Exploring Translation Technology: Perspectives from Jordan's Translation Industry

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Abstract: Technologization has reshaped the global translation industry, strengthening the connection between translation and technology. The growing availability of diverse technology-supported platforms has increased the industry's reliance on technology and the need for translators with specialized technological skills. This paper examines the impact of translation technology on Jordan's translation industry, focusing on the perspectives of translation institutions and translators regarding its effects on their work and future. Two questionnaires were distributed to assess views on the adoption of translation technology and its implications for the industry. The findings reveal that: (1) both groups widely use diverse technologies, though translation houses report only partial integration; (2) they acknowledge its positive impacts but emphasize constraints, particularly the importance of post-editing; (3) translators face challenges with software despite receiving some formal training, highlighting the need for more extended and targeted training programs that go beyond introductory exposure; and (4) both groups agree on the increasing significance of translation technology in Jordan, advocating for its integration into university curricula. These results underscore the necessity for enhanced training programs and greater adoption of translation technology to ensure the industry continues to evolve and meet the growing demand for efficient, technology-driven translation processes.

Keywords: Jordan, perceptions and attitudes, translation industry, translation technology, translator training

1. Introduction

In today's globalized world, technological advancements have transformed translation from a niche activity into a significant industry driving global interconnectedness. The relationship between translation and technology has gained prominence, requiring translators to possess both linguistic expertise and technical proficiency. This shift has spurred scholarly interest in machine translation (MT) and translation technology (TT), with studies in the 1990s and 2000s exploring modern tools and their impact on the profession. Researchers have examined the evolution of TT tools (Somers 2005), the strengths and limitations of statistical and neural translation systems (Carl and Schaeffer 2017), and the role of human post-editing (PE) for high-quality outputs (O'Brien 2012). Ethical concerns, such as privacy and bias, have been highlighted by Gambier (2019), while O'Hagan and Ashworth (2002) explored TT's role in improving workflow and quality. Despite advancements, research on TT adoption in Arabic-speaking countries, including Jordan, is scarce.

This research aims to fill this gap by addressing the following objectives:

1. To assess TT adoption in Jordan, encompassing translation house employers and individual translators.
2. To contrast the perceptions of translation house employers and individual translators regarding TT's effectiveness, benefits, challenges, and impact on quality and workflow.
3. To explore training and support adequacy for Jordanian translators, particularly regarding TT, from the viewpoint of both translation house employers and individual translators.
4. To investigate projected trends and the future role of TT in Jordan's translation industry, as envisioned by translation house employers and individual translators.

Understanding TT adoption in Jordan offers insights for the global industry, informs academia, and aids decision-making. This research, emphasizing Jordan's role as a cross-cultural communication hub, identifies areas for improvement, enhancing international collaboration and knowledge exchange.

The study begins with a literature review (Section 2), followed by a discussion of TT's historical development (Section 3) and Jordan's translation landscape (Section 4). The methodology (Section 5) details data collection, scoring, and reliability assessment. Survey data from translation houses and individual translators are analyzed and discussed (Section 6), with conclusions highlighting key findings and implications for TT's future in translation (Section 7).

2. Literature review

The advancement of MT and TT over the past two decades has transformed the translation landscape, prompting extensive research into their impact on the profession. For instance, Gaspari, Almaghout and Doherty (2015) found dissatisfaction with free online MT systems among translators, teachers, and LSPs. Likewise, Zaretskaya, Corpas, and Seghiri (2017) noted a preference for user-friendly CAT tools that enhance productivity. Similarly, Macías, Ramos and Rico (2020) reported negative attitudes toward MT and PE among migration translators, while Bundgaard (2017) linked MT's cognitive demands to translator resistance toward Translator-Computer Interaction (TCI).

Other studies highlight positive perceptions. Koskinen and Ruokonen (2017) found that 70 percent of translators viewed TT favorably due to productivity gains. Additionally, Borucinsky, Kegalj and Vukalović (2022) reported satisfaction with CAT tools among Croatian translators, emphasizing the need for training. Salmi (2021) observed strong support for TT among business translators, while Dillon and Fraser (2006) identified IT proficiency as key to adopting translation memory. Regarding PE, Cadwell, O'Brien and Teixeira (2018) and Guerberof (2008) noted general satisfaction, though concerns about MT quality persist. Similarly, Specia and Torres (2012) found that 32 percent of translators avoided PE due to doubts about output quality.

Moreover, comparative studies offer further insight. For example, Qin, Zhang and Lu (2019) identified a significant quality gap between GNMT and human translations. Muftah (2022), in contrast, reported no significant difference in adequacy for Arabic–English translations, suggesting a shift in translators' roles from sole producers to editors of MT output. Kasperė et al. (2023) used eye-tracking to explore how professionals and non-professionals read MT output, while Povilaitienė and Kasperė (2022) emphasized the importance of human evaluation in assessing MT suitability.

A recent contribution to TT research is *The Routledge Handbook of Translation and Technology* (O'Hagan 2020), particularly Section 2, which explores TT use across various user groups, including LSPs, public institutions, freelancers, learners, and non-professionals. Esselink (2020) describes how multinational LSPs use translation management systems (TMS) to streamline workflows and integrate MT, TM, and QA tools, despite tool fragmentation. Caffrey and Valentini (2020) show how institutions like WIPO combine TM and MT (e.g., WIPO Translate) to process patent corpora while maintaining quality. King (2020) highlights increasing TT adoption among small and medium-sized LSPs, with NMT valued for its productivity. Zetzsche (2020) examines freelancers' evolving use of CAT tools, calling for greater integration, autonomy, and sustainable design. Collectively, these studies (see also O'Hagan 2020; Bowker and Marshman 2009) highlight the growing centrality of terminology management, QA modules, and TMS platforms in professional workflows.

While TT has been widely studied globally, research in Arabic-speaking countries remains limited. For example, Zantout and Guessoum (2000) highlighted MT's strategic role and called for regional development. Similarly, Almutawa and Izwaini (2015) found limited trust in MT among Saudi institutions. Waʿrab (2017) reported that 94.45 percent of Algerian court translators held negative views of MT and CAT tools. Mahfouz (2018) observed favorable attitudes toward CAT tools among Egyptian translators for their speed benefits. Mohammed, Samad Shaikh and Mahdi (2020) found Yemeni translators generally positive toward CAT tools but saw no link between MT skills and employability. Additionally, Al-Mehawess, Aldubaikhi and Alowedi (2023) reported that Saudi translators exhibited varying levels of familiarity with translation technologies, influenced by training, education, and professional experience.

Specifically in Jordan, research on translation technology remains scarce. AlSaleem (2020) found that most governmental and non-governmental organizations avoid MT tools like Google Translate and Babylon, viewing them as unreliable and requiring extensive PE. Mahadin and Olimat (2022) examined COVID-19 translations and noted translator hesitancy toward MT, citing terminology challenges and the need for a standardized glossary. Overall, the consistently negative feedback from Jordanian translators and organizations signals the need for further study of TT's role in the local industry.

In summary, studies on translators' perceptions of TT and PE reflect a

nuanced picture. Some highlight dissatisfaction with free MT systems and a preference for user-friendly CAT tools. Others emphasize the need for training, especially for novice translators. While PE is generally viewed positively, concerns persist about MT quality. Comparative evaluations often show MT's quality gap, though some studies report more favorable views. Across Arabic-speaking contexts, attitudes range from mistrust in MT to support for TT's productivity. In Jordan specifically, organizational skepticism continues to shape translators' hesitancy toward TT adoption.

This study addresses that gap by investigating TT usage in Jordan's translation industry, drawing on input from both institutions and individual translators. Unlike previous studies (e.g., AlSaleem 2020; Mahadin and Olimat 2022), it offers a broader perspective on TT's impact on workflows and professional roles. In doing so, it contributes to more informed strategies for TT integration and a clearer understanding of local awareness levels.

3. The evolution of translation technology: A brief history

The origins of MT trace back to the ninth century with Al-Kindi, a cryptographer who innovated systematic translation techniques using cryptanalysis, frequency analysis, and probability principles (DuPont 2018). During the Renaissance, printed dictionaries and thesauruses facilitated term equivalence across languages, advancing translation accuracy. By the 17th and 18th centuries, visionaries like Athanasius Kircher and George Dalgarno experimented with mechanical translation devices. Kircher, for instance, designed wooden "computers" that enabled direct word substitutions (DuPont 2018).

However, TT's significant advances are largely attributed to progress in computer science and computational linguistics beginning in the 1950s, exemplified by the *Georgetown-IBM MT system*, which performed automatic translation of over sixty sentences from Russian to English (*Georgetown–IBM Experiment* n.d.). Despite its limitations in scope and challenges with linguistic intricacies due to computational constraints (Nye 2016), this early MT experiment spurred further research globally, including in the Soviet Union (Hutchins and Somers 1992:6).

The initial MT phase faced setbacks as early translation programs proved inefficient in quality, time, and cost. However, in the 1960s and 1970s, rule-based approaches using linguistic rules and grammar emerged, with systems *like Systran, Lucy LT*, and *Apertium* advancing TT but struggling with language nuances due to grammar and context complexity (Torregrosa et al. 2019).

Subsequently, the 1980s and 1990s saw breakthroughs in statistical machine translation (SMT), driven by advances in computer technology and linguistics, particularly computational and corpus linguistics (Borucinsky, Kegalj and Vukalović 2022). SMT, which uses bilingual data to predict translations, improved quality but required extensive PE to address context issues, as demonstrated by early versions of *Google Translate* (Al-Dabbagh 2014).

The 21st century introduced NMT via artificial neural networks, allowing systems like GNMT to produce coherent, contextually accurate translations that resemble human expression. NMT harnesses large datasets to refine translations, marking a substantial leap in cross-cultural communication.

As TT evolved, the focus shifted toward a synergy between machines and human translators, as seen in CAT tools, memory systems, and terminology databases. More recently, Large Language Models (LLMs), such as ChatGPT**,** have entered the translation space, offering context-aware assistance and reshaping translator–technology interaction. This blend of advanced tools and human expertise now anchors the modern translation industry, enhancing speed, cost-efficiency, and consistency across projects.

4. The translation scene in Jordan: An overview

The translation scene in Jordan gained prominence in the late 20th century with the establishment of governmental institutions overseeing translation. Previously, efforts were fragmented and lacked regulation, hindering development (Shunnaq 1997). A major milestone was the 1961 establishment of the *Jordanian Committee for Arabicization, Translation, and Publishing* under the *Ministry of Education*, tasked with translating books and Arabicizing foreign terms. However, financial constraints limited its output to seven books over 15 years (Anāʿūry 1985).

To address these limitations**,** the *Jordan Academy of Arabic* was founded in 1976. Granted financial and administrative independence, the Academy promoted translation, Arabicized scientific education and terminology, and organized scholarly competitions (Shunnaq 2016). It has published 20 reference works in fields like physics and health sciences and over 60 terminology catalogues (*Targamat Al-kutub Alʿilmiyā n.d.; Al-muṣṭalaḥāt n.d.*). To further highlight translation's importance, the Academy launched a *Best Translated Book Competition* in 2023.

Alongside this institutional growth, key contributors in the 1970s and 1980s included the *Royal Scientific Society* and the *Royal Academy for Islamic Civilization Research*. The former focused on Arabicizing and translating scientific materials, such as construction codes (Shunnaq 2016). The latter undertook translations of works like *The Educational System in Islam and Christianity* (1996), promoting interfaith understanding (Shunnaq 2016).

The *Jordanian Translators' Association* (JTA), established in 1993 under the *Ministry of Culture*, supports translators through training, quality standardization, and accreditation (Al-Hamad 2014; Shunnaq 2016). Since 2008, the Ministry of Culture has advanced translation by issuing translated books and, more recently, translating 100 short stories and poems focusing on Jordanian creative writing (Dḥayāt 2022).

True growth occurred in the late 20th and early 21st centuries, driven by private-sector expansion fueled by globalization. Jordan now has 187 registered translation companies offering legal, medical, and commercial services (*Number of Translation Companies in Jordan 2023*). Leading firms like *Tarjama, e-Arabization, Rosetta International*, and *Linguative* provide localization, subtitling, and interpreting services, employing advanced TT tools to enhance efficiency.

Tarjama's 2022 launch of an Arabic Machine Translation website positioned it as a *MENA* leader in language technology (Multilingual 2022).

Over the last two decades, Jordan's translation industry has adapted to evolving national and international demands. While it promotes cross-cultural understanding and knowledge exchange, challenges remain, including quality assurance, technology integration, a lack of regulatory oversight, and the need for skilled translators. Addressing these issues is crucial for the industry's continued growth and regional impact. In parallel, translator training has expanded through 15 undergraduate and 6 postgraduate programs at Jordanian universities, aimed at equipping graduates with the skills needed to meet market demands—particularly in Arabic–English–Arabic translation (Al-Dabbagh and Othman 2024).

5. Methodology

5.1 Data collection

Data for this study was collected via a secure online survey targeting two groups: individual translators and translation houses in Jordan. Survey links were shared through professional networks, industry associations, email invitations, and direct outreach to ensure diversity. Separate surveys were designed for each group, with three sections: (1) study objectives and informed consent, guaranteeing confidentiality, anonymity, and voluntary participation; (2) demographic information; and (3) statements on technology integration, TT efficiency, training, support, and future trends (see Tables 5 – 8). Field professionals reviewed the surveys, and their recommendations were incorporated to enhance validity and reliability.

5.2 Study tool and scoring method

The survey instruments focused on quantitative data analysis, employing a five-point Likert scale to measure participants' agreement with TT-related statements. Responses were weighted as follows: Strongly Disagree (1), Disagree (2), Neutral (3), Agree (4), and Strongly Agree (5). A systematic scoring procedure was used to determine agreement levels, assigning numerical values from 1 to 5.

To categorize responses, a class interval was calculated using the formula: Class Interval = Range ÷ Number of Levels = 4 ÷ 3 = 1.33. Based on this, the responses were categorized into the following agreement classes:

(1 - 2.33) indicates a low level of agreement.

(2.34 - 3.67) indicates a moderate level of agreement.

(3.68 - 5.00) indicates a high level of agreement.

5.3 Instrument reliability assessment

Pearson's correlation coefficient was used to assess instrument reliability by measuring the relationship between each dimension and the total scale score. Table 1 presents these correlation values.

Table 1. Pearson correlations between total dimension and scale scores

Sample	Dimension	Correlation with Total Score
Translation Employers	Technology Integration	0.927*
	Efficiency of Translation Technology	0.886*
	Training and Support	0.865*
	Future Outlook/Trends	0.800*
Translators	Translation Technology Usage	0.831*
	Perceptions and Attitudes toward Translation Technology	0.745*
	Training and Support	0.748*
	Future Trends	0.751*

*Correlation is significant at the (0,01) level.

In both Survey 1 and Survey 2, the high correlation coefficients (ranging from 0.745 to 0.927) indicate a strong alignment between responses within each dimension and the overall scale scores. For instance, in Survey 1, Dimension A (Translation Technology Integration) has a correlation coefficient of 0.927, signifying that positive individual ratings within this dimension align with high overall scores. The note 'Correlation is significant at the 0.01 level' confirms statistical significance, reinforcing the internal consistency and reliability of the survey dimensions. This implies that questions within each dimension offer a cohesive and consistent measurement of the intended construct.

5.4 Internal consistency evaluation

Internal Consistency of the instrument was assessed using Cronbach's Alpha coefficient. The coefficient ranges from 0 to 1, with values ≥ 0.6 typically considered acceptable indicators of internal consistency. The Cronbach's Alpha results for both surveys (Table 2) indicate a satisfactory level of internal consistency across the survey items.

Both surveys exhibit high overall reliability (Survey 1: Cronbach's Alpha = 0.930; Survey 2: Cronbach's Alpha = 0.870), ensuring dependable measurements. This reliability indicates that the statements within various dimensions are internally consistent. Although some dimensions display moderate reliability—possibly due to item specificity—the overall Cronbach's Alpha values (0.930 for Survey 1 and 0.870 for Survey 2) confirm that the instruments are reliable and suitable for assessing the targeted variables.

Table 2. Cronbach's Alpha coefficient for internal consistency

Sample	Dimension	Number of Statements	(α) alpha
Translation Employers	Technology Integration	3	0.920
	Efficiency of TT	3	0.732
	Training and Support	3	0.752
	Future Outlook/Trends	4	0.887
	All	13	0.930
Translators	TT Usage	3	0.791
	Perceptions and Attitudes toward TT	4	0.797
	Training and Support	4	0.774
	Future Trends	5	0.737
	All	16	0.870

6. Findings and discussion

6.1 Participant information

This section provides an overview of the participants involved in the surveys: translation houses and individual translators. The survey received responses from 24 of the 187 registered translation companies in Jordan, with founders and managers completing the questionnaire on behalf of their organizations, as well as from 59 individual translators.

Table 3. Sample distribution by translation house characteristics (N=24)

Variable	Category	Frequency	Percentage (%)
Years in operation	1-5 years	12	50.0
	6-10 years	4	16.7
	More than 10 years	8	33.3
Translators employed	1 to 10	15	62.5
	11 to 50	5	20.8
	51 to 100	3	12.5
	More than 100	1	4.2
Annual volume of translation projects	Low (up to 1,000 projects)	11	45.8
	Moderate (1,001-5,000 projects)	5	20.8
	High (5,001-10,000 projects)	8	33.3

For translation houses, three variables were examined: years in operation, number of translators employed, and annual volume of translation projects (see Table 3). The data shows a range in years of operation, with 50 percent of these houses offering translation services for 1-5 years, 33.3 percent for over 10 years, and 16.7 percent for 6-10 years. This diversity corresponds to variation in the number of translators employed: 62.5 percent of the houses employ between 1-10 translators, 20.8 percent employ 11-50, 12.5 percent employ 51-100, and one house employs over 100 translators (4.2%).

This variation in staffing is linked to the volume of projects handled annually. Among the 24 houses, 45.8% complete fewer than 1,000 translation projects per year.

Table 4. Sample distribution by translator characteristics (N=59)

Variable	Category	Frequency	Percentage (%)
Age	18-24	13	22.0
	25-34	35	59.3
	35-44	4	6.8
	45-54	2	3.4
	55 and above	5	8.5
Gender	Male	23	39.0
	Female	36	61.0
Educational background	Bachelor's degree	38	64.4
	Master's degree	20	33.9
	Ph.D. or higher	1	1.7
Years of experience as a translator	Less than 1 year	3	5.1
	1-5 years	34	57.6
	6-10 years	10	16.9
	More than 10 years	12	20.3

For translators, data were collected on age, gender, education, and experience (Table 4). The average respondent age was 31, with females (61%) outnumbering males (39%), aligning with the view that translation is a female-dominated profession (Ferreira-Alves 2012; Mahadin and Olimat 2022). Most participants (64.4%) held undergraduate degrees, while 35.6 percent had postgraduate qualifications (MA or PhD). Regarding experience, 57.6 percent had 1-5 years, 16.9 percent had 6-10 years, and 20.3 percent had over 10 years. This range of experience reflects typical trends in Jordan's translation workforce, consistent with findings from similar studies (Mahadin and Olimat 2022).

The diverse characteristics of the surveyed houses and translators, as reflected in Tables 3 and 4, are advantageous for the study. These characteristics align with the study's aim to provide a comprehensive understanding of the translation landscape in Jordan by including a varied and representative participant pool. This diversity ensures that the study's findings are based on a wide range of experiences and perspectives within the translation industry, enhancing the study's validity and relevance.

6.2 Attitudes and perceptions toward TT in Jordan

This section analyzes attitudes and perceptions toward TT in Jordan based on survey responses from translation houses and translators. Participants evaluated four dimensions: technology integration and usage, TT efficiency, training and support, and future trends. The statistical results and a detailed discussion of the responses from both groups are presented below.

6.2.1 Employers' views on TT

Tables 5 and 6 present the survey findings from translation house employers, offering insights into their perceptions across key dimensions related to TT. The data showcases agreement levels, arithmetic means, and standard deviations, revealing their views on technology integration (Dimension A), efficiency (Dimension B), training and support (Dimension C), and future industry trends (Dimension D).

Table 5. Employers' views on TT: Dimensions A and B (N=24)

Dimension		Statement	Arithmetic Mean	Standard Deviation	Rank
Technology Integration	1	The translation house extensively uses translation technology in its translation work	3.87	0.79	1
	2	The translation house has significantly invested in translation technology infrastructure	3.73	0.76	2
	3	The translation house has fully integrated translation technology in its workflow	3.63	0.72	3
		Grand Mean	4.15	0.71	---
Efficiency of Translation Technology	1	Using translation technology is highly effective in improving translation quality	4.16	0.83	2
	2	The use of translation technology significantly shortens project turnaround time	4.38	0.92	1
	3	The translation house is very satisfied with the level of efficiency achieved through translation technology	3.74	0.76	3
		Grand Mean	3.87	1.50	---

Within Dimension A (Technology Integration), translation houses express predominantly positive viewpoints. Statement 1 ranks highest (M = 3.87), indicating extensive technology use, followed by Statement 2 (M = 3.74), which reflects investment in TT infrastructure. Statement 3, on full workflow integration, receives the lowest mean (M = 3.63). Overall, this dimension reveals a generally high level of agreement, although a standard deviation of 1.54 suggests some diversity in perspectives.

The adoption of TT by the surveyed translation houses reflects their recognition of its role as both an "inescapable reality" and an "absolute necessity" (Samuelsson-Brown 1996) in today's commercially driven translation industry, where efficiency and cost-effectiveness are increasingly in demand. To balance quality and cost, these providers have implemented TT and invested in relevant infrastructure. While feedback indicates that TT is gaining a stronger foothold in Jordan, full integration remains incomplete. This partial adoption may be linked to the high purchasing costs of TT tools (Almutawa and Izwaini 2015; AlSaleem 2020; King 2020).

In Dimension B (Efficiency of Translation Technology), translation houses generally hold positive views. Statement 2, regarding project turnaround time, ranks highest (M = 4.38), followed closely by Statement 1 on translation quality. In contrast, Statement 3, concerning satisfaction with overall efficiency, receives lower agreement. Like Dimension A, this dimension shows strong agreement overall, but a standard deviation of 1.68 indicates variability in perspectives.

Respondents' emphasis on TT's role in reducing turnaround time aligns with global consensus that TT increases productivity and enables faster delivery (King 2020). They also associate TT with improved quality, particularly through translation memory and terminology management tools, which support consistency. However, limited satisfaction with overall efficiency may reflect the constraints of currently available TT tools (Doherty 2016).

In Dimension C (Training and Support, Table 6), Statement 2, referring to translators' skills in using TT, ranks highest (M = 3.88), followed closely by Statement 3 on the effectiveness of vendor support (M = 3.71). The lowest-rated is Statement 1, which concerns the provision of extensive training. Unlike the previous dimensions, this one shows moderate agreement overall, with a standard deviation of 1.46, indicating varied perspectives.

The perception that translators are highly skilled likely relates to age: 59.3 percent of surveyed translators fall within the 25–34 age group, which may explain greater TT familiarity (Mikhailov 2015). As a result, translation houses may see less need to provide extensive training, especially given its high cost (Fulford and Granell-Zafra 2005). Positive views on vendor support are expected, since inadequate support could compromise software functionality and violate service agreements.

In Dimension D (Future Trends), employers show strong consensus. Statement 3, on integrating TT into university curricula, ranks highest, followed by Statement 4 on ongoing technological evolution. Statements 1 and 2, related to reliance on TT and challenges faced by translators, rank third and fourth, respectively. The grand mean for this dimension (4.26) reflects high overall agreement, while the low standard deviation (0.87) suggests minimal variation in opinion.

Table 6. Employers' views on TT: Dimensions C and D (N=24)

Dimension		Statement	Arithmetic Mean	Standard Deviation	Rank
Training and	1	The translation house has provided extensive training on the use of translation technology to its translators	3.13	0.68	3
	2	The translation house believes that its translators are highly skilled in utilizing translation technology	3.88	0.78	1
	3	The technical support provided by translation technology vendors is highly effective	3.71	0.74	2
		Grand Mean	3.60	0.85	---
Future Outlook/Trends	1	The translation house anticipates a significant increased reliance on translation technology in the future	4.17	0.88	3
	2	In the coming years, translators who are not equipped with the technical skills of translation technology will find it difficult to be employed in the translation industry in Jordan	4.17	0.85	4
	3	To equip translation graduates for the demands of the translation industry, universities must teach different courses in translation technology	4.33	0.91	1
	4	The translation house envisions translation technology to evolve with improved accuracy and performance	4.25	0.88	2
		Grand Mean	4.26	0.58	---

The respondents' answers regarding their future outlook on TT integration in the Jordanian translation industry indicate strong agreement that universities must integrate TT courses into their curricula. This reflects the belief that current translation programs have failed to align training with market needs (Khoury 2017; Mahadin 2018). Updating curricula is expected to equip trainee translators with both theoretical and practical skills, including hands-on experience with TT tools relevant to today's job market (Bowker 2002; Alonso and Viera 2020).

The results show that translation houses expect TT to improve in accuracy and performance, increasing reliance on such tools. This reflects their awareness of rapid technological change in the field. Notably, Statement 3—on the employability risks for translators lacking TT skills—ranked lowest in this dimension, yet still averaged above 4.0, indicating moderate agreement. This suggests the issue is acknowledged, though not seen as critical. Similar findings elsewhere highlight that employability depends not only on technical skills but also on the ability to work effectively with TT tools to meet industry demands (Bowker 2002; Mahfouz 2018; Mohammed et al. 2020).

In summary, across the four dimensions analyzed, translation houses in Jordan generally express positive attitudes toward TT. Strong agreement is evident in Dimensions B and D, particularly regarding TT's role in reducing project turnaround time and the importance of including TT in university programs. In contrast, Dimension C reflects more moderate agreement, pointing to varied perspectives on training and support. Overall, the results highlight a favorable stance toward TT adoption and its future trajectory, while also revealing some diversity in viewpoints, as shown by the standard deviations.

6.2.2 Translators' views on TT

Tables 7 and 8 present the outcomes of Survey 2, capturing individual translators' perspectives and attitudes towards TT in the Jordanian translation landscape. The table is organized into four dimensions examining aspects of technology use (Dimension A), efficiency (Dimension B), training and support (Dimension C), and future trends (Dimension D).

In Dimension A (Translation Technology Usage), translators exhibit strong engagement with TT. Statement 1 ranks highest (M = 4.36), reflecting their active involvement with technology, including MT and CAT tools. Statement 2 follows (M = 4.02), reinforcing a positive view of technology integration. Statement 3 also receives high agreement, indicating that translators generally perceive their institutions as supportive of technology adoption. Overall, this dimension reflects a highly favorable trend among individual translators in Jordan regarding both their personal use of TT and institutional support for it.

Strong agreement with Statements 1 and 2 suggests that translators are familiar with a wide range of TT tools and actively use them. This also implies that translation house services have moved beyond "traditional translation" to require "a variety of technical skills and software types" (Gaspari et al. 2015:335). This shift is evident on agency websites, where diverse services are prominently advertised (see Section 4). High agreement with Statement 3 further confirms that TT is becoming embedded in the Jordanian translation industry—a trend also seen globally (Gaspari et al. 2015:335).

In Dimension B (Efficiency of Translation Technology), translators exhibit a positive outlook on TT. Statement 2, on reducing project time, has the highest mean (4.54), followed by Statement 4 on workflow impact (M = 4.20). Statement 1, which addresses translation quality, ranks third (M = 4.14), while Statement 3, concerning confidence in TT accuracy, ranks fourth (M = 3.36), indicating

moderate agreement. Overall, this dimension reflects a strong endorsement of TT among Jordanian translators, particularly in terms of efficiency and quality, as shown by the grand mean of 4.06.

Table 7. Translators' views on TT: Dimensions A and B (N=59)

Dimension	Statement		Arithmetic Mean	Standard Deviation	Rank
Trans lation Tech nolog	1	I have used translation technology in my translation work (e.g., machine translation,	4.36	0.58	1
		translation memory tools, CAT tools)			
	2	I always use translation technology in my work	4.02	0.51	2
	3	The translation institution I work for encourages the use of translation technology	3.95	0.5	3
		Grand Mean	4.11	0.52	---
Efficiency of Translation Technology	1	I believe that translation technology improves the quality of translations	4.14	0.53	3
	2	I believe that translation technology reduces the time required to complete translation projects	4.54	0.61	1
	3	I am very confident in the accuracy of translation technology	3.36	0.43	4
	4	The use of translation technology has positively impacted the workflow within translation institutions	4.20	0.55	2
		Grand Mean	4.06	0.52	---

Regarding efficiency, speed (Statement 2) and workflow effectiveness (Statement 4) received the highest agreement, indicating that TT enhances productivity—a finding supported by earlier studies (Mahfouz 2018; Mohammed et al. 2020; Salmi 2021). Statement 4 confirms TT's role in streamlining institutional workflows (Salmi 2021). While Statement 1 reflects general agreement that TT improves quality, the lower mean for Statement 3 reveals limited confidence in accuracy, highlighting the need for post-editing and targeted training to ensure high-quality, context-appropriate output.

In Dimension C (Training and Support, Table 8), translators' responses indicate moderate agreement. Statements 1 and 2 share the top rank (M = 3.56), reflecting mixed views on training and support availability. This suggests that while some translators have received formal training and feel supported, others may lack

sufficient access or confidence in available resources. Statement 3, concerning PE training, follows with a mean of 3.08, while Statement 4, which highlights difficulties in using TT, ranks lowest (M = 2.88). This variability is reflected in the dimension's grand mean of 3.27, indicating that although basic training and support exist, further improvement is needed to enhance TT usage among translators.

The translators' responses reveal that training and support have not received due attention from translation houses. Although they acknowledge having received formal training and access to adequate support (Statements 1 and 2), they still report challenges when using TT (Statement 4). This moderate consensus regarding training may be attributed to the cost and time demands of such programs (Fulford and Granell-Zafra 2005), which can be especially burdensome for small and medium-sized agencies. Given that PE is essential for producing "polished" MT output (Kelly, DePalma and Stewart 2012), the moderate agreement with Statement 3—on the provision of PE training—suggests a notable gap. This is a shortcoming that translation houses must address to ensure high-quality output and maintain their reputations as reliable service providers.

In Dimension D (Future Trends), translators express a shared vision of the profession's technology-driven future. Statement 4, which emphasizes integrating TT into university curricula, ranks highest (M = 4.63), reflecting broad awareness of the need for technological preparedness. Statement 3, which anticipates employability challenges for translators lacking TT skills, follows closely (M = 4.44). These high levels of agreement suggest that Jordan's translation industry is aligning itself with global developments.

Notably, translators and employers alike strongly agree on the need for universities to incorporate TT into curricula, indicating that current programs fall short of industry expectations (Khoury 2017; Mahadin 2018). This need has prompted the development of resources such as the Undergraduate Learner Translator Corpus (ULTC), which supports TT-integrated pedagogy through the systematic analysis of student translation output (Al-Furaih and El-Jasser 2024). Additionally, while there is concern about TT's impact on job availability, translators do not share the view that it will "kill" the profession (Schmitt 2015:234). Instead, they show only moderate agreement with Statement 2, which suggests that TT may reduce demand for human translators. Regarding TT's future capabilities, respondents believe ongoing improvements will address current limitations.

In summary, individual translators in Jordan demonstrate strong engagement with TT and positive views on its integration, efficiency, and quality impact. However, improvements in training—especially in PE—are needed. Their responses also point to a cohesive vision for a more technologically integrated future in the translation industry.

Table 8. Translators' views on TT: Dimensions C and D (N=59)

Dimension	Statement		Arithmetic Mean	Standard Deviation	Rank
Training and Support	1	I have received formal training on the use of translation technology	3.56	0.45	1
	2	I have access to adequate training and support for using translation technology effectively	3.56	0.45	1
	3	The translation institution provides post-editing training	3.08	0.42	3
	4	I face many challenges when using translation technology	2.88	0.42	4
		Grand Mean	3.27	0.42	---
Future Outlook/ Trends	1	I believe that translation technology will play a role in decreasing the demand for human translators in the future	3.53	0.44	5
	2	I anticipate an increased reliance on translation technology in the future	4.22	0.56	4
	3	In the coming years, translators who lack the technical skills needed for translation technology will encounter challenges in finding employment in the translation industry in Jordan	4.44	0.59	2
	4	To prepare translation graduates for the demands of the translation industry, universities must offer various courses in translation technology	4.63	0.63	1
	5	I envision translation technology evolving with improved accuracy and performance	4.34	0.57	3
		Grand Mean	4.47	0.60	---

6.2.3 Comparing attitudes

Table 9 presents the results of an Independent Samples Test conducted to assess the attitudes toward using technology in translation work between translation houses and translators. The sample size for translation houses was 24, with an arithmetic mean attitude score of 3.99 and a standard deviation of 0.65. On the other hand, the

group of translators consisted of 59 individuals, yielding an average attitude score of 3.92 with a slightly lower standard deviation of 0.58. The test used 81 degrees of freedom (D.F.) to evaluate the significance of the observed difference between these two groups. The calculated T value (0.0584) was compared to the critical value (Significant T), which in this case is 0.954. The comparison indicates that the calculated value is less than the significant value, implying that there is no statistically significant difference (at 0.05 significance level) in the attitudes towards using technology in translation work between translation houses and translators. However, it is important to note that statistical significance can be influenced by various factors, so further analysis and contextual understanding may be necessary to draw meaningful conclusions from these findings.

Table 9. Comparison of attitudes of translation houses and translators

Sample	No.	Arithmetic Mean	Standard Deviation	D.F	T. Calculated	Significant (T)
Translation Employers	24	3.91	0.78	81	0.0584	0.954
Translators	59	3.92	0.49			

7. Conclusions

The advent of technology has transformed Jordan's translation industry over the past decade, increasing demand for translators with specialized TT skills. This study examined the perspectives of two key stakeholder groups—24 translation houses and 59 professional translators—on the impact of TT integration, focusing on four dimensions: (1) workplace integration, (2) efficiency, (3) training and support, and (4) future trends. Overall, responses were favorable across all dimensions, though agreement levels varied.

Both stakeholder groups reported using a range of TT tools. However, translation houses emphasized that only partial integration had been achieved in recent years. While both groups acknowledged TT's positive impact on productivity, quality, and teamwork, they also noted its limitations—particularly in producing fully accurate output—underscoring the continued importance of PE. Regarding training, translators reported generally adequate support, but with varied experiences; some expressed challenges in implementation. The lack of PE-focused training, combined with the high cost and time demands of training programs, particularly for smaller agencies, indicates a gap that remains to be addressed. Both groups also stressed the need to integrate TT instruction into university curricula to better prepare graduates for market demands. Additionally, while moderate agreement was expressed regarding the link between TT knowledge and employability, this item ranked lowest in its dimension—suggesting that the connection is acknowledged but not seen as decisive.

These findings must be viewed within the broader industry context. Half of the surveyed companies have operated for five years or less, and nearly 60 percent of translators have under six years of experience. This points to the relatively recent growth of Jordan's translation industry, which gained momentum only in the late

20th century. This recency may help explain ongoing gaps in infrastructure, training, and technology integration.

The study offers a robust quantitative overview but did not include qualitative input such as open-ended feedback. This limits the depth of interpretation and the ability to capture more nuanced stakeholder perspectives—area future research should explore. Another limitation is that the survey grouped different types of TT (e.g., CAT tools and MT) under a single category, despite the likelihood that translators engage with these technologies differently. This may have influenced some responses and should be refined in future studies.

Although the findings are based on a limited sample, they shed important light on TT implementation in Jordan from the viewpoint of two key stakeholder groups. The insights are likely transferable to other members of the translation community, given the shared dimensions under investigation. It is the researchers' view that the feedback gathered in this study will: (1) offer valuable insights into the translation landscape in Jordan, especially regarding TT; (2) inform academic and institutional discourse; (3) help address gaps in TT adoption; and (4) support future decision-making in technology integration across the industry.

Data availability

The raw data supporting the results and analysis presented in this article are openly available in the following publicly archived datasets at the provided links:

https://docs.google.com/forms/d/10nw421Hl2Zn4ZFx7rN0fU5Mi-65xazLg3a2cJRkUa7s/edit

https://docs.google.com/forms/d/17QS79eJjlqGtMuNQZ3HPk7JssRr2W1nP2bmzmfxVCuk/edit

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