Horn of Africa Journal of Social Science Volume 4 No. 1, 2026 PP. 76 - 98 ISSN:2959 -9156

The Impact of Computer Science Degrees on Career Selection Among Graduates in Mogadishu, Somalia

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https://baacil.com

DOI: https://doi.org/10.70806/v4e5c340

Abstract

The expansion of information and communication technology (ICT) industries across East Africa and the broader IGAD and Arab regions has created an urgent demand for computer science (CS) graduates. In Mogadishu, Somalia, universities have rapidly expanded CS programmes; however, limited empirical evidence exists regarding how such degrees translate into actual career outcomes. This study investigated the impact of computer science degrees on career selection, employment trajectories, and professional preparedness among graduates in Mogadishu, Somalia. A cross-sectional descriptive study design was employed with 300 CS graduates selected through systematic sampling. A structured, self-administered questionnaire covering 17 items was administered electronically and in-person in January 2026. Data were analysed using descriptive statistics and inferential methods including chi-square tests of independence and cross-tabulations. The majority of respondents were male (74.3%) and young (70.7% aged 20–24). Interest in technology was the primary motivation for degree selection (67.7%). Of respondents, 61.0% were employed in CS-related roles while 39.0% worked outside the field. University preparation significantly predicted career confidence (χ^2 = 58.938, p < 0.001), and employment sector distribution differed significantly by sex (χ^2 = 9.334, p = 0.025). The principal employment barriers included limited job openings (40.7%), nepotistic hiring practices (30.3%), and inadequate technical skills (31.7%). An overwhelming 79.7% of graduates planned to seek employment abroad. Computer science degrees in Mogadishu confer meaningful employability advantages; however, structural barriers including clan-based nepotism, skill gaps, and limited industry-academia linkages constrain graduate outcomes. Curriculum reforms, strengthened internship programmes, and merit-based recruitment frameworks are urgently needed.

Keywords: Computer Science education, career selection, graduate employment, ICT workforce, Mogadishu, Somalia, East Africa, IGAD, skill gap

Introduction

The global transition towards a knowledge-based economy has elevated information and communication technology (ICT) as a central pillar of national development strategies. Computer science education has emerged as a key mechanism through which countries build the human capital necessary for economic transformation, technological innovation, and productive participation in the global digital economy (Yahya et al., 2024; Young, 2000). This dynamic is particularly pronounced in sub-Saharan Africa and the broader Horn of Africa region, where governments and international organisations increasingly recognise the ICT sector as a strategic driver of inclusive growth.

Within the regional context, the Intergovernmental Authority on Development (IGAD) has explicitly incorporated digital skills and technology-enabled livelihoods into its regional development frameworks, recognising the pivotal role of ICT in reducing youth unemployment across member states, including Somalia, Ethiopia, Kenya, and Djibouti (IGAD, 2022). Similarly, the East African Community (EAC) Vision 2050 positions the digital economy as a transformative pillar, envisioning a regionally integrated, innovation-driven workforce capable of competing in global markets (EAC, 2020). These regional frameworks resonate with the Arab League's Digital Agenda for Arab States, which similarly advocates for robust ICT education systems to reduce youth unemployment, enhance economic productivity, and accelerate post-conflict reconstruction in countries like Somalia (ITU/UNESCO, 2021).

In Mogadishu, Somalia, the post-conflict recovery era has witnessed a notable expansion in private universities offering computer science and ICT programmes. This growth reflects both growing demand from a youthful population and deliberate policy incentives from Somalia's National Commission of Higher Education (NCHE) to align academic supply with workforce needs (Yahya et al., 2024). The demand for technology professionals is intensifying as key sectors — including banking, telecommunications, public administration, and international development organisations — increasingly migrate to digital platforms (Sumo et al., 2023). Somalia's mobile money ecosystem, among the most advanced in Sub-Saharan Africa, and its rapidly growing telecoms industry represent concrete loci of ICT employment demand (Omar & Osman, 2022).

However, despite the proliferation of CS programmes and a demonstrable market demand for ICT professionals, significant research gaps remain. The literature is predominantly composed of studies from Western and East Asian contexts, with limited empirical evidence from fragile or post-conflict settings such as Somalia (Savić et al., 2020; Siddiky & Akter, 2021). Critically, it remains unclear how effectively CS degrees translate into employment outcomes, what structural barriers

inhibit CS graduates from securing appropriate employment, and whether Mogadishu's universities adequately prepare graduates for the practical demands of the job market.

Career selection among CS graduates is shaped by a complex interplay of intrinsic motivations (such as personal interest in technology), extrinsic drivers (such as financial incentives and job availability), and contextual socio-structural factors (such as kinship-based hiring norms and weak industry-academia linkages) (Suhi et al., 2021; Rahmat et al., 2012). The literature further identifies a persistent 'skill gap' — wherein graduate competencies fall short of employer expectations — as a global phenomenon that is particularly pronounced in developing economies (Ayofe et al., n.d.). In Somalia's case, this gap is compounded by infrastructural weaknesses, limited access to practical training facilities, and entrenched informal hiring practices.

This study was conducted to address these gaps by empirically examining the career selection patterns, employment outcomes, preparedness perceptions, and aspirations of 300 CS graduates in Mogadishu. The findings are intended to inform curriculum reform, policy development, and industry-university collaboration in Somalia and comparable post-conflict ICT ecosystems across the Horn of Africa region.

The study aimed to: (i) describe the sociodemographic and academic profiles of CS graduates in Mogadishu; (ii) identify the primary motivations driving CS degree selection; (iii) assess current employment patterns, sector distribution, and degree–career alignment; (iv) evaluate perceptions of university preparedness and self-assessed career confidence; (v) identify the principal barriers to CS employment; and (vi) examine the intention to seek employment abroad and perceptions of fairness in recruitment.

Literature Review

Computer Science Education and Graduate Employment in Developing Economies

Computer science education has increasingly been recognised as a strategic investment in developing economies seeking to accelerate growth through human capital formation. Globally, demand for CS-trained professionals has outstripped supply, creating structural shortages particularly acute in sectors such as artificial intelligence, cybersecurity, data analytics, and systems engineering (Yahya et al., 2024). In Sub-Saharan Africa, however, the relationship between CS education and graduate employment is more complex, often mediated by institutional quality, labour market structure, and contextual socio-economic conditions (Savić et al., 2020).

Research from comparable developing economies suggests that while CS degrees generally confer employability advantages relative to other disciplines, graduate outcomes are substantially shaped by the practical orientation of curricula,

access to industry linkages, and the maturity of the national ICT sector (Ayofe et al., n.d.; Siddiky & Akter, 2021). In contexts where the formal ICT sector remains underdeveloped, substantial proportions of CS graduates migrate into non-technical roles, representing a form of education–occupation mismatch that represents both a loss of investment for individuals and a misallocation of human resources for national economies (Sumo et al., 2023).

Regional ICT Workforce Development: EAC, IGAD, and Arab Frameworks

Regional development frameworks in East Africa and the Arab world increasingly situate digital skills and ICT workforce development at the heart of economic transformation agendas. The East African Community Vision 2050 explicitly identifies a 'digital and innovation economy' as one of its six core pillars, envisioning a regionally integrated, technology-literate workforce capable of driving sustainable economic growth (EAC, 2020). Concretely, the EAC has promoted harmonisation of ICT curricula across member states and encouraged cross-border talent mobility, though Somalia's relatively recent EAC accession in 2024 means its alignment with these regional standards remains nascent (Issa-Salwe et al., 2024).

The Intergovernmental Authority on Development (IGAD), whose membership includes Somalia, has similarly emphasised human capital development in its Regional Development Plan, identifying skills development and youth employment as cross-cutting priorities (IGAD, 2022). IGAD's Strategy 2016–2020, and its subsequent frameworks, have specifically highlighted the role of technical and vocational education in addressing youth unemployment — a challenge acutely felt in Somalia, where youth unemployment rates remain among the highest in Sub-Saharan Africa. IGAD member states are explicitly encouraged to align national higher education systems with regional labour market needs, creating a policy environment conducive to inter-state recognition of qualifications (IGAD, 2022).

At the broader Arab regional level, the League of Arab States and the ITU/UNESCO Broadband Commission have articulated a Digital Agenda for Arab States that frames ICT education as a foundational infrastructure for Arab digital transformation (ITU/UNESCO, 2021). Somalia's dual membership in Arab regional organisations and IGAD positions it at an intersection of complementary regional development frameworks that, taken together, underscore the strategic importance of building a robust, market-ready CS graduate population. These frameworks converge on the imperative for higher education institutions to update curricula, embed industry partnerships, and foster graduate competencies aligned with 21st-century labour market demands.

Career Motivation and Degree Selection

The academic literature identifies a range of factors influencing career selection in the CS field. Intrinsic motivations — principally interest in technology and intellectual curiosity — are consistently reported as primary drivers across diverse cultural settings (Suhi et al., 2021; Rahmat et al., 2012). Studies from South-East Asia and Sub-Saharan Africa find that between 60–75% of CS students cite personal interest as their primary motivation, with career opportunities as a secondary but important driver (Suhi et al., 2021). Family influence, while consistently reported, is typically a tertiary factor, though its relative weight may be elevated in family-oriented cultural contexts (Sumo et al., 2023).

Sex dynamics in CS career selection have received growing scholarly attention. Female underrepresentation in CS programmes is documented globally, attributed variously to stereotype threat, limited role models, and socially constructed perceptions of CS as a masculine domain (Yahya et al., 2024). In IGAD member states, structural sex inequalities in education access further compound this underrepresentation, particularly in STEM fields (IGAD, 2022). Studies suggest that female CS graduates, when they do enter the field, demonstrate comparable or superior academic performance but face differential labour market outcomes due to sex-based hiring biases and limited professional networks (Rahmat et al., 2012).

Skill Gaps and University Preparation

A substantial body of literature documents a persistent skill gap between CS graduate competencies and industry expectations. This gap manifests across multiple dimensions: technical skills (particularly programming, systems analysis, and cybersecurity), soft skills (communication, teamwork, and problem-solving), and practical experience (project work, internships, and client-facing exposure) (Ayofe et al., n.d.; Yahya et al., 2024). Universities in developing economies are particularly challenged by resource constraints that limit laboratory infrastructure, the currency of teaching materials, and the availability of industry-experienced faculty.

Within Somalia specifically, emerging evidence from Somali National University (SNU) suggests that while students and faculty are increasingly aware of and engaged with AI tools such as ChatGPT, significant barriers including limited digital infrastructure, inadequate training, and unequal access continue to constrain the effective integration of these technologies into teaching and learning (Isak & Isak, 2025). This institutional evidence underscores the argument that the skill gap facing CS graduates in Mogadishu is not merely a function of curriculum design but is compounded by the broader technological and pedagogical unpreparedness of Somali higher education institutions.

Institution-level evidence from Mogadishu's own universities further corroborates this picture: a

recent study of AI curriculum integration across Mogadishu-located universities found that AI adoption within formal degree programmes remained nascent and uneven, meaning that CS graduates are entering a labour market that increasingly demands AI-adjacent skills without having received systematic instruction in them during their studies (Hirsi & Sharif, 2026). This curriculum-workforce misalignment directly compounds the skill gap identified among CS graduates in the present study.

The digital skills deficit extends well beyond the university classroom. An assessment of digital skills and training in Somali government institutions found significant gaps in digital competency among public sector employees, revealing that the skills shortfall facing CS graduates entering the workforce is not simply a product of inadequate university preparation but reflects a broader, system-wide digital capacity challenge across Somali institutions (Hussein & Sharif, 2025). This finding strengthens the case for urgent and coordinated investment in both pre-service digital skills training and continuing professional development across all levels of the Somali public and private sectors.

Regional assessments by the EAC and IGAD indicate that higher education institutions across the Horn of Africa frequently fail to update curricula at the pace required by the rapidly evolving ICT sector, resulting in graduates whose technical knowledge is misaligned with current industry demands (EAC, 2020; IGAD, 2022). The Arab world faces analogous challenges: ITU/UNESCO reports note significant gaps between university IT curricula and the practical competencies sought by employers across Arab League member states, with particular deficits in cybersecurity, data science, and cloud computing domains (ITU/UNESCO, 2021).

Employment Barriers and Structural Constraints

In post-conflict and fragile economies, CS graduate employment is shaped not only by individual competencies but by structural market conditions. Research from comparable contexts — including post-conflict states in sub-Saharan Africa — identifies limited job market size, informalised hiring practices, and patronage networks as significant barriers to merit-based employment (Savić et al., 2020). Clan-based or kinship-based hiring norms, which prioritise social ties over professional qualifications, are documented across several IGAD member states and represent a particularly entrenched structural barrier in Somali labour markets (Omar & Osman, 2022).

The phenomenon of graduate emigration — or 'brain drain' — is well-documented as a consequence of constrained domestic labour markets for skilled professionals. For Horn of Africa countries, emigration of CS-trained professionals to Gulf states, Europe, and North America represents both a private rational response by individuals to limited domestic opportunities and a public cost in terms of forgone development potential (IGAD,

2022). This emigration intention is amplified by perceptions of unfair recruitment, low domestic salary offers, and limited career advancement pathways, all of which push skilled graduates towards international labour markets.

Methodology

Research Design

This study employed a quantitative, cross-sectional descriptive research design. The design was appropriate for the systematic collection of data at a single point in time and for the description and analysis of patterns in career selection, employment outcomes, and perceptions of preparedness among a defined population of CS graduates. Cross-sectional studies are widely utilised in educational and labour market research in developing country contexts due to their feasibility and their capacity to generate population-level insights from structured survey instruments (Siddiky & Akter, 2021).

Setting and Study Period

The study was conducted in Mogadishu, the capital of the Federal Republic of Somalia, which hosts the majority of the country's higher education institutions offering CS and ICT programmes. Data were collected in January 2026.

Study Population and Sampling

The target population comprised individuals who had completed a Computer Science or IT-related degree or diploma from universities in Mogadishu. A total of 300 participants were enrolled using a systematic sampling strategy, wherein individuals who were available and willing to participate were included. While this approach facilitated data collection in a logistically challenging environment, it is acknowledged that it may limit the generalisability of findings to the broader graduate population.

Data Collection Instrument

Data were collected using a structured, self-administered questionnaire comprising 17 items across six thematic domains: (i) sociodemographic and academic background; (ii) motivation for CS degree selection; (iii) current employment status and sector; (iv) barriers to CS employment; (v) university preparedness, skill deficits, and career confidence; and (vi) perceptions of recruitment fairness and emigration intentions. The questionnaire was distributed both in hard copy and electronically via Google Forms to maximise response rates. Prior to deployment, the instrument was reviewed for clarity and relevance.

Data Analysis

Data were analysed using Python (pandas, scipy). Descriptive statistics — including frequencies and percentages — were computed for all variables. Multi-select items (barriers, areas of unpreparedness, and job acquisition channels) were disaggregated using binary indicator coding to calculate the proportion of respondents endorsing each sub-item. Bivariate analysis employed

Pearson's chi-square (χ^2) test of independence to examine associations between categorical variables, with $p < 0.05$ adopted as the threshold for statistical significance. Cross-tabulations were constructed to illuminate associations between sociodemographic characteristics, employment outcomes, university preparation, career confidence, perceptions of fairness, and emigration intention. Where expected cell counts fell below five, results were interpreted with appropriate caution.

Ethical Considerations

All participation was voluntary. Informed consent was obtained prior to data collection, and respondents were assured of the confidentiality and anonymity of their responses. Data were used solely for research purposes.

Results

Sociodemographic and Academic Profile of Respondents

Table 1 presents the sociodemographic and academic characteristics of the 300 respondents. The sample was predominantly male (74.3%, n = 223), with female respondents comprising 25.7% (n = 77) of participants. This sex imbalance mirrors documented patterns of female underrepresentation in CS and STEM programmes across Sub-Saharan Africa and IGAD member states (Yahya et al., 2024; IGAD, 2022). The vast majority of respondents were young, with 70.7% (n = 212) aged between 20 and 24 years, indicating that the sample is primarily composed of early-career individuals who have recently entered or are seeking to enter the labour market.

In terms of educational attainment, 71.3% (n = 214) held a Bachelor's degree as their highest qualification, while 23.3% (n = 70) held a Diploma or Certificate. Postgraduate attainment was limited, with Master's degree holders comprising only 4.3% (n = 13) and PhD holders 1.0% (n = 3), reflecting the nascent stage of postgraduate CS education in Mogadishu. The overwhelming majority (82.0%, n = 246) had graduated between 2021 and 2025, meaning the study largely captures the experiences of very recent graduates navigating the contemporary labour market.

Computer Science (46.3%, n = 139) and Information Technology (29.0%, n = 87) were the dominant specialisations, together representing 75.3% of respondents. Software Engineering (9.7%), Networking and Security (6.0%), and Computer Multimedia (4.3%) were represented in smaller but meaningful proportions. Emerging and specialised fields such as Data Analytics and Data Engineering were minimally represented, reflecting the current orientation of Mogadishu's CS curriculum towards foundational rather than cutting-edge disciplines.

Table 1: Sociodemographic and Academic Characteristics of Respondents

Characteristic	n (%)
Sex	
Male	223 (74.3%)
Female	77 (25.7%)
Age Group	
20–24 years	212 (70.7%)
25–29 years	73 (24.3%)
30–34 years	12 (4.0%)
35–39 years	3 (1.0%)
Highest Education Level	
Bachelor's Degree	214 (71.3%)
Diploma / Certificate	70 (23.3%)
Master's Degree	13 (4.3%)
PhD	3 (1.0%)
Graduation Year	
2021–2025	246 (82.0%)
2016–2020	29 (9.7%)
2011–2015	11 (3.7%)
2006–2010	4 (1.3%)
2000–2005	6 (2.0%)
Before 2000	4 (1.3%)
Field of Specialisation	
Computer Science	139 (46.3%)
Information Technology	87 (29.0%)
Software Engineering	29 (9.7%)
Networking and Security	18 (6.0%)
Computer Multimedia	13 (4.3%)
Telecommunication Technology	7 (2.3%)
Computer Security and Forensics	5 (1.7%)
Other (Data Analytics, Data Engineering)	2 (0.6%)

Motivations for Choosing a Computer Science Degree

Table 2 presents a cross-tabulation of the main motivations for CS degree selection by sociodemographic characteristics. Across the full sample, personal interest in technology was the dominant motivation, cited by 67.7% (n = 203) of respondents. Career prospects and job opportunities constituted the second most cited reason (27.0%, n = 81), while family influence was a comparatively minor factor (5.3%, n = 16). These findings are consistent with the broader literature documenting intrinsic motivation as the primary driver of CS career selection in comparable contexts (Suhi et al., 2021; Rahmat et al., 2012).

Female respondents demonstrated a higher propensity to cite interest in technology (74.0%) compared to their male counterparts (65.5%), while males were more likely to identify job opportunities as their primary motivation (28.3% vs. 23.4%). However, chi-square analysis revealed no statistically significant association between sex and motivation ($\chi^2 = 2.577$, $p = 0.276$), suggesting that motivational patterns are broadly similar across sex. Similarly, no statistically significant

associations were found between motivation and age group (χ^2 = 6.131, p = 0.409), indicating that intrinsic interest in technology is a consistently dominant driver regardless of age cohort.

Across educational levels, the primacy of technology interest was maintained: Bachelor's (68.7%), Diploma (64.3%), and Master's holders (69.2%) all reported this as the primary motivator. Notably, all respondents in the 35–39 age group cited interest in technology as their exclusive motivation, possibly reflecting self-selection effects among older graduates who chose to pursue CS degrees later in their careers.

Table 2: Primary Motivation for CS Degree Selection by Sociodemographic Characteristics

Variable	Interest in Technology n (%)	Job Opportunities n (%)	Family Influence n (%)
Overall	203 (67.7%)	81 (27.0%)	16 (5.3%)
Sex			
Male	146 (65.5%)	63 (28.3%)	14 (6.3%)
Female	57 (74.0%)	18 (23.4%)	2 (2.6%)
Age Group			
20–24	146 (68.9%)	57 (26.9%)	9 (4.2%)
25–29	46 (63.0%)	22 (30.1%)	5 (6.8%)
30–34	8 (66.7%)	2 (16.7%)	2 (16.7%)
35–39	3 (100.0%)	0 (0.0%)	0 (0.0%)
Education Level			
Bachelor's Degree	147 (68.7%)	55 (25.7%)	12 (5.6%)
Diploma / Certificate	45 (64.3%)	21 (30.0%)	4 (5.7%)
Master's Degree	9 (69.2%)	4 (30.8%)	0 (0.0%)
PhD	2 (66.7%)	1 (33.3%)	0 (0.0%)

Employment Status, Sector, and Degree–Career Alignment

Table 3 presents cross-tabulations of current employment status by sociodemographic and academic variables. Overall, 61.0% (n = 183) of respondents were employed in CS-related roles, while 39.0% (n = 117) were employed in non-CS fields. This 61:39 ratio, while indicating a majority in degree-aligned employment, simultaneously reveals a substantial education–occupation mismatch affecting a significant minority of graduates.

Among those employed in non-CS roles, the most common alternative occupations were teaching and education (Teacher/Educator: n = 39, 33.3% of non-CS workers), sales and marketing (n = 27, 23.1%), and business management or entrepreneurship (n = 22, 18.8%). A small number were engaged in unskilled or manual labour (n = 7, 6.0%), which represents a particularly acute form of qualification underutilisation.

Cross-tabulation by sex revealed minimal differences in degree–career alignment: 61.4% of males and 59.7% of females were in CS-related roles, with no statistically significant association (χ^2 = 0.016, p = 0.899). Education level showed a directional but statistically non-significant relationship with CS employment: Master's degree holders demonstrated the highest CS-sector alignment (76.9%), followed by PhD holders (66.7%), Bachelor's graduates (60.7%), and Diploma holders (58.6%) (χ^2 = 1.605, p = 0.658). Whilst this gradient is intuitive, the absence of statistical significance may reflect small sample sizes in postgraduate categories and the limited discrimination between qualification levels in Mogadishu's current labour market.

Regarding employment sector, the private sector was the dominant employer (45.0%, n = 135), followed by self-employment (27.3%, n = 82), the public sector (21.0%, n = 63), and non-profit organisations (6.7%, n = 20) (χ^2 = 3.822, p = 0.281). The prominence of self-employment reflects both the entrepreneurial orientation fostered by CS education and the structural limitations of formal employment opportunities in Mogadishu's developing ICT ecosystem.

Table 3: Employment Status and Sector Distribution by Sociodemographic Variables

Variable / Category	CS-related Job n (%)	Non-CS Job n (%)
Overall	183 (61.0%)	117 (39.0%)
Sex		
Male	137 (61.4%)	86 (38.6%)
Female	46 (59.7%)	31 (40.3%)
Education Level		
Bachelor's Degree	130 (60.7%)	84 (39.3%)
Diploma / Certificate	41 (58.6%)	29 (41.4%)
Master's Degree	10 (76.9%)	3 (23.1%)
PhD	2 (66.7%)	1 (33.3%)
Sector		
Private sector	80 (59.3%)	55 (40.7%)
Self-employed	47 (57.3%)	35 (42.7%)
Public sector	45 (71.4%)	18 (28.6%)
Non-profit sector	11 (55.0%)	9 (45.0%)

Sector Distribution by Sex

Table 4 presents employment sector distribution disaggregated by sex. A statistically significant association was identified (χ^2 = 9.334, p = 0.025), driven primarily by differential rates of self-employment and private sector participation. Female graduates demonstrated a markedly higher rate of self-employment (39.0% vs. 23.3% for males), while males were more concentrated in private sector employment (48.9% vs. 33.8%). These patterns may reflect differential access to formal employment networks, as well as the flexibility that self-employment affords in navigating Mogadishu's sex-stratified labour market.

Table 4: Employment Sector Distribution by Sex

Employment Sector	Male n (%)	Female n (%)
Private sector	109 (48.9%)	26 (33.8%)
Self-employed	52 (23.3%)	30 (39.0%)
Public sector	49 (22.0%)	14 (18.2%)
Non-profit sector	13 (5.8%)	7 (9.1%)

Barriers to CS Employment

Respondents were presented with a multi-select list of potential employment barriers. Table 5 presents the frequency with which each barrier was endorsed. The most frequently cited barrier was limited job openings in the market (40.7%, n = 122), reflecting the structural constraint of a nascent formal ICT sector relative to the volume of graduates entering the market annually. This finding is consistent with EAC and IGAD assessments that identify small formal ICT sectors as a key constraint on graduate absorption in East African economies (EAC, 2020; IGAD, 2022).

The second most frequently cited barrier was a lack of required technical skills (31.7%, n = 95), pointing to a skills-demand mismatch between university curricula and industry expectations. This was closely followed by jobs being given based on clan, family, or personal relationships (nepotism) (30.3%, n = 91), which represents a particularly significant finding in the Somali socio-cultural context. Clan-based hiring norms undermine merit-based recruitment and create structural barriers for graduates who lack strategic social connections, irrespective of their technical competencies.

Other significant barriers included lack of industry connections or professional networks (24.7%, n = 74), low salary offers (20.7%, n = 62), limited internship and practical training opportunities (19.3%, n = 58), and poor access to technology and resources (16.3%, n = 49). High competition from other graduates was cited by 13.7% (n = 41), while lack of transparent and fair recruitment processes was explicitly identified by 9.0% (n = 27), though the broader fairness concern is more thoroughly captured through the dedicated recruitment fairness question examined below.

Table 5: Barriers to CS/IT Employment (Multi-select)

Employment Barrier	n (%)
Limited job openings in the market	122 (40.7%)
Lack of required technical skills	95 (31.7%)
Jobs given based on clan, family, or personal influence	91 (30.3%)
Lack of industry connections or professional networks	74 (24.7%)
Low salary offers	62 (20.7%)
Limited internship and practical training opportunities	58 (19.3%)
Poor access to technology and resources	49 (16.3%)
High competition from other graduates	41 (13.7%)
Lack of transparent and fair recruitment processes	27 (9.0%)

University Preparedness, Skill Deficits, and Academic Challenges

Table 6 presents findings on university preparedness perceptions, areas of post-graduation unpreparedness, and the most difficult academic subjects. When asked how well their university prepared them for the job market, 27.7% (n = 83) reported being prepared 'Very well', while 18.3% (n = 55) reported being prepared 'Well' — yielding a combined positive preparedness rate of 46.0%. Conversely, 25.0% (n = 75) indicated they were prepared 'Poorly' or 'Very poorly', while 29.0% (n = 87) held a neutral position.

The association between perceived university preparedness and career confidence was highly significant ($\chi^2 = 58.938$, $p < 0.001$), representing the strongest statistical association identified in this study. Graduates who perceived their university preparation as 'Very well' reported very high confidence (78.3%), compared to only 31.6% of those who felt 'Very poorly' prepared. This gradient demonstrates the critical mediating role of university preparation quality in shaping graduate career confidence. Furthermore, graduates reporting stronger preparation were also more likely to be employed in CS-related roles: 68.7% of 'Very well' prepared graduates were in CS employment, compared to 42.1% of those who felt 'Very poorly' prepared.

Table 6: University Preparedness and Career Confidence Cross-tabulation

University Preparation	n (%)	Very Confident %	Neutral %	Not Confident %	CS Job %
Very well	83 (27.7%)	78.3%	9.6%	1.2%	68.7%
Well	55 (18.3%)	58.2%	21.8%	1.8%	56.4%
Neutral	87 (29.0%)	46.0%	33.3%	1.1%	67.8%

University Preparation	n (%)	Very Confident %	Neutral %	Not Confident %	CS Job %
Poorly	56 (18.7 %)	44.6 %	37.5 %	0.0%	50. 0%
Very poorly	19 (6.3 %)	31.6 %	47.4 %	15.8 %	42. 1%

Regarding self-assessed post-graduation preparedness deficits (Table 7, multi-select), technical skills were the most commonly reported area of unpreparedness (45.7%, n = 137), followed by soft skills such as communication and teamwork (38.7%, n = 116). Practical or project experience (31.0%, n = 93) and industry awareness (31.0%, n = 93) were equally cited, while business and professional knowledge (30.3%, n = 91) and problem-solving in real contexts (25.7%, n = 77) were also substantially represented. The breadth of these deficits — spanning technical, interpersonal, and professional competency domains — suggests a systemic insufficiency in the current CS curriculum rather than isolated weaknesses.

In terms of the most challenging academic subject during studies, programming was cited by the largest proportion of students (39.7%, n = 119), followed by networking (15.3%, n = 46), security (12.3%, n = 37), and mathematics/theoretical CS (12.0%, n = 36). These patterns point to a need for enhanced pedagogical support in foundational programming instruction, as well as strengthened practical laboratory facilities to address networking and security competencies.

Table 7: Areas of Unpreparedness After Graduation and Most Difficult Academic Subjects

Variable	n (%)
Areas of Unpreparedness After Graduation (Multi-select)	
Technical Skills	137 (45.7%)
Soft Skills (communication, teamwork)	116 (38.7%)
Practical / Project Experience	93 (31.0%)
Industry Awareness	93 (31.0%)
Business / Professional Knowledge	91 (30.3%)
Problem-Solving in Real Contexts	77 (25.7%)
Most Difficult Subject During Studies	
Programming	119 (39.7%)
Networking	46 (15.3%)
Security	37 (12.3%)
Mathematics / Theoretical CS	36 (12.0%)
Web Development	27 (9.0%)
Databases	19 (6.3%)
Artificial Intelligence	14 (4.7%)

Career Confidence by Employment Status

Table 8 presents career confidence cross-tabulated by current employment status. Overall, 56.0% (n = 168) of all respondents described themselves as

'Very confident' in their ICT career path, with a further 14.0% (n = 42) 'Somewhat confident'. Only 3.7% (n = 11) expressed low or no confidence. The chi-square test revealed a statistically significant association between employment status and career confidence ($\chi^2 = 11.292$, $p = 0.023$).

Graduates employed in CS-related roles reported substantially higher career confidence: 61.7% described themselves as 'Very confident', compared to 47.0% of those employed in non-CS roles. Conversely, non-CS-employed graduates demonstrated higher neutrality (34.2% vs. 21.3%), suggesting that career misalignment is associated with greater uncertainty and reduced career self-efficacy. This association highlights the importance of securing degree-relevant employment in bolstering graduate career confidence, with implications for both individual wellbeing and national ICT workforce retention.

Table 8: Career Confidence by Employment Status

Employment Status	Very Confident n (%)	Neutral n (%)	Not Confident n (%)
CS-related job	113 (61.7%)	39 (21.3%)	31 (17.0%)
Non-CS job	55 (47.0%)	40 (34.2%)	22 (18.8%)

Job Acquisition Channels

Table 9 presents the channels through which respondents secured CS/IT employment (multi-select). University career services, internships, and job fairs were the most commonly reported channel (36.0%, n = 108), followed by online applications and social media (30.7%, n = 92). Direct self-application by sending CVs or emails was cited by 21.7% (n = 65) of respondents.

Significantly, informal and social channels also featured prominently. Referrals through family or personal connections accounted for 17.0% (n = 51) of job acquisitions, while clan-based or favoritism-based connections (nepotism) were explicitly cited by 16.7% (n = 50) of respondents. NGO or project-based training pathways contributed 11.3% (n = 34). Combined, informal channels (family referral, clan-based connections, and NGO pathways) accounted for approximately 45% of all cited acquisition methods, underscoring the significant role of social capital and informal networks in navigating Mogadishu's ICT labour market. These findings corroborate the barrier analysis where nepotistic hiring practices were identified as a major structural obstacle.

Table 9: Job Acquisition Channels Among CS/IT Graduates (Multi-select)

Job Acquisition Channel	n (%)
University career services, internships, or job fairs	108 (36.0%)
Online application or job advertisement (websites, social media)	92 (30.7%)
Direct contact or self-application (sending CV/email)	65 (21.7%)
Referral through family or close personal connections	51 (17.0%)
Clan-based or favoritism-based connections (nepotism)	50 (16.7%)
NGO or project-based training leading to employment	34 (11.3%)

Perceptions of Recruitment Fairness and Emigration Intentions

Table 10 presents findings on recruitment fairness perceptions and emigration intentions. A substantial majority of respondents held sceptical views of recruitment fairness in Somalia's ICT sector: 32.7% (n = 98) believed recruitment was not fair and not merit-based, 41.7% (n = 125) said it was only 'sometimes' fair, and only 25.7% (n = 77) considered it consistently fair. Thus, collectively, 74.3% of respondents expressed reservations about recruitment fairness, an alarming finding that speaks to the pervasiveness of perceived nepotism and structural inequity in the Somali ICT labour market.

A statistically significant sex difference was identified in recruitment fairness perceptions (χ^2 = 6.302, p = 0.043). Male respondents were more likely to perceive recruitment as unfair (35.9% selecting 'No') compared to female respondents (23.4%), while females were more likely to perceive it as fair (35.1% selecting 'Yes' vs. 22.4% for males). This counterintuitive finding may reflect differential exposure to formal recruitment processes, with male graduates more actively engaged in competitive job-seeking and thus more directly experiencing discriminatory or patronage-based hiring.

Regarding emigration intentions, an overwhelming 79.7% (n = 239) of respondents indicated they planned to seek CS/IT employment outside Somalia if given the opportunity, 11.0% were unsure, and only 9.3% intended to remain. This near-universal emigration intention represents a profound 'brain drain' risk for Somalia's nascent ICT sector and is consistent with IGAD's findings on skilled worker migration from Horn of Africa states (IGAD, 2022). A statistically significant association was found between career confidence and emigration intention (χ^2 = 16.240, p = 0.039): paradoxically, even very confident graduates overwhelmingly planned to leave (82.1%), suggesting that emigration intention is driven less by career insecurity and more by structural push factors — including limited domestic salary prospects, perceived unfair recruitment, and a desire for

professional development opportunities unavailable in Mogadishu.

Table 10: Recruitment Fairness Perceptions and Emigration Intentions

Variable	n (%)	Chi-square Test
Perceived Recruitment Fairness (Overall)		
No – not fair	98 (32.7%)	By sex: χ^2=6.302, p=0.043 (sig.)
Sometimes	125 (41.7%)	Males more likely to say 'No' (35.9%) vs females (23.4%)
Yes – fair	77 (25.7%)	Females more likely to say 'Yes' (35.1%) vs males (22.4%)
Intention to Seek Employment Abroad (Overall)		
Yes – plans to leave	239 (79.7%)	No significant diff. by sex (p=0.581)
Not sure	33 (11.0%)	By confidence: χ^2=16.240, p=0.039 (sig.)
No – plans to stay	28 (9.3%)	Very confident: 82.1% plan to leave

Discussion

Intrinsic Motivation and Its Policy Implications

The dominance of intrinsic interest in technology as the primary motivation for CS degree selection (67.7%) across all demographic subgroups suggests a fundamentally motivated graduate population in Mogadishu's CS ecosystem. This aligns with global literature from both developed and developing country contexts, wherein intrinsic interest consistently outweighs extrinsic factors such as financial remuneration or family pressure (Suhi et al., 2021; Rahmat et al., 2012). The absence of statistically significant associations between motivation and sex or age indicates that this intrinsic orientation is a broadly shared characteristic rather than a segmented demographic phenomenon.

From a policy perspective, this intrinsic motivation represents a significant human capital asset that universities and employers should leverage. Curricula and pedagogical approaches that nurture curiosity, provide opportunities for creative problem-solving, and expose students to real-world applications are likely to sustain motivation through to employment. Employers in Mogadishu's ICT sector should recognise that graduates are not primarily driven by salary maximisation, creating opportunities to attract talent through non-monetary incentives such as challenging work, professional development, and meaningful contribution to national development.

Education–Occupation Mismatch and Structural Labour Market Constraints

The finding that 39.0% of CS graduates are employed outside CS-related fields represents a significant degree of education–occupation mismatch. While lower than some estimates from comparable developing economies — where

mismatch rates of 50–60% are documented — this figure points to structural limitations in Mogadishu's formal ICT sector's capacity to absorb the volume of graduates being produced by universities (Sumo et al., 2023). The absence of statistically significant associations between employment status and either sex or educational level suggests that mismatch is not driven by differential individual characteristics but rather by structural market constraints affecting all graduates relatively equally.

The concentration of mismatched graduates in teaching (33.3% of non-CS workers), sales and marketing (23.1%), and entrepreneurship (18.8%) is noteworthy. Teaching represents a socially valuable redeployment of CS knowledge, potentially contributing to the pipeline of future ICT talent even if it represents individual career underutilisation. However, mismatched graduates in unskilled labour (6.0%) represent a more acute form of qualification waste warranting targeted intervention.

The prominence of self-employment (27.3% of all respondents) merits particular attention in the Mogadishu context. Self-employment may represent either a proactive entrepreneurial response to limited formal opportunities or a precautionary strategy adopted in the absence of formal employment alternatives. The EAC and IGAD frameworks both identify entrepreneurship and digital start-ups as strategic mechanisms for ICT workforce absorption, suggesting that supporting CS graduate entrepreneurship through incubator programmes, access to capital, and regulatory simplification could be a productive policy direction (EAC, 2020; IGAD, 2022).

The Skills-Demand Gap and University Preparation

The finding that perceived university preparation is the strongest predictor of career confidence in this study (χ^2 = 58.938, $p < 0.001$) underscores the critical relationship between higher education quality and graduate labour market outcomes. The gradient from 78.3% very confident (for 'Very well' prepared graduates) to 31.6% (for 'Very poorly' prepared graduates) is striking and suggests that investment in improving the quality of CS education — through updated curricula, better laboratory infrastructure, and industry-connected faculty — will yield commensurate improvements in graduate confidence and, by extension, labour market performance.

The breadth of self-reported skill deficits — spanning technical skills (45.7%), soft skills (38.7%), practical experience (31.0%), industry awareness (31.0%), business knowledge (30.3%), and problem-solving (25.7%) — indicates that the perceived inadequacy of CS preparation is not confined to any single competency domain but reflects a systemic misalignment between what universities currently offer and what the contemporary labour market requires. This finding aligns with both EAC and ITU/UNESCO assessments

of higher education quality in East Africa and the Arab world (EAC, 2020; ITU/UNESCO, 2021).

The identification of programming as the most difficult academic subject (39.7%) carries important curricular implications. Programming is the foundational competency underpinning virtually all CS career paths, including software development, data science, cybersecurity, and systems administration. Universities must urgently address the quality and quantity of programming instruction, including investment in practical coding environments, project-based learning, and supplementary online learning resources.

This concern is reinforced by institutional-level evidence from SNU, where Isak and Isak (2025) found that despite positive student attitudes towards AI tools, barriers related to digital infrastructure and the absence of targeted training programmes significantly limited the depth and equity of AI integration. For CS graduates, whose career value increasingly depends on proficiency with AI and data-driven tools, such institutional limitations represent a tangible risk to their labour market competitiveness.

Nepotism, Recruitment Fairness, and Social Capital in the Somali Labour Market

The finding that 30.3% of respondents identified clan-based and nepotistic hiring as a major employment barrier — combined with the parallel finding that 16.7% of those who obtained CS employment explicitly cited clan-based connections as their job acquisition channel — reveals a deeply embedded duality in Somalia's ICT labour market. Clan and kinship networks simultaneously constitute a structural barrier for those without strategic connections and a functional employment mechanism for those who do possess them. This finding resonates with wider documentation of patronage networks in post-conflict state employment systems in Sub-Saharan Africa (Omar & Osman, 2022).

The statistically significant sex difference in recruitment fairness perceptions ($\chi^2 = 6.302$, $p = 0.043$) — with males more likely to report unfair recruitment — may reflect the greater market exposure of male graduates, who are more likely to be actively and competitively job-seeking in the formal sector. Female graduates' higher rates of self-employment (39.0%) may partly reflect a strategic withdrawal from a competitive formal market perceived as inaccessible, rather than a preference for entrepreneurship per se. Policy interventions targeting transparent, merit-based recruitment — including anonymised application processes, structured interviewing standards, and regulatory oversight of hiring practices — are indicated by these findings.

Emigration Intentions and the Brain Drain Risk

The finding that 79.7% of CS graduates plan to seek employment abroad is one of the most consequential results of this study and demands urgent policy attention. The fact that even very

confident graduates plan to emigrate in large proportions (82.1%) confirms that emigration intention is not primarily driven by individual career insecurity but by structural push factors — particularly limited domestic salary offers, perceived unfair recruitment, and constrained professional advancement opportunities.

This finding places Mogadishu's CS graduate population within the broader pattern of skilled emigration documented across IGAD member states, where the combination of post-conflict economic fragility, limited formal employment opportunities, and diaspora networks facilitating international migration create powerful incentives for skilled professionals to seek opportunities abroad (IGAD, 2022). The Gulf Cooperation Council (GCC) states and Somalia's Arab partner countries represent primary emigration destinations, facilitated by Somalia's Arab League membership and longstanding diaspora networks in Gulf countries (ITU/UNESCO, 2021).

Addressing the brain drain risk requires a multi-pronged approach: creating more and better-paying CS employment opportunities through private sector development and foreign direct investment in the ICT sector; improving the quality of professional development and career advancement pathways to increase the attractiveness of domestic careers; and establishing diaspora engagement programmes that channel the skills and resources of Somali ICT professionals abroad back into domestic capacity building, as recommended by both IGAD and the Arab League's diaspora development frameworks.

Conclusion

This study provides the first comprehensive empirical examination of the relationship between computer science degrees and career selection among graduates in Mogadishu, Somalia. Drawing on a cross-sectional survey of 300 graduates, it demonstrates that CS degrees confer meaningful employability advantages in Mogadishu's nascent ICT labour market, with 61.0% of graduates securing degree-relevant employment. Intrinsic interest in technology is the dominant driver of CS degree selection, and career confidence is strongly and significantly predicted by perceived university preparation quality.

Simultaneously, the study reveals several deeply concerning structural challenges. A substantial education–occupation mismatch (39.0%) reflects the limited absorptive capacity of the formal ICT sector. Widespread skill deficits across technical, soft, and practical competency domains point to systemic inadequacies in current CS curricula. Entrenched nepotistic hiring norms undermine merit-based recruitment and disproportionately disadvantage graduates without strategic social connections. And an overwhelming 79.7% emigration intention rate threatens to deplete Somalia of the very ICT human capital that universities are producing.

These findings collectively call for urgent action from multiple stakeholders. Universities must update curricula to align with contemporary industry demands, invest in programming pedagogies and laboratory infrastructure, and strengthen industry-connected practical training. The National Commission of Higher Education (NCHE) should develop and enforce minimum quality standards for CS programmes. Employers and the government should work towards more transparent, merit-based recruitment frameworks. And Somalia's strategic partners in the EAC, IGAD, and the Arab League should support capacity-building initiatives that create better domestic ICT employment opportunities and engage the Somali diaspora as a development resource.

Recommendations

Based on the findings, the following recommendations are advanced:

For universities: Prioritise updating CS curricula to incorporate current industry requirements, with emphasis on programming, cybersecurity, data analytics, and cloud computing. Expand and formalise internship programmes and industry partnerships. Invest in professional development training for faculty. Embed soft skills, entrepreneurship, and professional ethics across the curriculum.

For the NCHE and government: Develop a national CS curriculum quality assurance framework benchmarked against EAC and IGAD standards. Introduce merit-based recruitment regulations for public sector ICT roles. Create graduate employment tracking systems to monitor outcomes. Invest in ICT infrastructure to expand the formal sector's capacity to absorb graduates.

For employers and the private sector: Adopt structured, transparent hiring processes that minimise clan-based patronage. Invest in graduate trainee programmes to bridge the skills gap. Offer competitive salary packages and professional development pathways that reduce the attractiveness of emigration.

For regional and international partners: Align IGAD and EAC capacity-building programmes with Somalia's specific CS workforce needs. Support diaspora engagement initiatives that connect Somali ICT professionals abroad with domestic institutions and employers. Fund longitudinal graduate tracer studies to enable evidence-based policy.

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