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# TECHNOLOGICAL SKILL GAPS AND THEIR IMPACT ON THE EMPLOYABILITY OF TOURISM AND HOSPITALITY GRADUATES IN ETHIOPIA: EVIDENCE FROM SELECTED UNIVERSITIES' GRADUATES

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## ABSTRACT

*The tourism and hospitality sector is undergoing rapid transformation due to digitalization and necessities technological expertise for graduates. In this regard, technological skills played a great role in enhancing graduate employability in the sector. The study aims to examine the technological skill gaps and their effects on the employability of Tourism and Hospitality graduates in Ethiopia. The research employed a mixed methods approach, utilizing a descriptive and explanatory research design. Both secondary and primary data sources were in place to obtain the relevant data. A total of 140 samples were employed to collect the data. A purposive sampling technique was employed to select participants. The data were analyzed using descriptive and inferential statistics, as computed in SPSS v27. The study revealed that among the five skill domains assessed, social media and digital marketing skills had the strongest positive influence on graduate employability, followed by emerging technology skills, property management system skills, computer reservation system skills, and basic digital literacy skills. Despite the observed positive correlations across all technological domains, the lower mean scores for emerging technologies and digital literacy highlight the existing competency gaps among graduates. These gaps could hinder the tourism and hospitality industry's readiness for a fast-evolving digital labor market. The study verifies that technology serve as both an enabler and a decisive factor in graduate readiness.*

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**KEYWORDS:** Technological Skill Gaps, Digital Literacy, Graduate Employability, Tourism and Hospitality Education, Ethiopia, Higher Education Curriculum Alignment.

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## 1. INTRODUCTION

The tourism and hospitality sector is rapidly evolving through digitalization, making technological proficiency essential for graduates (Stylianou & Pericleous, 2025). Global studies indicate that information technology (IT) and digital marketing hospitality significantly drive competitiveness in the hospitality sector, yet a worldwide shortage of skilled professionals in these areas persists (Qian, Lin, Law, & Li, 2022).

Hotels and tourism companies now require staff to use online booking platforms, digital check-in systems, mobile apps, and analytics tools to enhance guest experiences (Ionescu & Sârbu, 2024). Higher education in Ethiopia faces a “noticeable disconnect” between curricula and industry needs (Teressa & Beshu, 2020). Industry reports show that few Ethiopian hotels prioritize digital skills training, despite automation, AI, and data analytics transforming operations. This gap between academic training and technological demand threatens graduate employability in Ethiopia. Therefore, understanding how specific technology skills (property management systems, reservation/GDS tools, digital marketing, emerging technologies, and basic IT) relate to employability is critical. The problem of the mismatch between educational outcomes and market demands is one that persists in the academic environment and affects both the hospitality industry and the employment of graduates (Tushabe & Murimi, 2024). The way in which services and goods are offered and consumed in the hotel and tourism sector is changing due to technology (Buhalis et al., 2019).

The evolution involves the implementation of technologies such as social media advertising, automated check-ins, virtual tours, online booking platforms, robots, personalized experiences, smart room technologies, Customer Relationship Management (CRM) platforms, digital payment solutions, AI chatbots, and data analytics (Buhalis, Efthymiou, Uzunboyulu, & Thrassou, 2024; Ionescu & Sârbu, 2024). Because technology is changing so quickly, individuals in practically every hotel role, from front desk operations to revenue management, cleaning, marketing, guest services, and food and beverage management, need to have strong digital abilities (Carlisle, Ivanov, & Dijkmans, 2023). The Ethiopian higher education system is currently grappling with significant challenges related to the employability of its graduates, particularly within the dynamic tourism and hospitality sectors (Kebede, Asgedom, & Asfaw, 2024). A key issue is the noticeable disconnect between the academic

curricula offered by higher education institutions and the actual needs and demands of the labor market (Herut et al., 2025).

At the same time, the tourism and hospitality industries worldwide are undergoing rapid digital transformation. Experts observe that modern hospitality is now “knowledge-intensive,” requiring graduates to master up-to-date technologies (Qian et al., 2022). The tourism and hospitality industry in Ethiopia, like many other countries, faces a critical challenge in industry-ready graduates. The technological skill gaps affecting the employability of tourism and hospitality graduates in Ethiopia are influenced by a mismatch between industry expectations and the skills imparted by academic institutions. This gap is exacerbated by the rapid evolution of technology and the increasing demand for digital competencies in the workforce. The integration of advanced technologies such as automation, AI, and data analytics in the hospitality and tourism sectors further highlights the need for graduates to possess relevant technical skills (Başer, Kozak, & Büyükbeşe, 2025; Stylianou & Pericleous, 2025). The rapid technological advancements in AI and digital solutions have transformed the tourism and hospitality industry, necessitating a reevaluation of educational curricula to align with industry needs. For instance, UNESCO highlights that automation, AI, and virtual reality are increasingly used to enhance customer experience and address labor shortages in hospitality (Salama, 2024). In hotels and travel businesses, this means proficiency with hotel management software and online distribution tools is critical.

In Ethiopia, surveys of the industry indicate a lower understanding of digital requirements, with approximately 10 percent of hotels prioritizing digital skills for future training, despite calls from analysts for robust technology training to enhance competitiveness (Gebreyesus & Tekleselassie, 2021). There is a critical lack of direct, empirical research addressing the technological skills gap between Ethiopian tourism/hospitality academia and industry, with no known study triangulating both stakeholder perspectives and sector-specific technological content. Therefore, urgent, well-designed Ethiopian studies are needed to inform curriculum, policy, and investment in this rapidly evolving area. Moreover, the lack of alignment between educational curricula and industry needs results in graduates who are not fully prepared for the demands of the job market.

Therefore, this study specifically examines focuses on four fundamental technology skill areas

which support contemporary tourism and hospitality operations: (a) Property Management Systems (PMS) such as Opera, Protel, Micros; (b) Central Reservation / Global Distribution Systems (CRS/GDS), exemplified by Amadeus, Sabre, Galileo, Booking.com and Expedia; (c) Social Media and Digital Marketing competencies, including the utilization of platforms like Instagram, Facebook, TikTok for promotional purpose; (d) Emerging Technologies, encompassing AI, automation, and big data analytics; and basic digital proficiency, including familiarity with Microsoft Office software (excel, word and power point, email service and video conferencing tools (Zoom and Skype). These areas were selected because they represent both core operational tools (PMS/CRS) and marketing/innovation competencies.

## 2. LITERATURE REVIEW

### 2.1. Current Challenges in Tourism and Hospitality Education

The tourism sector has been recognized in many developing countries as an opportunity for accelerating socioeconomic development, particularly as a supplier of foreign exchange and job opportunities (Kunwar & Ulak, 2023). The tourism and hospitality education system in Ethiopia faces several challenges that hinder the employability of graduates. These challenges include outdated curricula, limited exposure to industry practices, and a lack of emphasis on emerging technologies (Sufi, Sigala, Rojas-Rivas, & Tirkey, 2025). A reciprocal relationship between academia and industry (Kunwar & Ulak, 2023).

Traditional academic practices often focus on theoretical knowledge, leaving graduates ill-prepared for the practical demands of the industry (YOO, 2024). One of the primary issues is the disconnect between what is taught in classrooms and what is required by the industry (Dhaliwal & Misra, 2020). Common challenges include outdated content, limited industry internships, and insufficient collaboration with employers (Kunwar & Ulak, 2023).

These factors contribute to a skills mismatch: universities are not fully integrating the latest hotel technologies or digital practices into teaching, so graduates lack hands-on experience with systems they will use on the job. Additionally, the rapid advancement of technology has created a digital divide, with many graduates lacking the technical skills needed to compete in a digitized industry (Aydin & Sirkeci, 2024).

### 2.2. Concept of Employability in Tourism and Hospitality

Graduate employability refers to the attributes, skills, and knowledge that make a graduate ready and competitive for employment (Hoque et al., 2023). In hospitality, employers expect a broad range of competencies. For example, one study of hotel managers found that graduates need multiple knowledge domains (e.g. operations, marketing, management theory) and skill domains (e.g., technical, interpersonal) to be industry-ready (Ngoepe & Wakelin-Theron, 2023). Thus, employability in tourism/hospitality is closely tied to both sector-specific technical skills (e.g., using hotel software) and general skills (e.g., customer service, communication) that employers value (Wyld, Ali, Constantinescu, & Schmitz, 2024).

### 2.3. Technological Transformation in Tourism and Hospitality

The tourism and hospitality industry has become knowledge-intensive and digital (Del Vecchio, Passiante, Vitulano, & Zampetti, 2014). Modern hotels and travel services increasingly rely on smart technologies. Studies report that the tourism industry is increasingly reliant on smart technologies due to rapid advances, using tools like online booking, mobile maps, navigation apps, digital check-ins, and keyless entry to improve guest experience (Ionescu & Sârbu, 2024). These smart tourism technologies (AI, Internet of Things, VR/AR, mobile apps, robotics, etc.) allow personalization and efficiency.

For instance, AI chatbots, data analytics, and virtual tours are reshaping how services are delivered, while online distribution (CRS/GDS and OTAs) now dominates bookings (Buhalis et al., 2024). This global digital transformation means tourism firms value graduates who can work with emerging technologies and integrate digital tools into service design (Busulwa, Pickering, & Mao, 2022). In sum, the literature emphasizes that technology is fundamentally changing hospitality operations and guest expectations, raising the bar for graduate IT skills (Das, 2023).

### 2.4. The Role of Technology in Bridging Graduate Skill Gaps

Educational technology and curriculum updates can help close the gap between graduate skills and industry needs (Mardis et al., 2018). The integration of technology in education can enhance the learning experience, making it more interactive and relevant

to industry needs (Dwivedi, Pandey, Currie, & Micu, 2024). For instance, the use of artificial intelligence (AI) and generative AI tools like ChatGPT can revolutionize the way students learn and interact with course materials (Adeyinka-Ojo, Lee, Abdullah, & Teo, 2020). Integrating simulations, hotel software training, and digital project work into tourism programs can better align learning with modern practice (Mandalia, 2023).

Emerging solutions like e-learning, virtual reality training, and artificial intelligence tutoring are proposed to enhance practical learning outcomes (Lin, Huang, & Lu, 2023). Incorporating technology-based learning (e.g., virtual internships, online collaboration tools) helps graduates acquire up-to-date competencies (Costello et al., 2014). By embedding current technology trends into coursework, educators can ensure students master both basic digital skills and advanced tools (AI models, data analytics) before entering the workforce (Dwivedi et al., 2024).

## 2.5. Major Technological Competencies in Tourism/Hospitality

Tourism and hospitality graduates must develop multiple technology domains to be employable. Key competencies identified in the literature include:

### 2.5.1. Property Management Systems (PMS)

Property Management Systems are software platforms that integrate a hotel's front desk and back-office functions (Commey, Akonnor, Commey, & Mensah, 2023). As Oracle Hospitality explains, a PMS "enables a hotel or group of hotels to manage front-office capabilities, such as booking reservations, guest check-in/check-out, room assignment, managing room rates, and billing" (Au-Yong-Oliveira, Bampoori, Moreira, & Grassos, 2023). In practice, PMS like Opera and Micros have evolved into central business-operating systems that also link to point-of-sale, revenue management, and loyalty systems (Neo, Almunawar, & Raimi, 2023).

Thus, proficiency in a PMS is typically considered a core technical skill for hotel graduates. It replaces manual record-keeping and directly impacts a property's efficiency and guest satisfaction (Kumar, 2023). If graduates enter the workforce without hands-on experience in these systems, they may be less immediately effective at routine tasks (check-in/out, room assignments, billing, etc.), which can hinder employability. Based on the above empirical reviews, the following hypothesis is proposed.

Hypothesis (H1): There is a significant relationship between Property Management

System (PMS) skills and graduate employability.

### 2.5.2. Central Reservation System (CRS)/Global Distribution System (GDS)

A Central Reservation System (CRS) and Global Distribution Systems (GDS) are platforms that manage hotel inventory and distribution (Aamir & Atsan, 2020). In simple terms, a CRS is operated by a hotel (or chain) to manage its bookings (often linking directly to consumers via websites or metasearch) (Krietemeyer, 2019), whereas a GDS is a third-party network used by travel agents and corporate clients (Aamir & Atsan, 2020). The major legacy GDS platforms (Amadeus, Sabre, Travelport/Galileo) are specifically designed to reach the corporate travel market (Ziegler, Troester, & Sazali, 2017).

While educational programs may mention distribution channels, there is evidence from other countries of a gap here: one Kenyan study emphasizes that hospitality curricula often do not keep pace with industry's use of distribution technology (Francis, Wamathai, Wandaka, & Jilo, 2020). The above literature leads to the development of the following hypothesis

Hypothesis (2): There is a significant relationship between Central Reservation System (CRS) skills and graduate employability.

### 2.5.3. Social Media and Digital Marketing Skills

Digital marketing and social media have become indispensable promotional tools in tourism (Afren, 2024; Armutcu, Tan, Amponsah, Parida, & Ramkissoon, 2023). Tourism scholars emphasize that even small destinations can achieve global reach via social platforms (Kiráľová & Pavlíčeka, 2015; Sotiriadis, 2017). As (Berhanu & Raj, 2024) point out, maintaining a social media presence "has become inevitable for tourism destinations," since it allows budget-limited organizations to access worldwide markets.

Indeed, studies show that social media campaigns boost a destination's visibility and image (Baber & Baber, 2023). However, empirical evidence suggests Ethiopian tourism organizations lag in this area. Researchers found that limited internet connectivity, lack of digital infrastructure, and insufficient expertise have left many Ethiopian tourism agencies with "inactive social media marketing" (Berhanu & Raj, 2024).

Despite technological advancements, research indicates a significant and urgent digital skills gap among employees entering the hotel sector at various positions, posing immediate challenges for technology integration and quality service delivery

(Stylianou & Pericleous, 2025). Since modern tourism marketing is heavily digital, a shortfall in these skills could directly limit the competitiveness of Ethiopian hospitality businesses and thus the employability of underprepared graduates. Hence, the following hypothesis is established.

Hypothesis (3): There is a significant relationship between Social-Media & Digital Marketing (SM) skills and graduate employability.

**2.5.4. Emerging Technologies (AI, Automation, and Big Data Analytics)**

The hospitality sector is also beginning to adopt advanced technologies like artificial intelligence, automation, and data analytics, which create new skill requirements (Jabeen, Al Zaidi, & Al Dhaheri, 2022; Nam, Dutt, Chathoth, Daghfous, & Khan, 2021). Industry reports and research note that concepts like the Internet of Things (IoT), big data analytics, and AI-driven services are changing how hotels operate (Štilić, Nicić, & Puška, 2023).

For example, (Francis et al., 2020) observe that “the future of tourism is an adaptation of technology in gathering and usage of big data, [IoT], and usage of Artificial Intelligence (AI)”. Surveys of tourism industry stakeholders often show that such advanced tech competencies are expected shortly (Carlisle et al., 2023). However, a recent ILO assessment found that only 10 % of Ethiopian tourism firms listed “digital skills” (a broad category that includes many of these technologies) among their top training needs (Gebreyesus & Tekleselassie, 2021). In any case, as

global competitors integrate AI and big data into operations, Ethiopian graduates who lack familiarity with basic data analytics or AI concepts may be at a disadvantage in the job market. Based on the existing scholars’ work, an assumption is proposed.

Hypothesis (4): There is a significant relationship between Emerging Technology (ET) skills and graduate employability.

**2.5.5. Basic Digital Skills (Microsoft Office (Excel, Word, and PowerPoint))**

Research shows a sizable and pressing digital skills gap among workers joining the hotel industry at different positions, despite technological developments. This presents obvious hurdles for technology integration and providing high-quality services (Stylianou & Pericleous, 2025).

Studies of hospitality workforce needs consistently list core ICT competencies as foundational (Hsu & Tseng, 2022). Research shows that basic digital skills like MS Office proficiency and email/communication software use are among the top skills employees need (Carlisle et al., 2023). Every role, from front desk to food and beverage, relies on simple technologies: word processing, spreadsheets, email, and video meetings. Therefore, competence in these basic applications is assumed and must be mastered by all graduates (Tony-Okeme, 2021).

Hypothesis (H5): There is a significant relationship between Digital Literacy Skills (DLS) and graduate employability.

**Table 1: Summary Table: Key Concepts, Tools, and Their Significance.**

Key Concept/ Tool/Selected Factors	Relevance to Employability and Technological Gaps
Property Management Systems (PMS)	Highly relevant. These are essential in hotel operations and are expected by employers. Lack of training in systems like OPERA or Protel indicates a direct skills mismatch.
Central Reservation Systems/ CRS/GDS (e.g., Amadeus, Sabre)	Central to travel agency/airline/hotel revenue and booking management. These systems are widely used in the industry but rarely covered in depth in academic programs in Ethiopian Universities.
Social media & Digital Marketing Skills	Increasingly demanded; underrepresented in academic programs. These are modern tools used in both hotel and destination marketing. Deficiency here directly affects job performance and competitiveness.
Emerging Technologies (AI, Automation, and Big Data Analytics)	Foundational. Without these, graduates struggle in any modern work setting. This is a baseline skill employers expect.
Basic Digital Literacy	Fundamental for employability across all tourism and hospitality roles. It includes proficiency in Microsoft Office (Word, Excel, and Power Point), email communication, and virtual collaboration tools (Zoom, Skype). Despite its foundational importance, many graduates demonstrate weak competencies in these areas, limiting their operational efficiency, communication, and adaptability in technology-driven workplaces.

**3. CONCEPTUAL FRAMEWORK**

The conceptual framework hypothesizes that graduate employability is influenced by multiple

technological skill domains. Independent variables: proficiency in Property Management Systems (PMS), Central Reservation/GDS systems, social media/Digital Marketing, Emerging Technologies

(AI, Automation, Big Data), and Basic Digital Skills (MS Office, email, conferencing). Dependent variable: Graduate Employability (measured by job attainment, employer satisfaction, etc.). In the framework, arrows from each technology domain

point to Employability, indicating that stronger skills in each area are expected to increase employability. This multi-factor model will guide the study's measurement and analysis (see Figure 1).

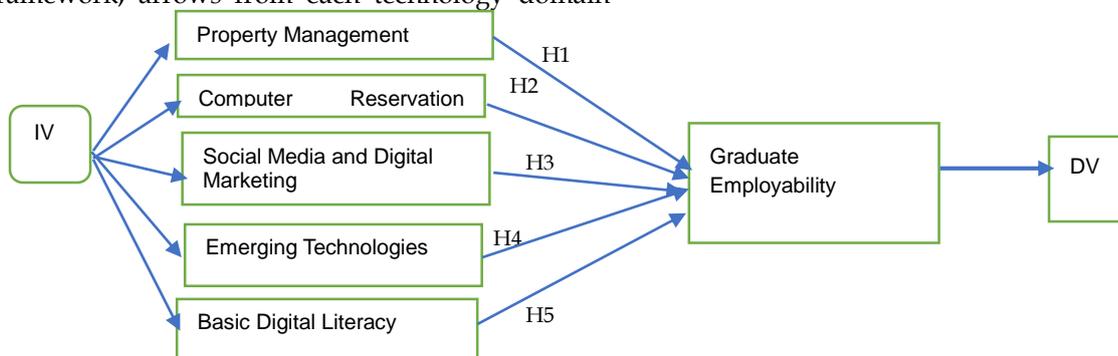


Figure 1: Technological Skill Domains (PMS, CRS/GDS, Social Media/Digital Marketing, Emerging Technologies, Basic Digital Skills) are Posited to Positively Affect the Employability of Tourism and Hospitality Graduates.

Source: Author's compilation, 2025.

## 4. METHODOLOGY

### 4.1. Research Design and Approach

A quantitative, cross-sectional, descriptive, and explanatory design was used. Descriptive elements profile graduates and stakeholders, while explanatory techniques (correlation and regression analysis) test relationships between technology skills and employability outcomes. This mixed approach is common in tourism employability research.

### 4.2. Target Population

The population includes tourism/hospitality graduates from selected Ethiopian universities, hospitality employers (e.g., hotel managers, tourism agencies), academic lecturers, and tourism officials. The universities were purposefully selected because they were among the first higher education institutions to launch Tourism and Hospitality programs in the country and are expected to offer high-quality teaching and learning experiences in Tourism and Hospitality Management, delivered by experienced instructors. In addition, these institutions were chosen based on three key criteria: they were among the first in Ethiopia to establish Tourism and Hospitality programs, and they offer comprehensive and practical-oriented curricula with

relatively experienced faculty. Moreover, they represent a mix of geographic and institutional diversity covering northern, central, and western regions of the country to ensure that the findings reflect a range of educational environments.

### 4.3. Sampling Techniques and Sample Size Determination

A purposive sampling strategy was employed, selecting participants with direct relevance: recent graduates who studied tourism/hospitality, employers who hire such graduates, and educators involved in tourism programs. As the study used a purposive sampling technique focused on specific universities and stakeholders, the findings may not be fully generalizable to all Ethiopian tourism and hospitality graduates. However, the selected participants are among the most relevant and experienced, providing valid insights into national trends. To find participants who were engaged in the tourism and hospitality education system or in hiring and educating recent graduates, the purposive sample technique was employed. Graduates were sampled from the 2020-2025 graduating cohorts to understand the current technological skill gaps affecting the employability of graduates.

Table 2: Population and Sample Size.

Category	Population	Sample Size	Sample Technique
Graduates	Tourism and Hotel graduates (2020-2025)	100	Purposive Sampling
Employers	Managers and HR professionals from Star-Rated Hotels in Addis Ababa, Bahir Dar, and Gondar.	10	Purposive Sampling

Lecturers	Faculty members from 4 selected Universities	20 (5 experienced instructors from each)	Purposive Sampling
Tourism Officials	Officials from relevant Tourism Bureaus and Offices.	10	Purposive Sampling
<b>Total</b>		<b>140</b>	

Source: Author's Survey, 2025.

**4.4. Data Collection Instrument**

A structured questionnaire was developed, with items addressing each of the selected skill factors: Property Management Systems (PMS), Central Reservation Systems/Global Distribution Systems (CRS/GDS), social media and digital marketing skills, emerging technologies, and Basic Digital Literacy skills. Respondents were asked to rate, using Likert scales, both the importance of each skill and their perception of recent graduates' proficiency in those areas. The survey included closed-ended items to allow for statistical analysis. To ensure content validity, the questionnaire items were constructed based on relevant industry literature and were reviewed by experts in tourism and hospitality education. A pilot test was conducted to refine the clarity of the questions and improve measurement accuracy. Reliability of the multi-item constructs was assessed using Cronbach's alpha.

**4.5. Variables and Model Specification**

Quantitative data were interpreted by using descriptive and inferential statistics (multiple regression and correlation analysis). Multiple regression model analysis is used for quantitative data analysis and helps to predict the quantitative dependent variable (Cox, Lambert, & Hitchcock, 2021).

$$Y = 0 + 1X_1 + 2X_2 + \dots + kX_k + e$$

Y = 0 + 1X<sub>1</sub> + 2X<sub>2</sub> + 3X<sub>3</sub> + 4X<sub>4</sub> + ... model specification  
 Y = dependent variable, X<sub>1</sub>, X<sub>2</sub>, X<sub>3</sub> = independent variables, 0 = Y-intercept (constant term), 1, 2, 3, ... = Slope coefficient for each independent variable, e = the model error. In this study, "Y" is the dependent variable, which is the graduate employability, and X<sub>1</sub> = Property Management System (PMS), X<sub>2</sub> = Global Distribution System (GDS), X<sub>3</sub> = Social Media Marketing, X<sub>4</sub> = Emerging Technologies, and X<sub>5</sub> = Basic Digital Literacy skills. The collected data were analyzed using statistical software. Descriptive statistics (frequencies, means, and standard deviations) were summarized for respondent profiles and average skill levels. Pearson correlation was used to assess pairwise relationships between

each tech skill and employability metrics. Finally, multiple regression analysis was conducted with employability as the dependent variable and the technology skill domains as independent variables. This was identified as which skill areas significantly predict employability when controlling for others. Regression is a common inferential method in educational research to test such impact hypotheses. All tests were used with appropriate significance levels and reported effect sizes.

**4.6. Validity and Reliability**

Table 3: Cranach's Alpha Test.

Variables	no_items	Cronbach's Alpha
PMS (IV)	4	.832
CRS (IV)	4	.877
SM (IV)	4	.840
ET (IV)	4	.697
DS (IV)	4	.825
GEP (DV)	5	.876
Overall Reliability	25	.954

Source: Author's Survey, 2025.

**5. RESULTS AND DISCUSSION**

**5.1. Characteristics of Respondents**

A total of 140 valid responses were collected for the study. As shown in Table 4, the gender distribution indicates that 63 respondents (45%) were male, while 77 respondents (55%) were female, showing a slightly higher participation of females in the survey. Regarding age, the majority of respondents, 99 individuals (70.7%), were between 18 and 35 years old, indicating that most participants were young professionals or recent graduates. 33 respondents (23.6%) were aged 36 to 45, and a smaller group, 6 participants (5.7%), fell within the 46 to 60 age range. In terms of educational qualifications, 82 respondents (58.6%) held a Bachelor's degree, 43 (30.7%) had a Master's degree, and 15 (10.7%) possessed a PhD or higher qualification; they are university professors. This educational distribution highlights that most participants had at least an undergraduate-level education, aligning well with the study's focus on graduate employability in tourism and hospitality.

Table 4. Demographic Characteristics of Respondents.

Gender	Male	63	45%
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	Female	77	55%
Age	18 - 35	99	70.7%
	36-45	33	23.6%
	46 -60	6	5.7%
	Bachelor Holder	82	58.6%
Qualification	MA Holder	43	30.7%
	PhD Holder and above	15	10.7%

Source: Author’s Survey, 2025.

**5.2. Descriptive Statistics of Variables**

From Table 5, the findings revealed that Computer Reservation System (CRS) (mean = 4.09, SD = 0.519), Graduate Employability (mean = 3.84, SD = 0.511), and Property Management System (PMS) (mean = 3.54, SD = 0.523) scored above the group mean, whereas Social Media Platform Skills (mean = 3.44, SD = 0.562), Emerging Technology Skills (mean = 3.37, SD = 0.504), and Basic Digital Literacy Skills (mean = 3.37, SD = 0.504) scored below

the overall group mean value. The mean value of both dependent and independent variables approached the “Agree” label. However, the range difference between the mean value of the Computer Reservation System and Emerging Technology Skills was the highest compared to the other independent variables. This could be attributed to the relatively higher perceived relevance and familiarity with computer reservation system tools among respondents, while familiarity with emerging technologies remains limited.

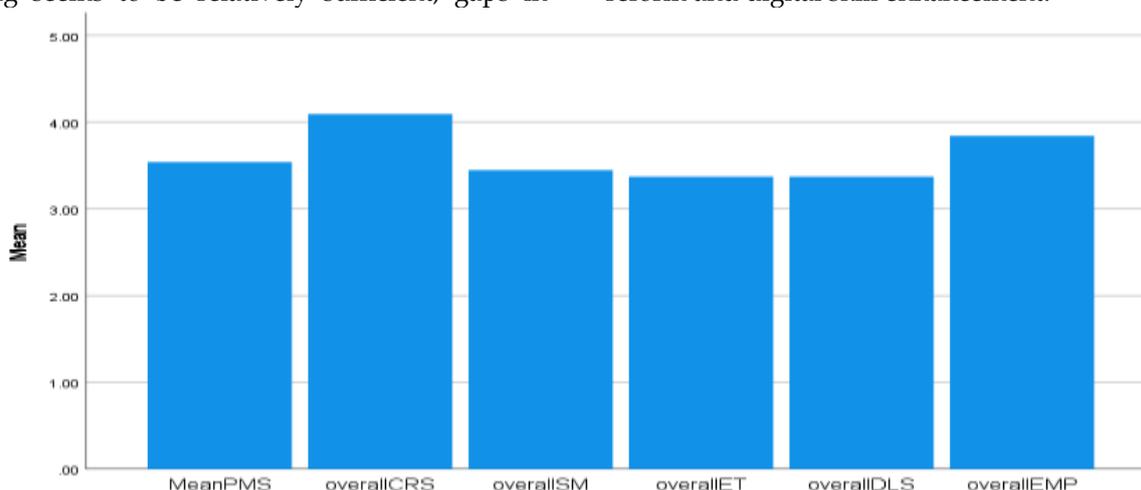
**Table 5: Mean Ratings of Variables, N = 140.**

Variables	M	SD
Property Management System (PMS)	3.54	.523
Computer Reservation System (CRS)	4.09	.519
Social Media Platform Skills	3.44	.562
Emerging Technology Skills	3.37	.504
Basic Digital Literacy Skills	3.37	.504
Graduate Employability	3.84	.511

Source: Author’s Survey, 2025.

Figure 2 illustrates that there is a notable mismatch between graduate digital competencies and industry expectations, especially in emerging tech and basic digital tools. Even though CRS/GDS training seems to be relatively sufficient, gaps in

basic foundational skills and advanced technology adaptation pose a serious threat to graduate readiness in a digitizing tourism and hospitality industry. This suggests the need for curriculum reform and digital skill enhancement.



**Figure 2: Mean Scores of Technological skill Domains.**

Source: Author’s Survey, 2025.

**5.3. Relationship between Independent Variables and Graduate Employability**

The highest degree of association ( $r = 0.810, p < 0.001$ ) was observed between Property Management

Systems and graduate employability. This strong positive correlation indicates that graduates with higher proficiency in PMS are perceived as

significantly more employable in the tourism and hospitality industry.

The second-highest correlation ( $r = 0.804, p < 0.001$ ) was found between social media Skills and PMS skills. This suggests that individuals proficient in PMS tend to also demonstrate strong social media and digital marketing skills, reflecting integrated digital literacy in hospitality functions.

The third strong and significant association ( $r = 0.774, p < 0.001$ ) was found between social media skills and employability. This shows that social media proficiency is a strong predictor of graduate readiness in the tourism labor market, consistent with the industry's increasing reliance on digital marketing and online presence.

The fourth-highest correlation ( $r = 0.687, p < 0.001$ ) was observed between emerging technologies and employability. This finding reinforces the growing role of AI, automation, and big data literacy in determining graduate employability in an evolving digital landscape. Similarly, digital literacy

skills were also significantly correlated with employability ( $r = 0.687, p < 0.001$ ), highlighting the foundational importance of tools like Microsoft Office, email, and video conferencing in professional success.

**Moderate but meaningful associations were also found between:**

- CRS/GDS skills and employability ( $r = 0.678, p < 0.001$ )
- PMS and emerging tech ( $r = 0.682, p < 0.001$ )
- PMS and digital literacy ( $r = 0.682, p < 0.001$ )

Overall, the correlation analysis revealed that all technological skill factors studied, PMS, CRS, social media, emerging technologies, and digital literacy, positively and significantly influenced the employability of tourism and hospitality graduates (all  $p$ -values  $< 0.001$ ).

No negative or inverse correlations were observed, indicating that all skills contribute positively to employability rather than substituting for one another.

**Table 6: Correlation Result.**

		Correlations					
		PMS	CRS	SM	ET	DLS	GEP
Property Management System	Pearson Correlation	1	.680**	.804**	.682**	.682**	.810**
	Sig. (2-tailed)		.000	.000	.000	.000	.000
	N	140	140	140	140	140	140
Computer Reservation System	Pearson Correlation	.680**	1	.611**	.532**	.532**	.678**
	Sig. (2-tailed)	.000		.000	.000	.000	.000
	N	140	140	140	140	140	140
Social-Media Platforms	Pearson Correlation	.804**	.611**	1	.645**	.645**	.774**
	Sig. (2-tailed)	.000	.000		.000	.000	.000
	N	140	140	140	140	140	140
Emerging Technologies	Pearson Correlation	.682**	.532**	.645**	1	1.000**	.687**
	Sig. (2-tailed)	.000	.000	.000		.000	.000
	N	140	140	140	140	140	140
Digital Literacy Skills	Pearson Correlation	.682**	.532**	.645**	1.000**	1	.687**
	Sig. (2-tailed)	.000	.000	.000	.000		.000
	N	140	140	140	140	140	140
Graduate Employability	Pearson Correlation	.810**	.678**	.774**	.687**	.687**	1
	Sig. (2-tailed)	.000	.000	.000	.000	.000	
	N	140	140	140	140	140	140

\*\* . Correlation is significant at the 0.01 level (2-tailed).

Source: Author's Survey, 2025.

**5.4. Regression Assumptions**

Multicollinearity refers to a situation where independent variables in a regression model are highly correlated, which can distort the estimation of regression coefficients and reduce the reliability of the model (Kim, 2019). In this study, the multicollinearity diagnostic results are presented in the table. The VIF values for all independent variables are below 10, and tolerance values are all above 0.1, indicating that multicollinearity is not a major issue in the model (see Table 9). Overall, since

all VIFs are under the threshold of 10 and all tolerance values are well above 0.1, the regression model is considered free from multicollinearity problems, ensuring the stability and validity of the coefficient estimates.

**5.5. Regression Output and Interpretation**

**5.5.1. Model Summary**

The model yielded an R value of 0.888, indicating a strong positive relationship between the combined independent variables and graduate employability.

The R Square (R<sup>2</sup>) is 0.788, which suggests that 78.8% of the variance in graduate employability is explained by the five technological skill domains included in the model. The Adjusted R Square is 0.780, which accounts for the number of predictors in the model and still indicates a very good fit. The standard error of the estimate is 0.23930, implying that the model predicts graduate employability with reasonably high accuracy. The Durbin-Watson

statistic is 1.923, which falls within the acceptable range (1.5–2.5), indicating no serious autocorrelation in the residuals.

This result demonstrates that the technological competencies studied collectively have a substantial impact on graduates’ readiness for employment in the tourism and hospitality sector in Ethiopia.

**Table 7: Model Summary.**

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	.888a	.788	.780	.23930	1.923

Source: Author’s Survey, 2025.

- a. Predictors: (Constant), DLS, CRS, ET, SM, PMS
  - b. Dependent variable: Graduate Employability
- From Table 8, the analysis of variance (ANOVA) reveals that the regression model is statistically

significant, with an F-value of 99.811 and a p-value of 0.000. Therefore, the model is a good fit for the data, and the independent variables collectively contribute meaningfully to predicting graduate employability in the tourism and hospitality sector.

**Table 8: Anova Test.**

ANOVAa						
Model	Sum of Squares	Df	Mean Square	F	Sig.	
1	Regression	28.579	5	5.716	99.811	.000b
	Residual	7.674	134	.057		

Source: Author’s Survey, 2025.

- a. Dependent Variable: GEP
- b. Predictor: (Constant), DLS, CRS, ET, SM, PMS

Table 9 shows the influence of the predictors’ variables on the dependent variables. Depending on the unstandardized beta coefficient analysis, the independent variables have a strong contribution to the existence of the dependent variable. This beta  $Y = \beta_0 + \beta_1X_1 + \beta_2X_2 + \beta_3X_3 + \beta_4X_4 + \beta_5X_5 + e$

coefficient indicates that the average amount of change in the dependent variable is caused by a unit change in the independent variable. Therefore, the researchers used the following stated model to show that the level of the determinant is as follows:

Where:

Y is graduate employability,

$\beta_0$  = the constant (coefficient of intercept),

$\beta_1$  = regression coefficient of Property Management System (PMS),

$\beta_2$  = regression coefficient of Central Reservation System (CRS),

$\beta_3$  = regression coefficient of Social-Media and Digital Marketing (SM),

$\beta_4$  = regression coefficient of Emerging Technologies (ET),

$\beta_5$  = regression coefficient of Digital Literacy Skills (DLS)

**Table 9: Summarized Beta Coefficients of the Regression Model.**

Coefficients <sup>a</sup>								
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
		B	Std. Error	Beta			Tolerance	VIF
1	(Constant)	.009	.206		.044	.965		
	PMS	.229	.104	.219	2.189	.030	.158	6.343
	CRS	.160	.053	.163	3.005	.003	.539	1.857
	SM	.318	.071	.334	4.475	.000	.284	3.522

	ET	.242	.090	.187	2.671	.008	.321	3.116
	DS	.126	.058	.124	2.186	.031	.487	2.053
a. Dependent Variable: GEP								

Source: Author’s Survey, 2025.

Then, the above equation can be expressed in terms of b-values as follows:

$$\text{Graduate Employability} = 0.009 + 0.229 \text{ PMS} + 0.160 \text{ CRS} + 0.318 \text{ SM} + 0.242 \text{ ET} + 0.126 \text{ DLS}$$

The above equation can be interpreted as:

Property Management System: A one-unit coefficient increase in the PMS will increase graduate employability by 0.229 units. PMS skills help improve hotel operational efficiency and enhance the readiness of graduates for modern roles (Talawanich & Wattanacharoensil, 2021). Computer Reservation System: A one-unit increase in the CRS will increase graduate employability by 0.160 units. Proficiency in CRS enables graduates to effectively manage bookings and connect with global travel networks (Kandampully & Solnet, 2024). Social-Media Marketing Skills: A one-unit coefficient increase in the SM will increase graduate employability by 0.318 units. Social media and digital marketing skills are essential for promoting tourism and hospitality

services in the digital age (Cloete, Ndlovu, & Prabhakaran, 2024).

Emerging Technology Skills: A one-unit increase in the ET will increase graduate employability by 0.242 units. Emerging technologies like AI, automation, and data analytics are crucial for innovation and competitiveness in the tourism sector (Samara, Magnisalis, & Peristeras, 2020). Basic Digital Literacy Skills: A one-unit increase in DLS will increase graduate employability by 0.126 coefficient units. Basic digital literacy supports daily tasks and communication in digital environments across tourism and hospitality operations (Yulia & Irina, 2023). To recap, from these regression results of the five technological skill domains, SM (social media) was the first variable that determined graduate employability, followed by ET, PMS, CRS, and DLS, respectively positively affecting graduate employability. (See Table 10 regarding the hypothesis testing results and the effect of independent variables on the outcome variable.)

Table 10: Summary of Hypothesis Testing.

Hypothesis	Results	Conclusion/Decision
Hypothesis (H1): There is a significant relationship between Property Management System (PMS) skills and graduate employability.	$\beta = 0.219$ ; $p = 0.030$ ; Positive, significant	H1: supported
Hypothesis (H2): There is a significant relationship between Central Reservation System (CRS) skills and graduate employability.	$\beta = 0.163$ ; $p = 0.003$ ; positive, significant	H2: supported
Hypothesis (H3): There is a significant relationship between Social-Media & Digital Marketing (SM) skills and graduate employability.	$\beta = 0.334$ ; $p < 0.001$ ; positive, significant	H3: supported
Hypothesis (H4): There is a significant relationship between Emerging Technology (ET) skills and graduate employability.	$\beta = 0.187$ ; $p = 0.008$ ; positive, significant	H4: supported
Hypothesis (H5): There is a significant relationship between Digital Literacy Skills (DLS) and graduate employability.	$\beta = 0.124$ ; $p = 0.031$ ; positive, significant	H5: supported

Source: Author’s Survey, 2025.

## 6. CONCLUSION AND RECOMMENDATIONS

### 6.1. Conclusions

Technological skill gaps significantly and positively affect the employability of tourism and hospitality graduates in Ethiopia. The findings revealed that among the five skill domains assessed, social media and digital marketing skills had the

strongest positive influence on graduate employability, followed by emerging technology skills, property management system skills, computer reservation system skills, and basic digital literacy skills. Despite the observed positive correlations across all technological domains, the lower mean scores for emerging technologies and digital literacy highlight existing competency gaps among graduates. These gaps could hinder their readiness for a fast-evolving digital labor market in the tourism

and hospitality industry. Social media skills were found to be the most influential factor, underscoring the increasing importance of digital presence and engagement in tourism marketing. Similarly, the role of PMS and CRS skills indicates the need for operational technology fluency in hotel and travel service delivery. Emerging technology and digital literacy skills, while also statistically significant, still represent areas where graduates lag in familiarity and practical application. The regression analysis confirmed that 78.8% of the variation in graduate employability could be explained by these five technological skills. This underscores the critical role of technology-related competencies in shaping the employability of tourism and hospitality graduates in Ethiopia. The study confirms that technology is not only an enabler but also a decisive factor in graduate readiness. Without bridging these technological skill gaps, graduates may continue to face challenges in securing competitive roles in the sector.

### **6.2. Recommendations**

Based on the study findings, several key recommendations are proposed to enhance graduate employability by addressing technological skill gaps. Universities and TVET institutions should revise tourism and hospitality curricula to include hands-on training in PMS, CRS, social media marketing, and emerging technologies like AI and big data. Instruction should integrate real-time hotel and travel systems with practical labs for digital tools. To close the social media skill gap, institutions must offer targeted courses on digital marketing, content creation, and influencer strategies. Strengthening university-industry linkages is essential for providing internships and exposure to real-world technologies. Basic ICT training in tools such as Microsoft Office, email, and Zoom should be mandatory. Graduates already in the workforce need ongoing access to refresher courses and certifications to stay current. Findings offer evidence-based recommendations for the Ethiopian Ministries of Education and Tourism to revise national harmonized curriculum guidelines. NGOs focused on education and digital inclusion can use the results to target support for ICT and hospitality training programs. Collaborative policymaking and donor-backed curriculum innovations can enhance technological readiness in Ethiopian hospitality education. Finally, continuous research and monitoring are necessary to track changing industry needs and graduate readiness.

### **6.3. Implications**

This study highlights the critical need to align tourism and hospitality education in Ethiopia with industry demands, especially in digital skills. The findings underscore the importance of integrating technological competencies, particularly in social media marketing, emerging technologies, PMS, CRS, and digital literacy into higher education curricula. For policymakers, the results offer evidence to support curriculum reform, industry collaboration, and targeted skill development initiatives. The study's findings can inform policy revisions at both the Ministry of Education and the Ministry of Tourism. By demonstrating clear linkages between specific technology skills and employability, the evidence supports government and NGO-led curriculum reform, capacity-building programs, and digital infrastructure investment across public universities. Employers may also use the insights to guide recruitment and professional development strategies aligned with digital competency requirements.

### **6.4. Limitations and Suggestions for Future Research Directions**

While the study provides valuable insights, it is not without limitations. The use of purposive sampling, while effective for targeting informed stakeholders, may limit the generalizability of results to all Ethiopian graduates. Future research could adopt probability sampling or include additional institutions for broader representativeness. The cross-sectional design offers a snapshot in time but does not capture changes or trends over time. Additionally, the study relied on self-reported data, which may be subject to response bias. The scope was also limited to selected universities and stakeholders, possibly excluding broader regional variations or perspectives from informal sector employers. These limitations should be considered when interpreting and applying the findings. Future research should consider longitudinal studies to explore how technological skill development affects employability outcomes over time. Comparative studies across different regions or countries could also provide a broader understanding of digital readiness in tourism and hospitality education. Researchers are encouraged to explore the role of emerging technologies such as AI, AR/VR, and big data in graduate training. Furthermore, qualitative studies involving in-depth interviews with industry professionals and graduates could enrich the understanding of contextual challenges. Lastly, the effectiveness of specific interventions like curriculum changes or digital training programs could be

evaluated through experimental or action research approaches.

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**Appendix A. Questionnaire**

Part I: Technological Skill Factors Affecting Graduate Employability

Dear respondents, please use the following Rating Scales under the columns, mark (√) sign only once for the given variables, depending on your level of agreement in front of it. Where, 1=Strongly Disagree 2=Disagree 3=Neutral 4=Agree 5=strongly agree.

	Technological Skill Gaps factor	1	2	3	4	5
<b>Property Management Systems (PMS).</b>						
1.	Recent tourism and hospitality graduates are adequately trained in using PMS software (e.g., OPERA, Protel).					
2.	Proficiency in PMS is essential for entry-level positions in the hotel industry.					
3.	There is a noticeable gap between industry expectations and graduate PMS competency levels.					
4.	Universities offer hands-on training on PMS tools.					
<b>Central Reservation Systems / Global Distribution Systems (CRS/GDS)</b>						
1.	Knowledge of CRS/GDS platforms is a critical requirement for tourism and hospitality job roles.	1	2	3	4	5
2.	Graduates demonstrate sufficient familiarity with systems like Amadeus and Sabre.					
3.	There is a skills gap in the graduate use of CRS/GDS tools.					
4.	CRS/GDS tools are well-integrated into university training.					
<b>Social media and Digital Marketing Skills</b>						
1.	Social media and digital marketing skills are essential for promoting tourism and hospitality businesses.	1	2	3	4	5
2.	Graduates are capable of managing social media platforms (e.g., Facebook, Instagram, TikTok) for professional use.					
3.	There is a gap between the digital marketing skills taught in universities and those required in the workplace.					
4.	Universities provide adequate digital content creation and promotion training.					
<b>Emerging Technologies - AI, Automation, Big Data Analytics</b>						
1.	Understanding of emerging technologies (e.g., AI, automation, and big data) is increasingly important in tourism and hospitality roles.					
2.	Graduates have adequate awareness of how AI and data analytics are applied in the industry.					
3.	The current curriculum adequately addresses emerging digital technologies.					
4.	There is a gap between graduate readiness and industry needs in emerging tech.					
<b>Foundational ICT Skills (Microsoft Office, Email, Zoom)</b>						
1.	Proficiency in basic ICT tools (MS Word, Excel, and PowerPoint) is expected of new graduates.					
2.	Graduates are well-prepared to use video conferencing tools (e.g., Zoom, Skype) in professional settings.					
3.	University training ensures adequate digital literacy.					
4.	The absence of basic ICT skills affects graduate employability.					