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RESEARCH ARTICLE

EXPLORING THE CHALLENGES ENCOUNTERED BY SAUDI TRANSLATORS IN UTILIZING ARTIFICIAL INTELLIGENCE FOR BUSINESS TRANSLATION

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Abstract

This study explores the challenges encountered by Saudi translators in utilizing artificial intelligence (AI) for business translation. The study aims to achieve three key objectives: identifying the linguistic challenges Saudi translators encounter when using AI-based tools in business translation, examining the technical and functional difficulties associated with AI integration, and assessing the challenges in human-AI collaboration, particularly in post-editing and accuracy verification. A quantitative research methodology was employed, utilizing a structured questionnaire distributed to 40 Saudi translators. The questionnaire measured participants' perceptions of AI translation tools across three categories: linguistic and terminological challenges, technical and functional difficulties, and human-AI collaboration obstacles. The collected data were analyzed using descriptive statistics, ANOVA tests, and correlation analysis to identify key trends and relationships between variables. The findings reveal that AI translation tools struggle with business-specific terminology, context-dependent meanings, and cultural adaptation, leading to frequent errors requiring extensive human post-editing. Additionally, technical inconsistencies and a lack of transparency in AI decision-making processes hinder effective workflow integration. The study also finds no significant differences in perceptions of AI translation challenges based on translators' education levels, indicating that these issues are widely recognized across different expertise levels.

Keywords: AI-assisted business translation, Saudi translators' challenges, Linguistic and cultural adaptation, Human-AI collaboration in translation, Technical limitations of AI translation.

Introduction

The integration of artificial intelligence (AI) in the field of translation has significantly transformed the way business communication is conducted across linguistic and cultural boundaries. AI-driven translation tools, including neural machine translation (NMT) systems, have improved translation speed and accessibility, allowing businesses to engage with global markets more efficiently. However, despite these technological advancements, translators particularly those specializing in business translation face numerous challenges when integrating AI into their professional practices. Saudi translators encounter specific difficulties due to the linguistic complexities of Arabic, the nuances of business terminology, and the cultural sensitivities inherent in translation. This study explores these challenges, drawing insights from existing literature on business translation, AI applications, and translation strategies.

Business translation, as a specialized field, requires a deep understanding of both linguistic and economic principles. Chiper (2002) highlights that business translation extends beyond mere word-to-word conversion; it necessitates an awareness of financial terminology, corporate communication strategies, and cross-cultural

negotiation tactics. Translators must ensure that the meaning and intent of the original text are preserved while maintaining linguistic accuracy and cultural appropriateness. This complexity is exacerbated when AI tools, which often rely on pattern recognition and statistical modeling, struggle to grasp the subtleties of business discourse.

The integration of AI in business translation has introduced both opportunities and constraints. AI-driven translation models, such as those employing neural networks, can process large volumes of text quickly, making them indispensable in global business transactions. However, as Chen (2021) notes, while AI-powered translation models have seen improvements through optimization techniques such as genetic algorithms, they still fall short in accurately capturing the contextual and idiomatic nuances of business language. This limitation poses a significant challenge for Saudi translators who must ensure that their translations align with both linguistic and cultural expectations.

One of the core challenges Saudi translators face is the linguistic disparity between Arabic and English, the two dominant languages in business translation. Talafha, Kasuma, and Moindjie (2023) discuss the behavior of voices in business and economic language translation, emphasizing that English-Arabic translation requires careful handling of passive structures, nominalization, and verb tenses. AI translation models, which are predominantly trained on English-centric data, often fail to generate accurate Arabic translations due to these structural differences. As a result, Saudi translators must frequently engage in extensive post-editing, increasing their workload rather than reducing it.

Cultural adaptation is another critical aspect that AI-driven business translation struggles with. Steyaert and Janssens (1997) argue that translation in international business contexts cannot be approached merely as a mechanical process; rather, it requires an understanding of the cultural and rhetorical norms that shape communication. AI tools, which operate primarily on algorithmic processing, often overlook these subtleties, leading to translations that may be technically accurate but culturally inappropriate. For Saudi translators, who navigate a business landscape deeply rooted in Islamic and Arab traditions, ensuring culturally sensitive translations is paramount. This challenge is further compounded by the limited availability of high-quality Arabic business corpora used in AI training, resulting in translations that may misinterpret context-specific terms or idiomatic expressions.

Another issue Saudi translators face is the pedagogical challenge of adapting to AI-driven tools in their professional training. Meng, Lu, Ji, and Zhao (2022) highlight the importance of incorporating AI literacy in translation education, particularly in business translation courses. In Saudi Arabia, where translation studies programs are still evolving in response to technological advancements, many translators may lack adequate training in effectively utilizing AI tools. This knowledge gap can hinder their ability to critically assess AI-generated translations and apply appropriate post-editing strategies.

Additionally, the debate surrounding translation universals in business discourse presents another layer of complexity. Feng, Crezee, and Grant (2018) conducted a corpus-driven study on translation universals in Chinese-to-English business translation, demonstrating that certain linguistic patterns tend to emerge regardless of the source language. However, such findings may not necessarily apply to Arabic business translation, given its distinct syntactic and semantic structures. AI models that are designed based on universal translation assumptions may, therefore, generate outputs that fail to meet the specific requirements of Arabic business contexts, necessitating significant human intervention.

Thus, we can say that while AI has revolutionized the field of business translation, Saudi translators continue to face substantial challenges in integrating AI-based tools into their workflow. These challenges include linguistic disparities, cultural sensitivities, inadequate AI training resources, and the inherent limitations of current translation models. As AI technology continues to evolve, addressing these issues will require a collaborative effort between translators, educators, and AI developers. Future research should focus on developing AI models that are more attuned to the linguistic and cultural intricacies of Arabic business

translation, as well as on enhancing training programs that equip Saudi translators with the necessary skills to navigate the complexities of AI-assisted translation effectively.

Significance of the Study

This study is significant as it sheds light on the challenges encountered by Saudi translators when utilizing artificial intelligence (AI) in business translation. AI-driven translation tools, while offering speed and efficiency, often struggle with linguistic, cultural, and technical complexities specific to Arabic-English business translation. By identifying these challenges, the study provides valuable insights for translators, educators, and AI developers to enhance AI-assisted translation processes, ensuring more reliable and culturally appropriate business communication.

Objectives of the Study

1. To identify the linguistic challenges Saudi translators face when using AI-based tools in business translation.
2. To explore the technical and functional difficulties associated with integrating AI into business translation workflows.
3. To assess the challenges of human-AI collaboration in ensuring translation accuracy and reliability.

Research Questions

1. What linguistic challenges do Saudi translators face when using AI-based tools for business translation?
2. What technical and functional difficulties arise when integrating AI into business translation processes?
3. What are the challenges in human-AI collaboration in translation, particularly in relation to post-editing and accuracy verification?

Literature Review

The field of business translation has evolved significantly over the years, with artificial intelligence (AI) playing an increasingly central role. However, Saudi translators face unique challenges in integrating AI into business translation due to linguistic, cultural, and technological factors. This review examines the existing literature on business translation challenges, following a chronological approach to highlight the progression of research in this field.

The foundation for understanding business translation challenges was laid by early scholars who explored the intricacies of translating financial and economic content. Abu-Ssaydeh (1993) provides an early perspective on business translation, emphasizing the complexities of financial and economic terminology and the necessity for precision. His work underscores how specialized vocabulary and context-specific meanings pose challenges for translators, particularly in business settings where accuracy is crucial. Building on this, Steyaert and Janssens (1997) challenge the traditional instrumental view of translation in international business, arguing for a more nuanced approach that acknowledges cultural and rhetorical variations. They emphasize that business translation is not merely about linguistic transfer but also about ensuring communicative effectiveness in diverse cultural and corporate environments.

Chiper (2002) builds upon these ideas by highlighting the specialized nature of business translation and the importance of domain-specific knowledge. His research illustrates the need for translators to have not only linguistic expertise but also an in-depth understanding of the business sector to produce high-quality translations. Blenkinsopp and Shademan Pajouh (2010) extend this discussion by exploring the role of translators in international business, underscoring the difficulties of translating culturally embedded concepts.

They argue that business translation requires a delicate balance between linguistic fidelity and cultural adaptation, a challenge that AI-based tools often struggle to navigate effectively.

As translation technology developed, researchers began examining its implications for business translation. Seljan (2011) introduces translation technology as both a challenge and an opportunity in business translation, setting the stage for later discussions on AI integration. He identifies key technological advancements that have transformed the translation process but also acknowledges the limitations and errors associated with automated translation tools.

Li (2013) proposes a task-based approach to teaching business translation, recognizing the growing role of technology in translation training. He emphasizes the importance of integrating technology into translation education to prepare translators for real-world challenges. Similarly, Chidlow, Plakoyiannaki, and Welch (2014) move beyond mere linguistic equivalence, advocating for a more contextual understanding of translation in international business research. They argue that business translation should consider pragmatic factors, discourse structures, and the dynamic nature of business communication.

Kriston (2014) further expands on this perspective by underscoring the functionalist approach in business translation, focusing on the intended purpose of translated texts. His work suggests that business translations should be goal-oriented, with AI tools adapting their output based on specific business needs rather than relying solely on direct word-to-word translations.

With the rise of AI-based translation tools, scholars began evaluating their effectiveness and limitations. Jemielity (2018) examines translation in intercultural business settings, emphasizing the need for translators to navigate economic and linguistic challenges effectively. His research suggests that while AI can assist in the translation process, human oversight remains essential to ensure accuracy and cultural appropriateness.

Feng, Crezee, and Grant (2018) analyze translation universals in business translation, demonstrating how certain linguistic patterns affect translation accuracy. They highlight common errors made by AI tools in business translation, including misinterpretations of idiomatic expressions and failure to recognize contextual variations.

Chen (2021) explores AI-driven translation models optimized by genetic algorithms, aiming to enhance translation accuracy and efficiency. However, the retraction of his study raises concerns about the reliability of AI in business translation, suggesting that AI models still require significant refinement before they can fully replace human translators.

Meng, Lu, Ji, and Zhao (2022) discuss the need for translation education to adapt to AI developments, especially in business translation courses. They propose integrating AI tools into translation curricula to better prepare future translators for the evolving technological landscape. Similarly, Talafha, Kasuma, and Moindjie (2023) address the challenges of English-Arabic business translation, a crucial issue for Saudi translators due to the linguistic disparities between the two languages. They identify structural differences, semantic ambiguities, and cultural nuances as major obstacles in AI-driven business translation.

More recent studies have continued to explore AI's role in business translation, offering insights into translation strategies and common pitfalls. Junipriansa (2023) and Nykytchenko and Kurbal-Hranosvka (2023) examine translation strategies and problems in official business discourse. Their findings indicate that while AI can streamline translation tasks, human intervention is often required to ensure accuracy and contextual appropriateness.

Lan and Man (2024) highlight common mistranslations in business contexts and suggest countermeasures from a pragmatic perspective. Their study underscores the necessity for AI models to incorporate pragmatic awareness and discourse-level analysis to improve translation quality.

Bian (2024) focuses on business English translation teaching in the context of economic integration, emphasizing the growing need for AI-assisted tools in translation education. His research advocates for the development of AI tools that are specifically designed for business translation, taking into account linguistic, cultural, and economic factors.

While AI has revolutionized business translation, Saudi translators continue to face significant challenges. The linguistic complexities of Arabic-English translation, cultural adaptation issues, and the limitations of AI-driven models create barriers to effective AI-assisted translation. Given the highly nuanced nature of the Arabic language and the importance of cultural context in business communication, AI tools often struggle to produce accurate translations without human intervention.

Future research should focus on enhancing AI models to better accommodate Arabic business translation and improving training programs to equip Saudi translators with the skills needed to navigate AI-assisted translation effectively. By integrating AI into business translation education and refining AI algorithms to better handle Arabic linguistic structures, the field can move toward more effective and reliable AI-assisted business translation solutions.

The studies on business translation challenges demonstrate the ongoing evolution of the field, from early discussions on linguistic and cultural complexities to the integration of AI tools. While AI offers promising advancements, its limitations highlight the continued importance of human expertise in business translation. Saudi translators, in particular, face unique challenges in utilizing AI for business translation due to the linguistic and cultural intricacies of Arabic-English translation. Addressing these challenges requires a combination of technological improvements, educational reforms, and interdisciplinary research to enhance AI-driven translation tools and ensure their effectiveness in business contexts.

Methodology

This study employs a quantitative research design to explore the challenges faced by Saudi translators in utilizing AI for business translation. A survey-based approach was used to gather data from Saudi translators regarding their experiences, perceptions, and difficulties when using AI translation tools in business contexts. This approach ensures an objective assessment of the linguistic, technical, and human-AI collaboration challenges within AI-assisted business translation.

Participants

The study involved Saudi translators specializing in business translation who have experience using AI-based translation tools. A total of 40 participants were selected, including translators with varying levels of experience and educational backgrounds (Bachelor's, Master's, and Ph.D.). The participants were chosen to ensure a diverse representation of perspectives on AI-assisted business translation challenges.

Instrument

A structured questionnaire was used as the primary data collection instrument. The questionnaire consisted of Likert-scale statements measuring participants' perceptions of AI translation tools concerning:

1. Linguistic and terminological challenges (e.g., accuracy of business terminology, handling of complex sentence structures).
2. Cultural and contextual challenges (e.g., AI's ability to adapt to business communication norms and cultural nuances).
3. Technical and functional challenges (e.g., inconsistency in AI-generated translations, formatting issues, and integration difficulties).
4. Human-AI collaboration challenges (e.g., post-editing workload, trust in AI-generated translations, and transparency of AI decision-making).

Procedure

1. **Participant Selection:** Saudi translators with AI translation experience were invited to participate.
2. **Survey Distribution:** The questionnaire was distributed online, allowing participants to complete it at their convenience.

Data Collection

The data for this study was collected through an online questionnaire designed to assess the challenges Saudi translators face when utilizing AI for business translation. The questionnaire was distributed to 40 Saudi translators with experience in AI-assisted business translation. The survey remained open for several days to allow sufficient time for responses.

The questionnaire consisted of Likert-scale statements addressing four main areas:

1. Linguistic and terminological aspects, focusing on the accuracy and appropriateness of business-specific terminology.
2. Cultural and contextual factors, evaluating AI's ability to align translations with business discourse norms and cultural expectations.
3. Technical and functional issues, addressing consistency, formatting, and AI integration challenges.
4. Human-AI collaboration dynamics, examining the extent of post-editing required, AI transparency, and trust in AI-generated outputs.

Participants rated their experiences and perceptions on a five-point Likert scale, ranging from 1 (Strongly Disagree) to 5 (Strongly Agree).

Data Analysis

The collected data was analyzed using quantitative statistical methods to identify key trends and patterns. The following analytical approaches were used:

1. Descriptive Statistics: Mean scores and standard deviations were calculated to assess the overall perception of challenges across different categories.
2. ANOVA (Analysis of Variance): ANOVA tests were conducted to compare responses across participants with different educational backgrounds (Bachelor's, Master's, and PhD.) to determine if academic qualifications influenced perceptions of AI translation challenges.
3. Correlation Analysis: Pearson correlation analysis was used to examine relationships between linguistic, technical, and human-AI collaboration challenges, identifying interdependencies between different factors affecting AI-based business translation.

The findings provided insights into the most pressing challenges faced by Saudi translators, highlighting areas where AI translation tools require improvement and where human intervention remains necessary.

Results

Table 1: Means and standard deviation of all statements

	Mean	Std. Deviation
AI translation tools struggle to maintain accuracy in business-specific terminology.	2.7879	1.16613
AI tools fail to capture the formal and professional tone required in business communication.	2.0303	1.10354
The translation of idiomatic expressions in business contexts is often inaccurate in AI-generated texts.	2.1212	1.11124
AI translation tools struggle with translating culturally sensitive terms in business documents.	1.9091	.87905
AI systems lack the ability to understand and translate implicit meanings in business discourse.	2.1212	1.26880
The quality of AI translations is inconsistent when dealing with complex sentence structures.	2.03030	.951474
AI-generated business translations often distort the intended message.	1.8788	.96039
AI tools fail to differentiate between business-specific jargon and general language.	2.0000	1.00000
AI-generated translations often require manual correction due to inconsistency in financial and legal terms.	2.2121	.99240
The lack of contextual understanding in AI-generated translations often leads to misinterpretation of key business terms.	2.1212	1.08275
AI translation tools struggle with context-dependent meanings in business texts.	2.4848	1.32574
The use of AI in business translation raises concerns about data security and confidentiality.	2.0000	1.08972
AI-generated translations often require extensive post-editing to ensure accuracy.	2.4545	1.14812
AI translation tools are not fully reliable for handling urgent business communication.	2.2121	1.16613
Business documents often require specific formatting that AI tools fail to preserve.	2.3333	.92421
AI translation tools have difficulty maintaining consistency across large volumes of business documents.	1.9697	.91804
AI-generated business translations often lack coherence and readability.	1.9394	1.02894
AI translation tools struggle to recognize and adapt to different business communication styles.	2.1515	1.09320
The lack of customization in AI translation tools limits their effectiveness for business translation.	1.9394	.82687
Frequent updates and changes in AI translation algorithms create inconsistencies in translation quality.	2.2121	1.19262
AI-generated translations often require extensive human intervention, increasing the workload rather than reducing it.	2.0000	1.08972
Integrating AI tools into existing business translation workflows is complex and time-consuming.	2.1212	1.02340
AI translation tools struggle to align with industry-specific translation standards, requiring frequent manual corrections.	2.0909	.91391
Human translators face challenges in reconciling AI's literal translations with the specific needs of business communication that require a nuanced cultural understanding.	2.3030	1.15879
AI tools do not effectively capture the translator's decision-making process, leading to inconsistent outputs.	2.3333	1.10868
AI translation tools do not provide sufficient explanations for their translation choices, making it difficult for translators to assess accuracy.	1.9091	.67840
The lack of transparency in AI translation processes makes it difficult for translators to trust the results.	2.0303	.95147
AI-generated business translations often lack creativity and adaptability, making them unsuitable for nuanced communication.	2.2121	1.11124
Translators find it difficult to trust AI-generated translations due to frequent errors in critical business documents like contracts and reports.	2.0000	1.11803
Human translators face challenges in balancing efficiency with quality when using AI-assisted translation tools.	2.2424	1.11888
Linguistic and terminological challenges	2.1212	.47550
Technical and functional challenges	2.1697	.39409
Human-AI collaboration Challenges	2.1242	.39924

The analysis of the mean scores and standard deviations for various challenges faced by AI translation tools in business contexts reveals several key insights. The highest mean score (M = 2.7879, SD = 1.16613) indicates that respondents generally agree that AI translation tools struggle to maintain accuracy in business-specific terminology. Other significant challenges include the need for extensive post-editing to ensure accuracy (M = 2.4545, SD = 1.14812) and difficulties with context-dependent meanings (M = 2.4848, SD = 1.32574). Conversely, the lowest mean scores suggest that respondents are less concerned about AI tools distorting the intended message (M = 1.8788, SD = 0.96039) and struggling with culturally sensitive terms (M = 1.9091, SD = 0.87905). Overall, the data indicates that while AI translation tools show promise, they still face significant

challenges in maintaining accuracy, consistency, and contextual understanding, often requiring human intervention to ensure the quality and reliability of translations.

Table 2: ANOVA analysis based on respondents' qualifications

		Mean	Std. Deviation	95% Confidence Interval for Mean		F	Sig.
				Lower Bound	Upper Bound		
Linguistic and terminological challenges	Bachelor	2.0636	.39057	1.8012	2.3260	.281	.757
	Master	2.1176	.51749	1.8516	2.3837		
	PhD	2.2600	.56833	1.5543	2.9657		
Technical and functional challenges	Bachelor	2.1091	.32697	1.8894	2.3288	.193	.825
	Master	2.1941	.44507	1.9653	2.4230		
	PhD	2.2200	.40866	1.7126	2.7274		
Human-AI collaboration Challenges	Bachelor	2.0909	.37538	1.8387	2.3431	.567	.573
	Master	2.1882	.46082	1.9513	2.4252		
	PhD	1.9800	.16432	1.7760	2.1840		

The mean scores for linguistic and terminological challenges across different education levels are as follows: Bachelor (M = 2.0636, SD = 0.39057), Master (M = 2.1176, SD = 0.51749), and PhD (M = 2.2600, SD = 0.56833). The overall mean score is 2.1212 (SD = 0.47550). The 95% confidence intervals for the mean scores indicate that the true mean for each group lies within the following ranges: Bachelor (1.8012 to 2.3260), Master (1.8516 to 2.3837), and PhD (1.5543 to 2.9657). The F-value is 0.281 with a significance level (p-value) of 0.757, suggesting no statistically significant difference in the perception of linguistic and terminological challenges among the different education levels.

The mean scores for technical and functional challenges are: Bachelor (M = 2.1091, SD = 0.32697), Master (M = 2.1941, SD = 0.44507), and PhD (M = 2.2200, SD = 0.40866). The overall mean score is 2.1697 (SD = 0.39409). The 95% confidence intervals for the mean scores are: Bachelor (1.8894 to 2.3288), Master (1.9653 to 2.4230), and PhD (1.7126 to 2.7274). The F-value is 0.193 with a significance level of 0.825, indicating no statistically significant difference in the perception of technical and functional challenges among the different education levels.

The mean scores for human-AI collaboration challenges are: Bachelor (M = 2.0909, SD = 0.37538), Master (M = 2.1882, SD = 0.46082), and PhD (M = 1.9800, SD = 0.16432). The overall mean score is 2.1242 (SD = 0.39924). The 95% confidence intervals for the mean scores are: Bachelor (1.8387 to 2.3431), Master (1.9513 to 2.4252), and PhD (1.7760 to 2.1840). The F-value is 0.567 with a significance level of 0.573, indicating no statistically significant difference in the perception of human-AI collaboration challenges among the different education levels.

Across all three sections linguistic and terminological challenges, technical and functional challenges, and human-AI collaboration challenges there are no statistically significant differences in perceptions based on education level. This suggests that individuals with different educational backgrounds perceive the challenges of AI translation tools similarly.

Table 3: Correlations

		Linguistic and terminological challenges	Technical and functional challenges	Human-AI collaboration Challenges
Level	Pearson Correlation	.128	.107	-.041
	Sig. (2-tailed)	.478	.555	.822
Linguistic and terminological challenges	Pearson Correlation		.332	.149
	Sig. (2-tailed)		.059	.409
Technical and functional challenges	Pearson Correlation	.332		.358*
	Sig. (2-tailed)	.059		.041

*. Correlation is significant at the 0.05 level (2-tailed).

The correlation analysis indicates weak and statistically insignificant correlations between education level and the challenges faced with AI translation tools, including linguistic and terminological challenges ($r = 0.128$, $p = 0.478$), technical and functional challenges ($r = 0.107$, $p = 0.555$), and human-AI collaboration challenges ($r = -0.041$, $p = 0.822$). Additionally, there is a moderate positive correlation between linguistic and terminological challenges and technical and functional challenges ($r = 0.332$, $p = 0.059$), and between linguistic and terminological challenges and human-AI collaboration challenges ($r = 0.149$, $p = 0.409$), though these are not statistically significant. However, a significant moderate positive correlation exists between technical and functional challenges and human-AI collaboration challenges ($r = 0.358$, $p = 0.041$), suggesting that as technical and functional challenges increase, human-AI collaboration challenges also tend to increase.

Discussion of Results

The analysis of challenges associated with AI translation tools in business contexts reveals critical insights into their limitations and the nuances of human-AI collaboration. The findings highlight persistent gaps in accuracy, contextual understanding, and workflow integration, underscoring the need for targeted improvements in AI translation technologies. Below, we discuss the implications of these results in three key areas: (1) primary challenges in AI translation, (2) the role of education level in shaping perceptions, and (3) interrelationships between challenges.

1. Key Challenges in AI Translation Tools

The data indicates that AI translation tools face significant hurdles in maintaining accuracy and consistency in business-specific contexts. The highest-rated challenge struggling with business-specific terminology ($M = 2.79$, $SD = 1.17$)—reflects AI's difficulty in mastering domain-specific jargon, a critical requirement for professional communication. Similarly, challenges such as inaccurate context-dependent translations ($M = 2.48$, $SD = 1.33$) and the need for extensive post-editing ($M = 2.45$, $SD = 1.15$) underscore AI's inability to grasp implicit meanings and adapt to nuanced business contexts. These issues align with prior research emphasizing AI's limitations in contextual and cultural sensitivity, particularly in specialized domains like finance or law.

Conversely, the lowest mean scores distorting intended messages ($M = 1.88$, $SD = 0.96$) and struggling with culturally sensitive terms ($M = 1.91$, $SD = 0.88$) suggest that while these are concerns, they are perceived as less critical compared to accuracy and contextual challenges. However, the relatively high standard deviations across all items (e.g., $SD > 1.0$ for many statements) indicate variability in user experiences, possibly reflecting differences in the types of documents or industries surveyed.

A recurring theme is the dependency on human intervention. Challenges such as manual corrections for financial/legal terms ($M = 2.21$, $SD = 0.99$) and increased workload due to human-AI collaboration ($M = 2.00$, $SD = 1.09$) highlight that AI tools, in their current state, augment rather than replace human translators. This aligns with the broader discourse on AI as a supplementary tool rather than a standalone solution in high-stakes business communication.

2. Education Level and Perception of Challenges

The ANOVA results (Table 2) reveal no statistically significant differences in perceptions of challenges across education levels (Bachelor's, Master's, PhD). For instance, linguistic and terminological challenges were rated similarly by Bachelor's ($M = 2.06$), Master's ($M = 2.12$), and PhD holders ($M = 2.26$), with overlapping confidence intervals and insignificant p-values (e.g., $p = 0.757$ for linguistic challenges). This pattern holds for technical/functional challenges ($p = 0.825$) and human-AI collaboration challenges ($p = 0.573$).

This uniformity suggests that educational background does not meaningfully influence how users perceive AI translation limitations. Whether due to the ubiquity of these challenges or shared professional expectations

across education levels, the data implies that AI's shortcomings are universally recognized, regardless of expertise. Developers and businesses can thus prioritize solutions that address these universal pain points, such as improving contextual algorithms or standardization, without tailoring interventions to specific educational demographics.

3. Interrelationships Between Challenges

The correlation analysis (Table 3) reveals a moderate positive relationship between technical/functional challenges and human-AI collaboration challenges ($r = 0.358$, $p = 0.041$). This suggests that technical inadequacies—such as inconsistent outputs or poor integration with existing workflows—exacerbate collaboration difficulties, likely by increasing the time and effort required to reconcile AI outputs with human standards. For example, frequent updates to AI algorithms ($M = 2.21$, $SD = 1.19$) may disrupt workflows, compounding collaboration challenges.

Notably, education level showed no significant correlation with any challenge type ($|r| < 0.13$, $p > 0.47$), reinforcing the ANOVA findings. However, the weak correlation between linguistic and technical challenges ($r = 0.332$, $p = 0.059$) hints at interconnected issues: terminology inaccuracies may stem from both linguistic complexity and technical limitations (e.g., poor training data).

The results underscore that while AI translation tools offer efficiency gains, their adoption in business contexts remains constrained by accuracy, contextual, and collaboration challenges. Developers should prioritize enhancing contextual awareness (e.g., through domain-specific training data) and ensuring consistency in algorithm updates. Businesses, meanwhile, must recognize the necessity of human oversight, particularly for high-stakes documents like contracts or reports.

The lack of educational disparities in perceptions implies that training programs for AI tools can be standardized across user groups. However, the correlation between technical and collaboration challenges highlights the need for holistic improvements addressing technical flaws could indirectly ease collaboration burdens.

The results clearly reveal that AI translation tools are not yet reliable for autonomous use in business settings. Their value lies in complementing human expertise, not replacing it. Future research should explore hybrid workflows that leverage AI's speed while retaining human oversight for quality assurance.

Conclusion

The findings of this study underscore the complexities and challenges faced by Saudi translators in integrating artificial intelligence (AI) into business translation. While AI-driven translation tools offer significant advantages in terms of speed and accessibility, their effectiveness remains constrained by linguistic, cultural, and technical limitations. The results highlight that Saudi translators frequently encounter difficulties in maintaining accuracy, ensuring cultural appropriateness, and managing the inconsistencies inherent in AI-generated translations. These challenges necessitate extensive human intervention, often increasing the workload rather than reducing it.

One of the primary concerns identified is the struggle of AI tools to accurately translate business-specific terminology, particularly in the English-Arabic language pair. The structural and semantic differences between these languages, coupled with AI's reliance on predominantly English-centric training data, contribute to frequent misinterpretations. Translators must therefore engage in rigorous post-editing processes to rectify errors and refine AI-generated outputs, which diminishes the efficiency gains promised by automation. Moreover, the inability of AI to grasp contextual and idiomatic nuances further exacerbates translation inaccuracies, reinforcing the indispensable role of human expertise in business translation.

Cultural adaptation represents another significant challenge. Business communication is deeply rooted in cultural norms, rhetorical conventions, and industry-specific terminologies that AI models often fail to

recognize. The findings suggest that AI-generated translations may be technically correct but lack the cultural sensitivity required for effective communication in a Saudi business context. This limitation raises concerns about the reliability of AI tools in scenarios where precise and culturally appropriate language is crucial, such as contract translation, legal documentation, and corporate negotiations.

The study also highlights the pedagogical challenges associated with AI integration in translation education. Many Saudi translators have limited formal training in AI-assisted translation tools, leading to suboptimal utilization and a steep learning curve. This gap underscores the need for translation programs to incorporate AI literacy and training modules that equip translators with the skills necessary to critically assess AI-generated translations and implement effective post-editing strategies.

From a technical perspective, AI translation tools exhibit inconsistencies in formatting, terminology consistency, and adaptation to business communication styles. Frequent updates to AI algorithms, coupled with the opacity of AI decision-making processes, further complicate their integration into professional workflows. The lack of customization options tailored to business translation requirements limits the practicality of these tools, necessitating continued advancements in AI technology to enhance their contextual awareness and reliability.

The findings also indicate that perceptions of AI translation challenges are consistent across different education levels, suggesting that these issues are widespread and not limited to specific translator demographics. This uniformity reinforces the need for industry-wide improvements in AI translation systems, as well as targeted efforts to enhance translator training programs and bridge the gap between AI capabilities and human expertise.

Thus, it can be concluded that while AI presents promising opportunities for business translation, its current limitations necessitate a hybrid approach that leverages human expertise alongside technological advancements. Future research should focus on refining AI models to better accommodate Arabic business translation, enhancing contextual learning capabilities, and developing AI-assisted training programs tailored to business translation professionals. By addressing these challenges, AI translation tools can evolve into more effective and reliable resources, ultimately improving translation quality and efficiency in business communication.

Study Recommendation

Based on the findings, it is recommended that:

1. AI developers enhance translation models to better accommodate the linguistic and cultural complexities of Arabic business translation.
2. AI tools should incorporate domain-specific training data and improve contextual understanding to minimize errors.
3. Translation programs in Saudi Arabia should integrate AI literacy and post-editing strategies into their curricula.
4. Further research should focus on optimizing AI-human collaboration, ensuring AI-generated translations align with business communication standards, and developing user-friendly AI tools that support professional business translation workflows effectively.

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مقالة بحثية

استكشاف التحديات التي يواجهها المترجمون السعوديون في استخدام الذكاء الاصطناعي في الترجمة التجارية

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المُلخّص

تستكشف هذه الدراسة التحديات التي يواجهها المترجمون السعوديون في استخدام الذكاء الاصطناعي (AI) في الترجمة التجارية. وتهدف إلى تحقيق ثلاثة أهداف رئيسية: تحديد التحديات اللغوية التي يواجهها المترجمون السعوديون عند استخدام أدوات الترجمة المعتمدة على الذكاء الاصطناعي في المجال التجاري، وفحص الصعوبات التقنية والوظيفية المرتبطة بدمج الذكاء الاصطناعي، وتقييم التحديات المتعلقة بالتعاون بين الإنسان والذكاء الاصطناعي، خاصة فيما يتعلق بمرحلة ما بعد التحرير والتحقق من الدقة. استخدمت الدراسة منهجية كمية، من خلال استبانة منظمة تم توزيعها على 40 مترجمًا سعوديًا. وقامت الاستبانة بقياس تصورات المشاركين حول أدوات الترجمة بالذكاء الاصطناعي ضمن ثلاث فئات: التحديات اللغوية والمصطلحية، والصعوبات التقنية والوظيفية، ومعوقات التعاون بين الإنسان والذكاء الاصطناعي. تم تحليل البيانات باستخدام الإحصاء الوصفي، واختبارات ANOVA، وتحليل الارتباط لتحديد الاتجاهات والعلاقات بين المتغيرات. وكشفت النتائج أن أدوات الترجمة بالذكاء الاصطناعي تواجه صعوبات في التعامل مع المصطلحات الخاصة بعالم الأعمال، والمعاني التي تعتمد على السياق، والتكيف الثقافي، مما يؤدي إلى أخطاء متكررة تتطلب الكثير من التحرير البشري بعد الترجمة. كما تبين أن هناك مشكلات تقنية وتباينًا في الأداء، بالإضافة إلى غياب الشفافية في آلية اتخاذ القرار لدى أدوات الذكاء الاصطناعي، مما يعيق دمجها بسلاسة في سير العمل. وأظهرت الدراسة أيضًا عدم وجود فروق ذات دلالة إحصائية في تصورات المترجمين حول تحديات الترجمة بالذكاء الاصطناعي بناءً على مستوياتهم التعليمية، مما يشير إلى أن هذه التحديات معترف بها على نطاق واسع بين مختلف فئات الخبرة.

الكلمات المفتاحية: الترجمة التجارية المدعومة بالذكاء الاصطناعي، تحديات المترجمين السعوديين، التكيف اللغوي والثقافي، التعاون بين الإنسان والذكاء الاصطناعي في الترجمة، القيود التقنية للترجمة بالذكاء الاصطناعي.

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