. While Western countries have experienced relatively minimal changes for women during this period, Arab societies have witnessed significant and far-reaching transformations. The lives of Arab women have emerged as one of the most dynamically evolving aspects of these societies. Factors such as westernization, globalization, and modernization have contributed to increased educational opportunities, improved employment prospects, and a reevaluation of traditional gender roles. Consequently, Arab women are no longer confined to narrow stereotypes of being timid, inferior, and solely domestic; instead, they are actively engaged in various aspects of public life, challenging outdated perceptions and contributing to societal progress (Omair, 2011).

Afifoui and Karam's (2013) study underscores a multifaceted comprehension of how perceptions of career achievements are shaped through the interplay of individual agency and contextual influences. Women may not passively accept societal expectations but rather employ strategic tactics to navigate these norms while maintaining legitimacy through alternative avenues. The examination of how women's career trajectories impact both gender norms and academic paradigms merits further exploration within the region. It is important also to highlight that traditional career theories, with their focus on organizational careers, has also been criticized for often viewing careers from a gender-neutral position (Stalker & Mavin, 2011) and thus, offering limited insight on the experiences of working women. This calls for a need for a career development theory that explicitly addresses the lives and experiences of women.

7 CONCLUSION

This paper aims to shed light on women under-representation in SET fields considering UN’s SDG 5 by investigating a possible link between job status and lack of development opportunities in the workplace. A questionnaire was formulated for that purpose adopted from Bergman and Hallberg (2002) WWC. The sample for this study compromised of fifty-two females working or have at some point worked in the field of SET in the UAE and are currently pursuing their post graduate studies. After running ANOVA test on the variables, the findings indicate that the job status of women does not relate to lack of career development opportunities in the workforce. Such results can be
explained by the progressive evolution that the country has been witnessing over the past several years in terms of economic diversification, in addition to several primary initiatives in terms of gender quality and women empowerment. Literacy among adult Arab females has increased in recent decades, from 31% in 1978 to 66% in 2016 (World Bank, 2019). This stride in women’s education has paved the way for their increased workplace participation. Policy makers and legislators are advised to provide continuous learning opportunities for females that would advance their future careers. Government initiatives that advance women empowerment and career advancements, especially in domains where women are underrepresented should be highly considered. Legislative laws such as Emiratization is a good tool to encourage women to join the workplace. STEM industries are fast paced and always evolving; therefore, organizations are advice to provide women employees with learning opportunities such as trainings and workshops that will equip them with up-to-date skills to advance their careers.

Similar to all other studies, this study has some limitations. One limitation is the sample size which is only fifty-two respondents due several challenges discussed in the methodology section. A larger sample size would be more reflective of the respondents’ age, educational level, nationality, job status, and occupational perceptions. Future studies could explore other organizational dimensions such as organizational culture or support and attempt to understand their effect on women’s career development in STEM fields. A qualitative research approach can also offer more in-depth understanding of the lived experiences of women as an underrepresented group in STEM fields.

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