مجلة العلوم الإدارية والقانونية

المجلد السادس - العدد الأول والثاني - ١٤٤٢هـ - ٢٠٢١م

ISSN: 2410-6224

مجلة علمية
دورية نصف سنوية مُحكّمة

تصدر عن كلية أحمد بن محمد العسكرية

مجلة
العلوم الإدارية والقانونية
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رقم الإيداع: ٧/ح م ف
لدى إدارة حماية حقوق الملكية الفكرية

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كلية أحمد بن محمد العسكرية

مجلة دورية علمية نصف سنوية محكمة تصدر عن كلية أحمد بن محمد العسكرية وتُعنى بنشر البحوث النظرية والتطبيقية المتعلقة بالعلوم الإدارية، والمحاسبية، والقانونية، ونظم المعلومات الحاسوبية.

وتهدف المجلة من خلال البحوث العلمية التي تنشر فيها إلى إثراء المفاهيم العلمية في التخصصات ذات العلاقة من خلال بحوث محكمة.

مع الإشارة إلى أن كلية أحمد بن محمد العسكرية تمنح درجة البكالوريوس في تخصصات: القانون، والإدارة، والمحاسبة، ونظم المعلومات الحاسوبية، والعلاقات الدولية، وإدارة الإمداد والتجهيز، وعلوم الحاسوب، والأمن السيبراني.

أولاً- قواعد النشر في المجلة

١. تقبل المجلة الأبحاث والدراسات العلمية الأصيلة المكتوبة باللغتين العربية والإنجليزية، التي تتوافر فيها قواعد البحث العلمي وشروطه المتعارف عليها في العرض والتوثيق.

٢. يُشترط في البحث ألا يكون قد نُشر أو قُدّم للنشر في مجلة أخرى، وألا يكون جزءاً من رسالة الدكتوراه أو الماجيستير التي تقدم بها الباحث، أو جزءًا من كتاب له سبق نشره. وعلى الباحث أن يقدم إقراراً خطياً مرفقاً ببحثه وفقا لنموذج محدد.

٣. ينبغي أن يكون البحث مكتوباً بلغة سليمة، خالية من الأخطاء اللغوية والنحوية والمطبعية، ويتحمل الباحث مسئولية الأخطاء الواردة في بحثه.

٤. تُرسَل نسخة إلكترونية من البحث بواسطة البريد الالكتروني إلى المجلة، مطبوعة بواسطة مايكروسوفت ورد.

٥. يُرفَق مع البحث ملخص باللغة العربية وآخر باللغة الإنجليزية، في حدود (١٥٠ - ٢٠٠) كلمة.

٦. يحق لهيئة التحرير عدم نشر أي بحث لا يتوافق مع رؤية وأهداف المجلة، مع اخطار الباحث.

٧. البحوث التي ترسل الى المجلة لا تعاد ولا تسترد سواء نشرت أو لم تنشر.

٨. تُعد البحوث التي تم إقرار نشرها في المجلة العلمية للكلية، ملكاً للمجلة، ولا يجوز نشرها في مجلة علمية أخرى أو أي جهة أخرى.

٩. لهيئة تحرير المجلة الحق في إعادة نشر البحوث التي سبق نشرها وملخصاتها ورقياً أو إلكترونياً، وذلك بعد إعلام الباحث.

١٠. يحق لهيئة التحرير إجراء تعديلات شكلية على البحوث المقبولة للنشر، بما يتناسب مع نمط النشر بالمجلة.

١١. يُعطى صاحب البحث المنشور بالمجلة خمس مستلات ونسخة واحدة من عدد المجلة المنشور بحثه

فيها. وفي حالة اشتراك أكثر من باحث في البحث الواحد يُعطى كل منهما/ منهم خمس مستلات ونسخة واحدة من عدد المجلة.

١٢. يرفق الباحث مع بحثه الأشكال التوضيحية وصور من الخرائط والوثائق والمخطوطات الأصلية.

١٣. تُرفق مع البحث سيرة ذاتية حديثة مختصرة عن الباحث.

١٤. ما يُنشر في المجلة يعبر عن وجهة نظر صاحبه ولا يعبر بالضرورة عن وجهة نظر المجلة.

ثانياً- قواعد التحكيم في المجلة

١. تخطر هيئة التحرير الباحث (أو الباحثين) بوصول بحثه (أو بحثهم) من خلال إشعار كتابي، أو بالبريد الإلكتروني.

٢. لهيئة تحرير المجلة حق الفحص المبدئي (الأولي) للبحث وتقرير صلاحيته للتحكيم.

٣. تخضع جميع البحوث الواردة للمجلة، للتحكيم من قِبل متخصصين من ذوي المكانة العلمية والخبرة البحثية المتميزة.

٤. تُراعى الرتب العلمية للمحكمين والباحثين عند اختيارهم ويجوز للأستاذ المشارك أن يحكم لمن هو في درجته.

٥. يُعرض البحث على ثلاثة من المحكمين من ذوي الاختصاص، لبيان مدى صلاحيته للنشر، وفي حالة اقرار أثنين منهما للبحث يعتبر صالحا للنشر.

٦. يبدي المحكم رأيه في البحث كتابةً، وفق عناصر محددة، موضوعة لغرض التقييم.

٧. يُعد رأي المحكمَين ملزماً لهيئة التحرير ولرئيس التحرير وللباحث أو الباحثين.

٨. يُخطر الباحث أو الباحثون بنتيجة تحكيم البحث، قبولاً أو رفضاً، وذلك الكترونيا أو كتابيا.

٩. يجوز لرئيس التحرير إفادة صاحب البحث غير المقبول للنشر برأي المحكمين أو خلاصته عند طلبه ذلك، دون ذكر أسماء المحكمين، ودون أي التزام بالرد على مبررات صاحب البحث.

١٠. إذا كان الباحث أو أحد الباحثين من كلية أحمد بن محمد العسكرية، يتوجب أن يكون المحكمون من خارج الكلية.

١١. إذا لم يلتزم الباحث أو الباحثون بإجراء التعديلات المطلوبة على البحث في المدة المحددة من قبل هيئة تحرير المجلة، فيحق لهيئة التحرير الاعتذار عن عدم قبول البحث بعد انتهاء المدة، ما لم يكن لديه عذر مقنع يُقدم كتابةً لهيئة تحرير المجلة.

ثالثاً- المواصفات الفنية المنظمة لطبع المجلة العلمية

يُعاد إرسال البحث بعد إجازته للنشر بالمجلة عن طريق البريد الإلكتروني مستخدماً إحدى برمجيات معالجة النصوص(word) ، وذلك بالمواصفات الآتية:

١. نوع الخط: (Times New Roman).

٢. المسافة: تكون المسافة بين الأسطر (١,٥) سم.

٣. أحجام العناوين: عنوان البحث (20pt.Bold)، العناوين الرئيسية (16pt .Bold)، العناوين الفرعية (14 pt) مع مراعاة أن تكون الكتابة العادية بحجم (12pt).

٤. تُكتب العناوين الرئيسية للبحث مستقلةً في بداية السطر، وتُكتب العناوين الفرعية مستقلةً في الجانب الأيمن. أما العناوين الثانوية فتُكتب في بداية الفقرة، ولا تُوضع خطوط تحت العناوين، سواء كانت رئيسية أو فرعية أو ثانوية، وفي جميع الأحوال يتم ترقيم العناوين الفرعية والثانوية بشكل متسلسل.

٥. تُطبع جميع الجداول والأشكال في متن البحث، على أن تُرقم بشكل متسلسل، ويكون لكل منها عنوان مكتوب بفاصل سطرين أعلى الجدول، ويتم توثيق الجدول تحته مباشرةً، ولا تزيد مساحة أي جدول أو شكل عن الحجم المحدد لصفحات البحث.

٦. ترقم جميع صفحات البحث، بما فيها تلك التي تحتوي جداول أو رسومات.

٧. لا تتجاوز عدد صفحات البحث (٢٥) صفحة، شاملةً الأشكال والرسوم (إن وُجدت) والجداول والمراجع.

٨. يُشار إلى المراجع أسفل المتن في كل صفحة، باسم عائلة المؤلف مع سنة النشر (بين قوسين)، وتُدرج المراجع جميعها تحت عنوان المراجع، في نهاية البحث بالأسلوب التالي:

أ- البحوث المنشورة بالدوريات (المجلات العلمية):

الاسم الكامل للمؤلف مبتدئا باسم عائلته، تاريخ نشر البحث بين قوسين، عنوان البحث كاملاً بين علامتي تنصيص، اسم الدورية بخط مائل تحته خط، رقم المجلد، رقم العدد، أرقام الصفحات. مثال:

Alatar, Jamal, (2010).»Factors influencing voluntary and involuntary labor turnover: Views of managers in Qatari industrial sector», International Journal of Business and Public Administration (IJBPA), Vol. 4, No. 1. PP.436-430.

الجميعي، فؤاد محمد (١٩٨٩م) «أسباب عجز قوة العمل الوطنية وأساليب علاجها في أقطار الخليج العربي»، المجلة العربية للإدارة، م ١٣, ع ١، ٨٧ – ١٣٣.

ب- الكتب

الاسم الكامل للمؤلف مبتدئا باسم عائلته، تاريخ نشر الكتاب بين قوسين، عنوان الكتاب كاملاً بين علامتي تنصيص بخط مائل تحته خط، مكان النشر، الناشر. مثال:

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of the applicability of the research findings across diverse economic and cultural contexts. Moreover, the current study exclusively employed a quantitative approach to achieve its objectives. Future research endeavors could benefit from adopting a mixed-method approach, which integrates both qualitative and quantitative methodologies. This approach would allow for a more nuanced exploration of the factors influencing environmental sustainability and social responsibility among businesses. By incorporating qualitative insights, researchers can capture a deeper understanding of the contextual nuances that quantitative data alone may not fully illuminate. It's essential to acknowledge the unique circumstances in Iraq, where the government has initiated various programs to enhance capabilities in preparation for the digital revolution. These circumstances may differ in other states, and it is prudent for future research to recognize and account for these variations when interpreting results. Generalizing the findings beyond the specific context of Iraq would require further evaluation, particularly in countries facing distinct external pressures. Despite these limitations, the current research serves as a valuable foundation, paving the way for future investigations into the integration of 4.0 big data-powered and AI technological applications in sustainable business practices and consumption patterns. The insights gained from this study can inform and inspire subsequent research endeavours aimed at advancing our understanding of the broader implications of technological advancements on sustainability in various global contexts.

Regarding practical implications, this research underscores the critical role of businesses in harnessing technological advancements to foster green practices and achieve sustainable performance in the long term. In essence, executives must continually evaluate their environmental performance, establish new environmental goals, integrate technological support into business processes, and hire competent individuals to advance environmental compliance, reduce air emissions, and enhance both reputation and profitability. Active participation in green innovation is crucial for business owners and management to gain and sustain a competitive advantage over time. Additionally, recognizing the drivers of green innovation, such as trend identification and information management, is essential. Elements crucial for long-term performance, such as product or service innovation, should be identified as well (Al Halbusi et al., 2022b).

Practically, organizations should consistently redesign production and operation procedures to enhance energy sustainability, redevelop products or services to meet evolving environmental standards, utilize sustainable and non-polluting resources, and foster partnerships with green businesses and suppliers (Arfi et al., 2018). From another perspective, given the diverse nature of business activities and limited knowledge of environmental practices, decision-makers play a pivotal role in engaging with technological learning resources. To maximize the use of acquired information, decision-makers should explore how to complement technical capabilities with interoperability (Iyer et al., 2019). Businesses are also urged to enhance monitoring to safeguard the distribution of confidential data and protect the personal data of service users. Adopting a green digital learning orientation (GDLO) appears highly beneficial in fostering a collaborative environmental approach among business executives and their supplier network. With numerous business suppliers, GDLO facilitates clear communication on the business's configuration and efficient management of the environmental approach's execution in design, products, and building sustainability (Abu Afifa and Nguyen, 2022). This finding holds great potential and paves the way for a substantial debate on the application of a new model of environmental learning, particularly in business settings.

8.2 Limitations and Future Suggestions

This research is subject to several limitations that warrant consideration. Firstly, its focus on businesses in Iraq, a developing nation in the Gulf states, suggests a need for additional studies to validate the proposed concepts in other evolving or established countries within the region, such as Saudi Arabia, UAE, Oman, Kuwait, Bahrain, or other Middle Eastern nations. Expanding the geographical scope would contribute to a more comprehensive understanding

findings notably highlight that the level of green digital learning orientation (GDLO) has a positive impact on business sustainability.

The implications of the results underscore two critical assumptions. First, the attainment of high levels of green digital learning orientation serves as a motivating factor rooted in establishing a perception of elevated green and sustainable standards within firms. Second, for green innovation to exert its maximum impact, a critical level of green digital learning orientation is essential. The effectiveness of higher green digital learning orientation and the application of green innovation work in tandem to augment the sustainable performance levels of businesses. In essence, the study emphasizes the interconnectedness of knowledge management, green digital learning orientation, and AI capability in shaping sustainable business practices.

8.1 Knowledge and Practical Implications

This study made three theoretical contributions to the existing body of literature on sustainable green business. Firstly, it advanced and empirically validated a model for assessing long-term sustainable performance. Consequently, the acknowledgment of knowledge management systems was identified as a significant contributor to research on sustainable performance. While previous studies have identified various success factors, they often lacked a comprehensive perspective, as illustrated by Santoro et al. (2018). In contrast, this current research broadens the literature by examining the role of knowledge management systems in fostering green digital learning orientation and, consequently, achieving long-term sustainable performance. Unlike earlier investigations that primarily considered success factors, this study specifically delves into how green digital learning orientation enhances overall business performance. Only a limited number of studies have explored the impact of green learning orientation on long-term performance within the context of sustainable development. Therefore, this research expands our understanding of sustainable performance and elucidates the positive influence of green digital learning orientation. Furthermore, this research revealed the theory of green learning orientation and its correlation with sustainable performance. While previous studies have explored factors affecting sustainable development, such as stakeholder integration, green supply-chain management, and green intellectual capital, few have examined the role of green digital learning orientation in mediating the relationship between green innovation and sustainable performance (Imran et al., 2022). Consequently, this report underscores the significance of a robust green learning orientation in enabling businesses to achieve superior performance when integrating green innovation.

Table 4

Structural Path Analysis: Direct Effect.

						Bias and Corrected Bootstrap 95% CI	
Hypothesis	**Relationship**	**SB**	**SD**	**t-value**	**p-values**	**[Lower Level; Upper Level]**	**Decision**
H-1	Knowledge Management Systems (KMS) -> Green digital learning orientation (GDLO)	0.198	0.066	3.019	0.000	[0.075; 0.293]	Yes
H-2	Green Digital Learning Orientation (GDLO) -> Sustainable Business	0.231	0.059	3.751	0.000	[0.041; 0.243]	Yes

8. Conclusion

The primary objective of this research was to investigate the interplay between knowledge management systems (KMS), green digital learning orientation (GDLO), and AI capability and understand how this interrelationship influences sustainable business practices. In the current era of knowledge, technological advancements and collaborative efforts among economic entities have significantly reshaped management systems. Technology plays a pivotal role in enhancing knowledge management processes, and facilitating the seamless flow of information through cutting-edge information and communication technologies (Cillo et al., 2022). The Internet of Things (IoT) is particularly transformative, altering how businesses approach innovation and create value for stakeholders in their day-to-day operations. However, only a limited number of studies have delved into the impact of KMS utilizing advanced ICTs, internal and external knowledge, and management processes. These studies have demonstrated the potential of fostering business innovativeness and contributing to overall business sustainability (e.g., Santoro et al., 2018). This research sought to validate the critical role of KMS in fostering business sustainability. The

		I C T a d o p-tion/sup-p o r t	0.881			
Green Digital Learning Orientation		GDLO1	0.795	0.811	0.889	0.641
		GDLO2	0.766			
		GDLO3	0.785			
Sustainable Business		SB1	0.853	0.717	0.808	0.531
		SB2	0.770			
		SB3	0.810			
		SB4	0.811			
		SB5	0.788			
Note: CR= Cronbach's alphas, CR= Composite Reliability, AVE= Average Variance Extracted.						

Table 3

Discriminant Validity Via HTMT.

Constructs	**1**	**2**	**4**
1. Knowledge Management Systems			
2. Green Digital Learning Orientation	0.554		
4. Sustainable Business	0.527	0.404	

Note: HTMT should be lower than 0.85.

7.2 Hypotheses Testing

Table 4 provides the results of the direct hypotheses (H1, H2). As expected, both the knowledge management system (KMS) and green digital learning orientation (GDLO) exhibited a significant relationship with sustainable business. Specifically, the relationship for the knowledge management system (KMS) was found to be significant (β= 0.198, t= 3.019, p< 0.000), and similarly, the relationship for green digital learning orientation (GDLO) was also significant (β= 0.231, t= 3.751, p< 0.000). Therefore, both H1 and H2 were confirmed.

Based on the Multitrait-Multimethod Matrix, if the Heterotrait-Monotrait Ratio (HTMT) values exceed 0.85, there is a concern with discriminant validity. Table 3 reveals that all HTMT values are below 0.85, indicating that each pair of variables demonstrates discriminant validity (Henseler et al., 2015).

Table 2

Measurement Model, Loading, Construct Reliability and Convergent Validity

First-Order Constructs	Second - Order Constructs	Items	Loading (> 0.5)	CA (> 0.7)	CR (> 0.7)	AVE (> 0.5)
IT infrastructures		ITI1	0.788	0.750	0.841	0.557
		ITI2	0.841			
		ITI3	0.755			
		ITI4	0.800			
Collaborative Technologies		CT1	0.785	0.754	0.818	0.631
		CT2	0.796			
		CT3	0.805			
		CT4	0.722			
		CT5	0.814			
ICT adoption/support		ICT1	0.853	0.747	0.840	0.589
		ICT2	0.770			
		ICT3	0.710			
		ICT4	0.845			
		ICT5	0.852			
		ICT6	0.771			
	Knowledge Management Systems	IT infrastructures	0.863	0.789	0.887	0.697
		Collaborative Technologies	0.794			

conducted to assess the risk of CMV biasing the results. While acknowledging that CMV cannot inflate the interaction terms, the primary focus of this research (Podsakoff et al., 2012). Initially, Harman's (1976) single-factor technique was employed to evaluate CMV bias, and the outcomes were not deemed critical. Subsequently, exploratory factor analysis was conducted to ascertain if a single factor could explain the majority of the covariance among the study items. The analysis identified five factors with eigenvalues exceeding one, collectively accounting for 68% of the total variance. Notably, the variance in the first factor explained only 29%, indicating that CMV is not a significant concern (Podsakoff et al., 2003). Furthermore, a comprehensive collinearity assessment was conducted based on variance inflation factors (VIFs) (Kock and Lynn, 2012; Kock 2015). Following recommended guidelines, this test assessed both vertical and lateral collinearity, indicating that a VIF greater than 3.3 signifies collinearity issues that could be influenced by CMV. The analysis, as presented in Table 1, revealed that the current study is devoid of CMV concerns.

Table 1
Common Method Variance Assessment Via Full Collinearity Estimate Criteria

Variable	Knowledge Management Systems	Green Digital Learning Orientation	Sustainable Business
VIF	1.221	2.137	1.325
Note: VIF = Variance Inflation Factor			

7. Data Analysis and Results

To validate the research model, partial least squares structural equation modeling (PLS-SEM) with Smart PLS 4.0, was utilized (Ringle et al., 2015).

7.1 Measurement Model

Table 2 presents measurements encompassing item reliability, internal consistency reliability, and convergent and discriminant validity. In terms of item reliability, the majority of items surpass the recommended 0.707 threshold (Hair et al., 2017). Both Cronbach's alphas and composite reliabilities (CR) exceed the 0.70 cut-offs (Hair et al., 2017). The average variance extracted (AVE) for all constructs surpasses the 0.5 threshold, signifying convergent validity ranging from 0.531 to 0.697 (Hair et al., 2017). Therefore, based on these outcomes, the measurement objectives have been achieved. Concerning discriminant validity, Heterotrait-Monotrait Ratio (HTMT) approach was employed.

6. Method

6.1 Sample Procedures

In practical terms, non-probability sampling is commonly preferred and is more suitable for fieldwork research (Hulland et al., 2018). It is deemed appropriate when the chosen sampling strategy aligns with the research objectives and the scope of the study. Since the research aims for theory generalization, considering the absence of a complete sampling frame in the given context, convenience sampling was selected as the most fitting strategy. Accordingly, data collection was conducted from 395 cases of small and medium-sized enterprises (SMEs) in Iraq. The participants were reached through self-administered surveys distributed via Google Drive. Additionally, to ensure the validity and acceptability of responses, participants were explicitly informed that all contributions are valuable and welcomed, emphasizing that the study is conducted solely for academic purposes.

6.2 Variables Measurement

All the measurement items employed in this study were adapted from previous research. To assess knowledge management systems (KMS), three dimensions were considered: IT infrastructures, collaborative technologies, and ICT adoption. Specifically, IT infrastructures were evaluated using 4 items, collaborative technologies with 5 items, and ICT adoption with 6 items—all adapted from (Meroño-Cerdan et al., 2007; Soto-Acosta & Meroño-Cerdan, 2008; Santoro et al., 2018). Concerning green digital learning orientation (GDLO) was measured using 3 items sourced from (Iyer et al., 2019; Benzidia et al., 2021). Sustainable business, on the other hand, was measured with 6 items drawn from (Benzidia et al., 2021). Additionally, firm size and age were included as control variables, acknowledging their potential influence on sustainable business, based on existing literature.

6.3 Common Method Variance (CMV)

Recognizing the potential impact of common method variance (CMV) in this study, considerable efforts were devoted to minimizing this risk. Following rigorous design methods outlined by Podsakoff et al. (2003) and Podsakoff et al. (2012), the survey underwent a series of phases. Preliminary versions were scrutinized and modified by a panel of experts from both academia and industry. These experts evaluated the validity of the questions and the appropriateness of their presentation.

In addition to these pre-emptive procedural measures, several post-hoc tests were

in digital innovations, and streamlining subsequent information exchange (Abu Afifa et al., 2022). Demonstrating enhancements in green digital learning orientation (GDLO) serves as a motivator for businesses to leverage AI capability, particularly to enhance operational efficiency and sustainable performance. Learning-focused organizations often deploy cross-functional teams to enhance operational procedures and promote knowledge acquisition among workers (Iyer et al., 2019; Sahoo et al., 2022).

Precisely, GDLO significantly influences learners' motivation, cognitive processes, methods, comprehension, and innovation (Borah et al., 2021). According to Sendlhofer and Lernborg, (2018) and Zhou et al. (2019), digital learning proves more effective as it encourages individual or collaborative learning through videos and quiz-style tasks. An advantage of digital learning lies in team members' ability to assess learners' understanding using advanced tools on computers or mobile devices. Such advancements align with new regulations aimed at environmental protection and overall sustainability (Zhang et al., 2020; Ardito et al., 2021). Thus, green digital learning initiatives are currently prevalent in areas such as manufacturing safety, risk management, system security, handling toxic compounds, waste disposal, and industrial hygiene (Nasiri et al., 2022; Rehman et al., 2022). Therefore, this research considers the moderating role of green digital learning orientation (GDLO) in the relationship between green innovation and sustainable performance. Grounded in the reasons mentioned above, the hypothesis posited is as follows.

Hypothesis 2: Green digital learning orientation (GDLO) is positively correlated to sustainable business.

5. Research Conceptual Framework

The conceptual framework of this research encompasses the interplay between environmental sustainability demands, knowledge management systems, green digital learning orientations, and technological capabilities within the context of small and medium-sized enterprises (SMEs). It suggests that the increasing pressure for environmental sustainability prompts businesses to adopt knowledge management systems, embrace green digital learning orientations, and enhance technological capabilities. These elements are hypothesized to directly influence of knowledge management systems and green digital learning orientations the sustainability practices of SMEs. Hence, this study underlines the critical role of knowledge management systems, emphasizing their functionality and strategic operational decisions, in enabling SMEs to adapt to the evolving business landscape and sustain competitiveness on a global scale.

customers (Jarrahi et al., 2023). A typical KMS encompasses several components. For instance, a knowledge repository serves as a centralized database for storing and organizing information and knowledge. Knowledge creation involves the capturing and generation of new knowledge through collaborative efforts, experimentation, or research (Di Vaio et al., 2021). Knowledge sharing, another component, entails disseminating information across the organization through avenues such as forums, wikis, or social media platforms.

In the context of sustainable business practices, knowledge management systems (KMS) play a pivotal role by assisting organizations in capturing, storing, and sharing knowledge related to sustainability issues (Elia et al., 2022). For instance, KMS can support sustainable business practices by facilitating the sharing of best practices, including waste reduction, energy efficiency, and environmental management (Al Halbusi et al., 2022c). Furthermore, through the development of knowledge and skills, KMS can empower organizations to implement sustainable business practices such as sustainable product design, circular economy initiatives, and green supply chain management (Huesig & Endres, 2018). Additionally, KMS fosters collaboration among employees, suppliers, and other stakeholders, facilitating the sharing of information and resources necessary for the implementation of sustainable business practices (Friedrich et al., 2020).

Regarding tracking progress, KMS can monitor and report on sustainability performance, aiding organisations in identifying areas for improvement and measuring progress over time. Moreover, KMS contributes to fostering innovation by helping organizations identify new opportunities for sustainable innovation, such as developing new sustainable products or business models. Therefore, the role of KMS extends to enabling organizations to build the knowledge, skills, and infrastructure required for the successful implementation of sustainable business practices, ultimately enhancing environmental, social, and economic performance. Based on the above argument the following hypothesis was suggested:

Hypothesis 1: Knowledge management systems (KMS) positively correlated to Green digital learning orientation (GDLO).

4.2 Green Digital Learning Orientation (GDLO) and Sustainable Business

Green digital learning orientation, as highlighted by Benzidia et al. (2021), is acknowledged as an intangible resource influencing inter-functional management and collaboration with external partners within the manufacturing sector. The emphasis on learning within this context encourages environmentally friendly activities, facilitating the sharing of information externally, promoting the application of knowledge and skills

understand the impact of these factors on the sustainability of SMEs, with a focus on their functionality and strategic operational decisions. Moreover, it aims to identify critical catalysing factors necessary for SMEs to adapt to the dynamic business landscape and sustain competitiveness on a global scale.

2. Research Objectives

Therefore, stemming from the main aim of this study, we transition to delineating the specific research objectives, outlined as follows.

1. To investigate the relationship between the implementation of knowledge management systems and the green digital learning orientations.
2. To examine the influence of green digital learning orientations on the sustainability efforts of businesses.

3. Research Importance

The significance of this research extends across both theoretical and practical realms. Theoretical perspectives benefit from an in-depth analysis of how the increasing emphasis on environmental sustainability shapes organizational strategies, such as the implementation of knowledge management systems and green digital learning orientations. By examining these dynamics, the research contributes to the theoretical understanding of how businesses adapt to emerging sustainability trends. On a practical level, the investigation offers valuable insights into the effectiveness of specific strategies, such as knowledge management systems and green digital learning, in enhancing the sustainability of businesses. This dual perspective bridges theoretical frameworks with actionable strategies, providing practical guidance for businesses striving to align with sustainable practices in a rapidly evolving landscape.

4. Literature Review and Hypothesis

4.1 Knowledge Management System (KMS) and Green digital learning orientation (GDLO)

A knowledge management system (KMS) serves as a software-based platform designed to facilitate organizations in capturing, storing, sharing, and managing knowledge and information. Its ultimate goal is to enhance organizational efficiency, effectiveness, and innovation by providing easy access to knowledge for employees, stakeholders, and

waste in production processes, leading to improved efficiency and reduced environmental impact. Thus, renewable energy optimization within these systems can enhance the performance of renewable energy systems like wind turbines and solar panels, resulting in increased efficiency and decreased costs. The application of these capabilities extends to sustainable product design by identifying materials and manufacturing processes with lower environmental impacts. Additionally, through environmental monitoring, these systems can analyze environmental data, boosting businesses in identifying areas for improvement in sustainability and reducing their overall environmental impact. In essence, the capabilities of knowledge management systems and green digital learning orientation empower companies to make informed decisions, reduce waste, enhance efficiency, and contribute significantly to sustainable business practices (Gupta et al., 2023).

Therefore, building on the preceding discussion, the primary objective of this research is to delve into the influence of knowledge management systems (KMS) and green digital learning orientation (GDLO) on sustainable business practices. The proposed model is inherently practice-oriented, equipped to identify challenges related to knowledge management systems and sustainable performance and to tackle issues in the development of green digital learning orientation (GDLO). Many firms currently face challenges arising from the shifting landscape of institutional forces and resources. Consequently, the model is designed to provide valuable insights into actual issues, offering assistance to management and decision-makers in crafting more effective action plans to attain their desired goals for environmental sustainability.

The research is important as it sheds light on the imperative role of knowledge management systems and green digital learning orientations in enabling small and medium-sized enterprises (SMEs) to meet the growing demand for environmental sustainability. By assessing the impact of these systems and orientations on business sustainability, the study provides actionable insights for SMEs in Iraqi context, and potentially beyond. Its findings emphasize the critical catalysing factors necessary for SMEs to adapt to dynamic business environments and sustain competitiveness globally, emphasizing the paramount importance of strategic operational decisions in this endeavour. Thus, this study attempted to addressed the research problem as there are massive need for small and medium-sized enterprises (SMEs) to effectively respond to the increasing demand for environmental sustainability. Specifically, this study investigates how SMEs can utilize knowledge management systems, green digital learning orientations, and enhanced technological capabilities to foster sustainable business practices. The study seeks to

1. Introduction

In the ever-evolving business landscape, maintaining a competitive edge on the global stage necessitates adopt strategic, functional, and tactical decision-making (Haarhaus & Liening, 2020). The rising interest in extensive data for decision-making in intricate contexts has become a focal point for industry experts (Tseng et al., 2022). Nevertheless, the reliance on data-driven approaches by firms calls for significant investments in resources and labour capabilities for sustained viability, prompting the need for further research exploration (Papadopoulos & Balta, 2022). In the digital era, nations worldwide have strategically designed technology solutions tailored to navigate societal constraints and promote digital initiatives (Ardito et al., 2021; Chew et al., 2023). Institutional pressures play a guiding role, steering corporations to operate within these established boundaries. Technology investments are instrumental in delineating clear objectives and performance benchmarks, reinforcing business capabilities in the age of digitization (Bohnsack et al., 2022; Hassani et al., 2022). Moreover, the evolving landscape of customer demands exerts influence, compelling suppliers to leverage digital technology to enhance their resources and capabilities (Al Halbusi et al., 2022a). The examination of these dynamics reveals that institutional demands positively impact the availability, commitment, and infrastructure of tangible resources (Bag et al., 2021).

In Industry 4.0, data assumes a pivotal role as a significant asset (Ghobakhloo, 2020). The integration of Industry 4.0 technologies holds the potential to propel advancements in 'smart business' practices (Fromhold-Eisebith et al., 2021). Within the Industry 4.0 era, the capabilities of knowledge management systems and green digital learning orientation have emerged as invaluable tools, presenting opportunities for substantial innovation. These capabilities have been shown to enhance a business's cost and operational performance, exerting a positive influence on its current state (Abkenar et al., 2021; Benzidia et al., 2021).

The integration of knowledge management systems and green digital learning orientation has the potential to foster sustainable business practices through various avenues. For instance, algorithms focused on energy efficiency within these systems can optimize energy consumption in buildings, factories, and other facilities, thereby reducing costs and lessening environmental impact (Jarrahi et al., 2023; Chowdhury et al., 2023). Furthermore, these systems can aid businesses in streamlining supply chains to minimize waste, enhance delivery times, and decrease transportation costs, ultimately contributing to a reduction in carbon emissions (Leal Filho et al., 2022). In terms of waste reduction, the capabilities of these systems extend to identifying and minimizing

استدامة الابتكار: استراتيجية لتحقيق نجاح الأعمال في العصر الرقمي

الملخص:

يستكشف هذا البحث كيف يجبر الطلب المتزايد على الاستدامة البيئية الشركات على تنفيذ أنظمة إدارة المعرفة، وتبني توجهات التعلم الرقمي الأخضر، وتعزيز القدرات التكنولوجية. وبالتالي، يقيم هذا التحقيق تأثير أنظمة إدارة المعرفة وتوجهات التعلم الرقمي الأخضر على استدامة الأعمال. واستنادا إلى النموذج المقترح، تم جمع البيانات من ٥٩٣ حالة لمشاريع صغيرة ومتوسطة الحجم في أربيل، شمال العراق. وكشفت النتائج عن أهمية كل من نظام إدارة المعرفة وتوجه التعلم الرقمي الأخضر في تعزيز ممارسات الأعمال المستدامة. في جوهرها، تسلط هذه الدراسة الضوء على العوامل المحفزة الحاسمة، مع التأكيد على الأهمية القصوى لأنظمة إدارة المعرفة، ووظائفها، والقرارات التشغيلية الاستراتيجية في التكيف مع مشهد الأعمال الديناميكي والحفاظ على القدرة التنافسية على الساحة العالمية.

الكلمات المفتاحية: الاستدامة البيئية، أنظمة إدارة المعرفة، الرقمية الخضراء، ٤, ٠ التقنيات

Innovation Sustainability: A Strategy for Achieving Business Success in the Digital Era

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Abstract

The present research explores how the growing demand for environmental sustainability compels businesses to implement knowledge management systems, embrace green digital learning orientations, and enhance technological capabilities. Consequently, this investigation assesses the impact of knowledge management systems and green digital learning orientations on the sustainability of businesses. Drawing upon the proposed model, data were collected from 395 cases of small and medium-sized enterprises (SMEs) in Erbil, northern Iraq. The results revealed the significance of both the knowledge management system and green digital learning orientation in fostering sustainable business practices. In essence, this study highlights critical catalysing factors, emphasizing the paramount importance of knowledge management systems, their functionality, and strategic operational decisions in adapting to the dynamic business landscape and sustaining competitiveness on the global stage.

Keywords: Environmental Sustainability, knowledge management systems, Green Digital, 4.0 Technologies

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concerns related to vaccine distribution, efficacy, or virus variants increased volatility within these sectors. During the pandemic, the emphasis on public health and safety led to higher investments in the healthcare industry and a faster development and distribution of vaccinations, treatments, and medical equipment. The healthcare industry was affected by regulatory changes regarding telehealth and virtual healthcare in a different way than other industries.

and Europe), and crucial events (the equity market collapse, the oil price crash, US presidential race, the commencement of COVID-19 vaccination campaign, detection of the first US Omicron infection). To model sectoral volatility, we utilize a Beta-Skew-t-EGARCH model. This GARCH-type framework is robust to outliers and volatility jumps, and serves to split volatility into short-term and long-term components. The empirical analysis includes two primary steps. First, we adopt the elastic-net regularized linear regression to pinpoint factors that add to the US market sector volatility. Second, the potential for endogeneity among those regressors selected in the first step is addressed using the POLASSO modelling method.

Our chief findings are summarized as follows. First, USD exchange rate changes, gold, Bitcoin, European stock returns, treasury bill rates, term spread, and implied volatility of gold are uncorrelated with sectoral volatility. Second, pandemic-induced factors (i.e., COVID-19 positive cases and fatalities, stringency of US policy responses, vaccination campaign rollouts, and the detection of Omicron cases) tend to add to sectoral volatility. Third, trading volume, stringency of US policy responses, volatility of broad USD exchange rates, Google search trends of market sectors, positive cases of coronavirus, US economic policy uncertainty, Google search volume for coronavirus, VIX, and the introduction of vaccination programs are the predominant variables explaining sectoral volatility. Fourth, barring such common determinants, a group of heterogeneous factors appear to be relevant to sectoral volatility. In retrospect, the peculiar conditions of the pandemic had a significant impact on the factors driving US equity market volatility during the COVID-19 period. However, there were also sector-specific risks, industry dynamics, company-specific characteristics, and investor behavior that contributed to dissimilar volatility patterns across sectors. While the aforementioned common factors did arise across the bulk of sectoral indexes, the diversity of factors can be explained by the fact that different businesses within each industry responded to the pandemic in various ways. For instance, companies with strong balance sheets, effective online presence, or essential products/services were often more resilient, than those with weaker counterparts, which frequently experienced financial setbacks or operational disruptions. Company-specific factors, such as earnings reports, supply chain disruptions, or remote work transitions, contributed to volatility at the individual stock level, affecting sectoral indices differently. The progress in vaccine development and treatment options significantly impacted market volatility during the COVID-19 period. Positive news about vaccine efficacy, distribution plans, or treatment breakthroughs often resulted in market rallies, benefiting sectors directly impacted by the pandemic. Conversely, setbacks or

diversification opportunities across sectors. Monitoring the time path of the robust factors serves to provide a general picture of the direction sector-specific volatilities will take in the future, thereby broadening the information set that investors can draw upon to make informed decisions. Investors can modify their expectations for future volatility based on the behavior of the robust explanatory variables as a sign of a sectoral rally or downturn. Furthermore, given the decoupling of sectoral volatilities from the price swings of Bitcoin and gold, both investment options can act as a potential safe-haven asset against US stock market fluctuations. On the other hand, as the coronavirus threat is more likely to last over time, policy makers and stock market regulators should carefully consider effective means that keep the overall market sentiment buoyant in the face of the pandemic-induced adversities. The observed impact of mass vaccination schemes on returns and volatility highlights the favourable outcomes of promoting the public health-financial market nexus. In addition to being crucial for accomplishing national health goals and reducing the pandemic's human cost, the successful rollout of vaccine campaigns is a fundamental key to maintaining an optimistic outlook for the US economy and asset markets, which, in turn, helps to limit extreme price movements. Equally important, given the varying factors driving market volatility, policymakers may need to strengthen macroprudential policies to promote financial stability. Macroprudential policies aim to address systemic risks that can affect the stability of the financial system as a whole. These policies may include setting limits on leverage, improving risk monitoring systems, and enhancing stress testing to identify potential vulnerabilities.

7. Conclusion

In this study, we aim to identify the sturdy factors influencing the volatility of US stock returns within specific major sectors (i.e., Information Technology, Consumer Discretionary, Industrials, Financials, Healthcare, and Energy), under the persistent impact of the COVID-19 pandemic. The paper also examines whether these factors are heterogeneous across sectors. The pool of potential volatility determinants embrace macroeconomic fundamentals (inflation expectation rates, treasury bill interest rates, real economic activity, default spread, term spread), market sectors' exposure to the pandemic (US coronavirus positive cases, death counts, stringency of US policy responses, infectious disease equity market volatility), public attention (Google search queries for COVID-19 and the US equities), financial markets (aggregate trading volume, broad US dollar index, European and Chinese stocks, Bitcoin, gold, and oil), global anxiety and uncertainty (Twitter-based economic uncertainty, policy uncertainty in US and China, forward-looking volatility indices for gold, oil, Bitcoin, and for stock markets of US

Bouri et al. (2023b) find that oil implied volatility has a greater influence on sectoral index returns and volatilities than does geopolitical risk, particularly for consumer discretionary and consumer staples sectors.

Surprisingly, on the other hand, several factors, including for example, USD exchange rate changes, gold, US real economic activity, default spread, and Bitcoin are uncorrelated with sectoral volatility. Our findings regarding the insignificance of these factors contrast with the outcomes observed in several earlier studies. For instance, Bouri et al. (2022) show that Bitcoin prices serve as a robust predictor for the volatility observed in US sectoral stock indices. Uzonwanne (2021) finds bidirectional shock transmissions between the S&P 500 market and Bitcoin over the long term. Schwert (1989) finds that stock price swings are correlated with the level of macroeconomic activity. Mnasri and Essaddam (2021) find that US presidential elections seem to amplify the S&P 500 index's volatility. Based on monthly data from China, Si et al. (2021) establish that trade policy uncertainty tends to increase the volatility of telecommunication services, information technology, financials, energy, and utilities sectors. Fang et al. (2020) demonstrate that default spread is among the most robust predictors of the long-term stock volatility in US markets.

The findings also document that trading volume has a paramount role in describing price fluctuations in the vast majority of sectors. Such evidence is in line with some chief liquidity-based theories that underscore the positive link between price volatility and trading volume. More plainly, specifically, liquidity-based theories underline the importance of market liquidity in understanding the relationship between trading volume and price volatility. They emphasize that changes in liquidity conditions can impact the ease of trading and the subsequent price movements, leading to a positive association between trading volume and price volatility. These theories offer insights into the mechanisms through which liquidity considerations can influence market dynamics (e.g., Amihud, 2002; Glosten and Harris, 1988).

By and large, our evidence presents practical implications for investment professionals and policy makers. A thorough understanding of the factors underlying sectoral volatility enables portfolio managers to devise sensible investment decisions, and policy makers to lay down regulations intended to curb excessive volatility. More specifically, the dynamics of trading volume, the USD exchange rate volatility, positive cases of coronavirus, stringency of US policy responses, Google search trends, US economic policy uncertainty, and VIX seem to contain important information about sectoral volatility and, consequently, should be taken account of by thematic fund managers seeking

particular, the introduction of vaccination programs leads to a decrease in volatility, with the energy sector being the only exception. For example, a one-percentage-point rise in the vaccination rate would be associated with 0.159, 0.308, and 0.374 percentage-point reduction in the volatilities of industrials, information technology, and healthcare sectors respectively, *ceteris paribus.*

Fifth, in terms of the relative impact of independent variables, trading volume, the VIX, and US economic policy uncertainty are the most influential factors in explaining volatility in 5 out of 6 sectors. In contrast, European stock returns, US real economic activity, contagious disease stock price turbulence, and US presidential elections provide the weakest explanatory power.

Finally, the last row of Table 3 shows the statistic, which is significant across sectors at the 0.05 level or better. This implies rejection of the null hypothesis that the estimated coefficients of each model are jointly indistinguishable from zero.

6. Discussion and policy implications

Taken together, our evidence reveals that, apart from some common ones, the factors affecting volatility tend to differ across US equity sectors. Trading volume, stringency of US policy responses, volatility of broad USD exchange rates, Google search for market sectors, positive cases of coronavirus, US economic policy uncertainty, Google search volume for coronavirus, the introduction of mass vaccinations and VIX are the most relevant factors for the majority of sectors. This finding is largely consistent with the results of previous research works, which show that market volatility is associated with trading volume (e.g., Brailsford, 1996; Chen et al., 2001; Ngene and Mungai, 2022), volatility of foreign exchange rates (e.g., Apergis and Rezitis, 2001; Cho et al., 2020; Maghrebi et al., 2006; Sikhosana and Aye, 2018), confirmed cases and deaths of coronavirus (e.g., Bora and Basistha, 2021; Choi and Hung, 2022; Lúcio and Caiado, 2022; Uddin et al., 2021; Xu, 2022), the stringency index of policy responses (e.g., Baig et al., 2021; Bakry et al., 2022; Kheni and Kumar, 2021; Lo et al., 2022; Wang et al., 2021b), Google search trends (e.g., Afkhami et al., 2017; Audrino et al., 2020; Dimpfl and Jank, 2016; Hamid and Heiden, 2015; Xu et al., 2019), VIX (e.g., Bekaert and Hoerova, 2014; Liu et al., 2022; Wang, 2019; Xiao et al., 2021), economic policy uncertainty indicators (e.g., Belcaid and El Ghini, 2019; Li et al., 2020; Liu and Zhang, 2015; Mei et al., 2018; Si et al., 2021), and mass vaccination programs (e.g., Apergis et al., 2022; Demir et al., 2022; Rouatbi et al., 2021). Based on data pertaining to Gulf Cooperation Council (GCC) stock sector indices,

Second, we observe that the coefficient estimates associated with trading volume, positive cases of coronavirus, stringency of US policy responses, Google search trends of market sectors, Google search volume for coronavirus, VIX, US economic policy uncertainty, and the launch of vaccination programs prove statistically significant at the 0.10 level or better across the majority of sectors (i.e., 4 sectors or more). The corresponding signs are positive, which suggest that positive changes in these explanatory variables are inclined to raise sectoral volatility. For instance, every one-percentage-point increase in the overall trading volume would lead to 0.308, 0.509, and 0.428 percentage-point rises in the volatilities of industrials, financials, and information technology sectors respectively, *ceteris paribus*. Likewise, a one-percentage-point higher in the VIX, all else equal, would result in 0.189, 0.308, and 0.429 percentage points higher in the volatilities of industrials, energy, and financials sectors, respectively. Other covariates (namely, the USD exchange rate fluctuations, oil prices, COVID-19 death rates, implied volatility of oil prices, the 2020 equity market collapse, the 2020 oil price war, and the spread of Omicron variant) demonstrate statistical relevance to volatility at conventional significance levels, though for a range of 3 sectors or less.

Third, the estimated coefficients corresponding to European stock returns, contagious disease stock price turmoil, US economic activity, term spread, Twitter-based economic uncertainty, Euro STOXX volatility, and US presidential elections either are marginally significant or fail to achieve statistical significance at even the 0.10 percent level. Since the overall health of the economy and financial market volatility are closely correlated via a variety of channels and mechanisms (e.g., Christiansen et al., 2012; Engle et al., 2013; Schwert, 1989), the finding that US economic and monetary factors have no demonstrable role in explaining sectoral volatility seems to be rather surprising. Veronesi (1999) proposes an intertemporal, rational expectations equilibrium model that depicts the relationship between stock market volatility and economic uncertainty. He shows that during times of elevated uncertainty, investors are more susceptible to news, which in turn pushes up the volatility of asset prices. Engle et al. (2013) develop a brand-new category of component volatility models and connect them directly to US macroeconomic fundamentals. For European stock markets, Errunza and Hogan (1998) document that macroeconomic information serves to improve the predictability of return volatility. For China, Girardin and Joyeux (2013) and Cai et al. (2017) establish that economic activity indicators are important for understanding and forecasting volatility.

Fourth, although the extent and strength of their effects differ across sectors, pandemic- and health-related variables seem to be a contributing factor to volatility. In

Euro STOXX 50 volatility						0.192 (0.128)
CBOE oil ETF volatility index		**0.430 (0.190)	**0.096 (0.046)	0.039 (0.073)		***0.102 (0.033)
Twitter-based economic uncertainty		0.395 (0.297)		0.480 (0.377)		
US economic uncertainty	**0.183 (0.089)	***0.293 (0.065)	**0.127 (0.058)	***0.246 (0.031)		**0.165 (0.078)
Stock market turmoil	*0.207 (0.109)	0.209 (0.196)	0.054 (0.034)	**0.186 (0.081)		
Oil price war		**0.363 (0.152)	*0.176 (0.096)			0.184 (0.165)
US presidential elections			0.113 (0.087)			
COVID-19 vaccinations	*0.308− (0.172)	0.081− (0.110)	**0.159− (0.075)		***0.374− (0.087)	**0.137− (0.067)
New COVID-19 variant	*0.159 (0.091)		0.086 (0.060)	**0.116 (0.049)	**0.285 (0.143)	0.194 (0.177)
(W-test statistic (p-value	92.430 (0.000)	174.990 (0.000)	70.890 (0.000)	21.250 (0.019)	145.180 (0.000)	181.740 (0.000)

Notes: This table shows estimation results of the POLASSO model for each sector. Heteroskedasticity-robust standard errors are in parentheses. The W-test, known as the Wald test, examines the collective significance of independent variables. It follows an asymptotic distribution under the assumption that all parameters are collectively equal to zero in the null hypothesis. ***, **, and * stand for statistical significance at the 0.01, 0.05, and 0.10 levels, respectively.

Several conclusions can be extracted from Table 3. First, barring a few commonalities, the factors impacting sectoral volatility show considerable heterogeneity. This outcome is by no means surprising, given the varied nature of industries in the US market. The disparities among US stock sectors arise from their distinct structural compositions, varied operational challenges, divergent historical performance trends, and dissimilar sensitivities to economic and financial uncertainties, all contributing to the likelihood that relevant factors will affect each sector uniquely. Si et al. (2021) find that China's sectoral stock volatilities display dissimilar responses to policy uncertainty shocks. Kanno (2021) demonstrates that the onset of the COVID-19 pandemic has varied impacts on the performance of Japan's key industries.

Table 3

Estimation results of POLASSO models

Variable	Information Technology	Energy	Industrials	Financials	Healthcare	Consumer Discretionary
Trading volume	***0.428 (0.065)		**308 .0 (0.134)	***0.509 (0.119)	**0.370 (0.171)	***0.134 (0.028)
Volatility of broad USD index		***0.125 (0.038)	**167 .0 (0.078)	**0.381 (0.180)		
European stock market				0.133− (0.272)		0.303 (0.288)
Oil prices		***0.169 (0.045)	**0.204 (0.095)		0.328− (0.297)	**0.076− (0.037)
US coronavirus infection cases		**0.250 (0.111)	**0.281 (0.129)	0.093 (0.074)	***0.576 (0.158)	*0.142 (0.083)
US coronavirus fatalities				*0.217 (0.116)	**0.462 (0.203)	**0.207 (0.085)
Stringency of US policy responses		*0.089 (0.051)		*0.079 (0.045)	***0.438 (0.130)	*0.064 (0.037)
Infectious disease equity market volatility			0.047 (0.217)	0.172 (0.123)		
Google search queries for US market sectors		***0.216 (0.058)		**0.223 (0.101)	**0.316 (0.145)	***0.461 (0.107)
Google search queries for coronavirus	0.035 (0.312)	0.197 (0.222)	**0.269 (0.115)	*0.213 (0.120)	**0.379 (0.177)	**0.363 (0.172)
US economic activity		0.106− (0.185)	0.385− (0.295)			
Term spread	0.040 (0.112)		0.165 (0.127)	0.106 (0.095)		*0.109 (0.059)
VIX	**0.147 (0.070)	***0.308 (0.032)	***0.189 (0.048)	**0.429 (0.191)	***0.224 (0.066)	

Default spread						
Inflation expectation rates						
VIX	0.025	0.074	0.062	0.241	0.063	
Euro STOXX 50 volatility						0.079
Implied volatility of Bitcoin						
CBOE oil ETF volatility index		0.386	0.464	0.154		0.166
CBOE gold ETF volatility index						
Twitter-based economic uncertainty		0.055		0.087		
US economic uncertainty	0.047	0.003	0.175	0.035		0.053
China economic uncertainty						
Stock market turmoil	0.011	0.443	0.065	0.094		
Oil price war		0.455	0.304			0.069
US presidential elections			0.002			
COVID-19 vaccinations	0.083−	0.027−	0.068−		0.018−	0.086−
New COVID-19 variant	0.093		0.038	0.049	0.111	0.073
No. of factors chosen	8	14	16	16	10	15

Notes: This table displays outcomes from the elastic net penalized regression for parameter selection. Empty cells indicate variables whose coefficients have been reduced to zero.

5.2 Inferential findings

In the second step, we utilize the POLASSO modelling methodology with a view to tackling potential endogeneity problems. For purposes of parsimony, the variables that the elastic-net algorithm identified as relevant drivers of volatility are those that we are interested in. Table 3 presents the estimation results.

Table 2

Results of the elastic net estimator

Variable	Information Technology	Energy	Industrials	Financials	Healthcare	Consumer Discretionary
Trading volume	0.318		0.305	0.263	0.153	0.240
Broad US dollar index						
Volatility of broad USD index		0.109	0.476	0.407		
European stock market				0.074−		0.023
Chinese stock market						
Bitcoin prices						
Oil prices		0.532	0.261		0.164−	0.350−
Gold prices						
US coronavirus infection cases		0.108	0.139	0.491	0.411	0.018
US coronavirus fatalities				0.032	0.246	0.019
Stringency of US policy responses		0.115		0.127	0.031	0.072
Infectious disease equity market volatility			0.098	0.006		
Google search queries for US market sectors		0.354		0.361	0.052	0.377
Google search queries for coronavirus	0.029	0.072	0.053	0.008	0.063	0.021
US economic activity		0.026−	0.083−			
Relative TB rate						
Term spread	0.071		0.138	0.042		0.063

of 32 factors as sturdy drivers of the volatility within the industrials and financials sectors, resulting in the least parsimonious model representations for both sectors. It is worth mentioning that Google search queries related to coronavirus, the number of positive cases, trading volume, US economic policy uncertainty, the rollout progress of COVID-19 vaccinations, the VIX, and the sudden emergence of the Omicron variant are among the most prevalent drivers of volatility across nearly all sectors. There are factors that affect 3 or 4 sectors, including Google search volume for market sectors, the stringency index of policy responses, the volatility of USD exchange rates, oil prices, the implied volatility of oil, the oil price war, the COVID-19 death rates, term spread, and the US stock market turbulence. Other factors appear to contribute to explaining the volatility in fewer than half of the sectors (i.e., Twitter-based economic uncertainty, European stock market returns, the US presidential elections, contagious disease stock price turbulence, US economic activity, and Euro STOXX volatility). On the flip side, we identify 10 factors (i.e., China's economic uncertainty, implied volatility of gold prices, default spread, implied volatility of Bitcoin prices, expected inflation rates, treasury bill rates, gold prices, stock prices on Chinese exchanges, Bitcoin prices, and USD exchange rates) that seem to have no relevance to the volatility of the US sectoral index.

Regarding their signs, the chosen regressors exhibit the anticipated theoretical signs in most instances. For example, rises in the COVID-19 infection rates and deaths, Google search volume, VIX, trading volume, US economic uncertainty, and term spread typically correlate with heightened sectoral volatility. However, the vaccination campaign's progress in the US and real economic activity seem to diminish volatility. On the other hand, the situation is less consistent for oil prices and European stock returns, since their corresponding coefficients change signs across different sector specifications.

partialing-out LASSO instrumental-variables linear regression (POLASSO, hereafter) model. Meanwhile, the remaining variables, which are indeed weak in statistical sense, are utilized as controls. POLASSO treats these control variables as irrelevant, and thus, their corresponding inferential statistics are not presented (Chernozhukov et al., 2015b). The econometric representation of the POLASSO model is given as:

where is the response variable (i.e., sector index volatility), is a vector of endogenous variables and are their respective coefficient estimates of interest. is a -dimensional vector of instruments and is a -dimensional vector of exogenous control variables, from both of which a LASSO-type estimator specifies those incorporated in and those dropped from the final model. In this context, we have , but , which results in endogeneity. The fundamental concept behind this estimation method is based on the orthogonality principle, achieved through partialing out (Belloni et al., 2016). This involves creating orthogonal estimating equations for each . To do so, we employ a post-LASSO estimator to separate the influence of from , , and . The resulting residuals are then utilized to calculate the instrumental variable estimator, , for the parameter . We perform inference on utilizing and heteroscedasticity-robust standard errors. In our empirical analysis, we designate the second and third lags of the main explanatory variables as instrumental variables. Due to the challenges associated with proving that external instrumental variables contain relevant information for the endogenous counterparts while remaining unrelated to the disturbance term, lagged values are introduced as suitable instruments. This is because they provide information about the endogenous regressors and are independent of the disturbance term. In the POLASSO method, tests are conducted for all variables under investigation, whether they are exogenous or endogenous, and LASSO is used to select potential controls and instruments.

5. Empirical evidence

Our analysis includes two primary steps. First, we adopt the elastic-net regularized linear regression to pinpoint the factors that add to the US market sector volatility. Second, the potential for endogeneity among those regressors selected in the first step is addressed using the POLASSO modelling method.

5.1 Elastic net regression findings

We report the results of the elastic net estimator in Table 2. We observe that only 8 out of 32 factors are demonstrated as robust determinants of the volatility within the information technology sector. This small chosen group of factors implies the sparsest model representation for this sector. In contrast, the elastic net method selects 16 out

where are the parameter coefficient estimates of the regression model and are the disturbance terms. Standardizing variables before applying LASSO ensures that the regularization process focuses on the variables' relative importance in predicting the response variable, allowing for a fair and interpretable comparison between them (Simon et al., 2013). The intercept term in Eq. (7) is omitted due to the standardization applied to all variables. Tibshirani (1996) maintains that the LASSO method is premised on a penalty function to produce a sparse solution for the convex optimization problem:

where stands for the penalty. This penalty term is a crucial component of the LASSO method as it encourages sparsity in the model by shrinking coefficients towards zero and promoting variable selection. The parameter acts as a tuning parameter that controls the strength of the penalty applied to the estimated coefficients Tibshirani (1996) indicates that a larger value results in more aggressive shrinkage, potentially leading to more coefficients being pushed to zero, thereby promoting sparsity. Conversely, a smaller value reduces the penalty, allowing more coefficients to retain non-zero values.

A limitation of the LASSO method is that, in cases of high multicollinearity, it may struggle to handle correlated predictors efficiently, potentially leading to instability and arbitrary selection among strongly correlated variables. Zou and Hastie (2005) show that if a model's predictors display significant multicollinearity, the LASSO method can encounter instability in its solution paths. In such scenarios, the LASSO often chooses a random variable from closely correlated groups. To tackle this challenge, Zou and Hastie (2005) introduce the elastic net technique. This method handles highly correlated variables by employing a "grouped selection" strategy and merges LASSO-style shrinkage with automatic feature selection. Besides the norm penalty, elastic net regularization employs the norm penalty, which penalizes the sum of squared coefficients. It is expressed as follows:

In Equation (7), we make the assumption that . However, the exogeneity assumption is at a higher risk of being breached in time-series regression models that include a large number of regressors, as is the case in our situation. Unless adequately addressed, such endogeneity issue can introduce bias into the model's parameter estimates and result in incorrect inferences. To mitigate the risk of endogeneity, we deploy a two-step approach, in line with Chernozhukov et al. (2015a) and Belloni et al. (2016). Initially, as mentioned earlier, we use the elastic net method to identify the most significant factors influencing stock volatility. Subsequently, the variables identified in the first step as robust determinants of volatility (referred to as primary regressors) are included in a cross-fitting

relationships. Nonetheless, there exist some exceptions that include cross-sector correlations of volatility, and correlations between almost all sectoral volatilities on the one hand and trading volume, volatility of USD exchange rates, COVID-19 positive cases and deaths, Google search volume for coronavirus, and default spread on the other.

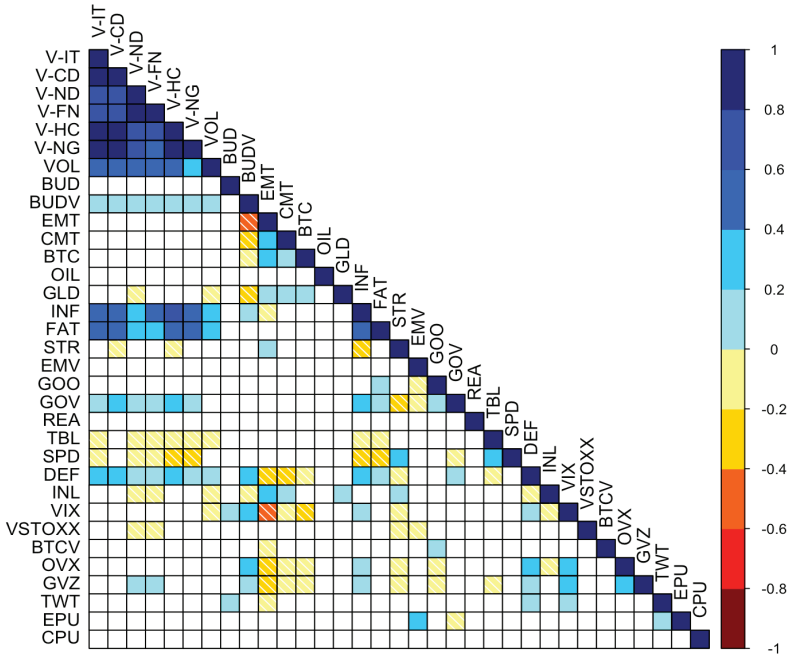

Fig. 2. A heatmap representation of pairwise correlations.

Note: "V-" represents a sector-specific index volatility. For example, "V-ND" and V-NG" denote return volatilities of Industrials and Energy sectors, respectively.

4. Econometric methodology

The econometrics and statistics literature proposes a wide variety of methodologies devised to single out the most powerful covariates in a regression model analysis. The LASSO method and its more enhanced versions hold significance as vital tools for selecting features or variables, addressing challenges in parameter interpretation, forecasting accuracy, as well as managing computational complexities within a specific model (Simon et al., 2013). We define the response variable, , as the vector standing for the conditional volatility of the sectoral index, and as the vector comprising potential volatility determinants. The linear model denoting the linkage between and is formulated as:

Crucial events	Equity market unrest ()	, a dummy variable, symbolizes the stock market collapse in the US during the initial turmoil of the coronavirus outbreak. Specifically, it takes on a value of one between 24/02/2020 and 23/03/2020, signifying the crash period, and holds a value of zero otherwise.	-
	Oil price war ()	is a dummy variable representing the period of the Saudi Arabia-Russia oil price war. It takes on a value of one between 06/03/2020, and 13/04/2020, signifying the approximate duration of the rift, and holds a value of zero otherwise.	-
	US presidential elections (USP)	is a dummy variable that reflects the US presidential race in 2020. Between 03/11/2020, the day of the election, until 20/01/2021, Joe Biden's inauguration, is equal to one; otherwise, it is zero.	-
	COVID-19 vaccination campaign ()	a dummy variable, designates the initiation of the vaccination campaign in the US. It is set to one starting from 14/12/2020, indicating the commencement of this campaign, and holds a value of zero otherwise.	-
	Detection of a new COVID-19 variant ()	a dummy variable, denotes the identification of a new version of the pandemic. It is set to one from 26/11/2021, marking the date of the first reported Omicron infection case in the US, and retains a value of zero otherwise.	-

Notes: A quick overview of the potential factors influencing the sector volatility of the US stock market appears in this table.

Since our inquiry comprises a great deal of covariates, it is of particular interest at this early level of analysis to shed light on their interrelationships. The pairwise correlations between continuous variables are displayed as a heatmap visualization in Fig. 2. Cross-correlation coefficients lacking statistical significance (i.e.,) are shown in blank cells. Very weak positive (negative) coefficients (i.e.,) are illustrated in turquoise (yellow), whereas very strong positive (negative) ones (i.e.,) are colored in dark blue (dark brown). It is obvious that the entire dependence structure is dominated by either statistically insignificant or very weak pairwise

Global fear and uncertainty		Derived from S&P 500 call and put option prices, quantifies investors' sentiment and the anticipated market volatility over the next 30 days.	https://fred.stlouisfed.org/
		mirrors the degree of fluctuation in the prices of the 50 major blue-chip stocks from eurozone countries included in the Euro STOXX 50 index.	https://www.stoxx.com/index-details?symbol=v2tx
	Implied volatility of Bitcoin ()	is an index that reflects the market's anticipation of 30-day volatility based on Bitcoin option prices from various exchanges.	https://t3index.com/indices/bit-vol/
		index measures the market's expectation of 30-day fluctuation in crude oil prices.	https://www.cboe.com/us/indices/dashboard/ovx/
		index tracks the market's expectation of 30-day volatility in gold prices.	https://www.cboe.com/us/indices/dashboard/gvz/
	Twitter-based economic uncertainty ()	Proposed by Baker et al. (2021), functions as a real-time measure capturing the perception of economic uncertainty worldwide among Twitter users.	https://www.policyuncertainty.com/twitter_uncert.html
	US economic policy uncertainty ()	Introduced by Baker et al. (2016), index quantifies policy economic uncertainty within the US. It provides insights into the impact of policy changes on economic conditions and market behavior.	https://www.policyuncertainty.com/us_monthly.html
	China economic policy uncertainty ()	Developed by Huang and Luk (2020), index serves as a proxy indicator measuring policy economic uncertainty specifically within mainland China.	https://economicpolicyuncertaintyinchina.weebly.com/

Macroeconomic fundamentals	US real economic activity ()	The Aruoba-Diebold-Scotti (REA) index, as introduced by Aruoba et al. (2009), serves as a real-time gauge of the general economic activity within the US. index has a zero average value, and hence incrementally larger positive (negative) values indicate steadily better- (worse)-than-average general conditions.	https://www.philadelphiafed.org/
	Relative treasury bill rate ()	Treasury bills are often used as a proxy for short-term interest rate developments and are considered an essential component in assessing monetary policy. In the spirit of Peña et al. (1999), is calculated as	https://fred.stlouisfed.org/
	Term spread ()	We adopt as a proxy for determining the stance of US monetary policy.	https://fred.stlouisfed.org/
	Default spread ()	We use as an indicator of market sentiment regarding credit conditions and corporate borrowing costs.	https://fred.stlouisfed.org/
	Inflation expectation rates ()	represents the forecast of average inflation over a five-year period, reflecting the US market's outlook on future inflation trends.	https://fred.stlouisfed.org/

Pandemic risk	US coronavirus cases ()	In accordance with Ding et al. (2021), INF is quantified as the rate of growth of cumulative infections recorded on a specific day.	https://covid.cdc.gov/covid-data-tracker
	US coronavirus fatalities ()	is calculated using the same methodology as .	https://covid.cdc.gov/covid-data-tracker
	Stringency of US policy responses ()	The Oxford COVID-19 Government Response Tracker (STR) is employed as a comprehensive metric reflecting the actions taken by the US government in response to the pandemic.	https://covidtracker.bsg.ox.ac.uk/
	Infectious disease equity market volatility ()	Introduced by Baker et al. (2020), is derived from newspaper reports. It quantifies how infectious disease developments related to pandemics impact the overall volatility of the US stock market.	https://www.policyuncertainty.com/infectious_EMV.html
Public attention	Search volume for stock market sectors ()	Google Search offers a powerful means to capture public attention to a specific keyword or topic. In our case, the search terms under scrutiny revolve around the sector-specific names, which include Information Technology, Consumer Discretionary, Industrials, Financials, Healthcare, and Energy. We follow the approach outlined in Lyócsa et al. (2020) to produce at a daily granularity.	https://trends.google.com/trends/?geo=QA
	Search trends for coronavirus ()	monitors the level of search attention throughout the US specifically to the term “coronavirus”. Daily values are produced using a methodology akin to that of data.	https://trends.google.com/trends/?geo=QA

Table 1

A summary of variable description

Dimension	Variable (Symbol)	Definition	Raw data source
Financial markets	Trading volume (	denotes the aggregate daily dollar value of stocks traded on US equity markets, acting as a gauge of the overall liquidity present in the market.	https://www.backtestmarket.com/en/
	Broad US dollar exchange rate index ()	index is a measure that indicates the comparative strength of the US dollar's foreign exchange value vis-à-vis a range of major currencies from both developed and developing economies.	https://fred.stlouisfed.org/
	Volatility of USD index ()	A first order one-component Beta-skew-t-EGARCH model is employed to capture the fluctuations of the BUD index.	Own calculation
	China's stock market ()	The S&P China 500 index mirrors the stock market performance of China, encompassing the 500 most significant and highly liquid equities across a diverse spectrum of industry sectors.	https://www.spglobal.com/en/
	European stock market ()	The S&P Europe 350 index serves as a representation of stock price fluctuations within European markets. It monitors the performance of the 350 most prominent and highly liquid stocks from a set of 16 developed markets in Europe.	https://www.spglobal.com/en/
	Gold prices ()	The spot prices of the yellow metal are expressed in US dollars per troy ounce, commonly abbreviated as (USD/Oz).	https://www.gold.org/
	Oil prices ()	The spot prices of West Texas Intermediate (WTI) oil, expressed in US dollars per barrel.	https://fred.stlouisfed.org/
	Bitcoin prices ()	The price of a single unit of Bitcoin in US dollars on the Bitstamp trading platform.	https://bitcoincharts.com/

the relevancy of a wide variety of factors as robust catalysts of US stock sector volatilities throughout the course of the pandemic. The pool of factors being considered consists of thirty two variables, including 5 dummy variables that represent significant occurrences during the period under study. Those potential determinants capture global economic and financial market influences, which comprise macroeconomic fundamentals (US inflation expectation rates, real economic activity, default spread, term spread, treasury bill interest rates), market sectors' exposure to the pandemic (US coronavirus positive cases, death counts, stringency of US policy responses, infectious disease equity market volatility), public attention (Google search queries for COVID-19 and US equities), financial markets (aggregate trading volume, broad US dollar index, European and Chinese stocks, Bitcoin, gold, and oil), global uncertainty and angst (Twitter-based economic uncertainty, policy uncertainty in US and China, forward-looking volatility indices for gold, oil, Bitcoin, and for stock markets of the US and Europe), and milestone events (the equity market collapse, the oil price crash, US presidential race, the commencement of COVID-19 pandemic vaccination campaign, detection of the first Omicron infection). In general, the rationale behind selecting these candidate variables stems from three main reasons. Firstly, these variables are chosen due to their theoretical relevance in understanding market volatility specifically during the pandemic. We consider the variables related to government interventions, economic indicators, public health conditions, and investor sentiment, since they are likely to have a direct or indirect impact on market volatility during crisis times. Secondly, empirical evidence provides a foundation for selecting those variables that have demonstrated a robust association with market volatility. Through examining relevant works and empirical research, we choose variables that have shown significant relationships with market volatility in similar contexts or during periods of market turmoil. This empirical evidence is basically informed by financial theories and models that explain the link between certain variables (e.g., trading volume, investor sentiment) and market volatility. Finally, data availability constraints are the last factor governing the choice of our candidate determinants of volatility.

To address the challenge posed by non-synchronicity of dataset releases, we adopt a method similar to Forbes and Rigobon (2002) and Hon et al. (2004) by employing two-day rolling averages across all factors. This helps us create a more consistent and comparable series. To meet the stationarity requirement, we transform our variables into the logarithmic form of the first difference. In Table 1, we provide a summary of the variables along with their respective data sources.

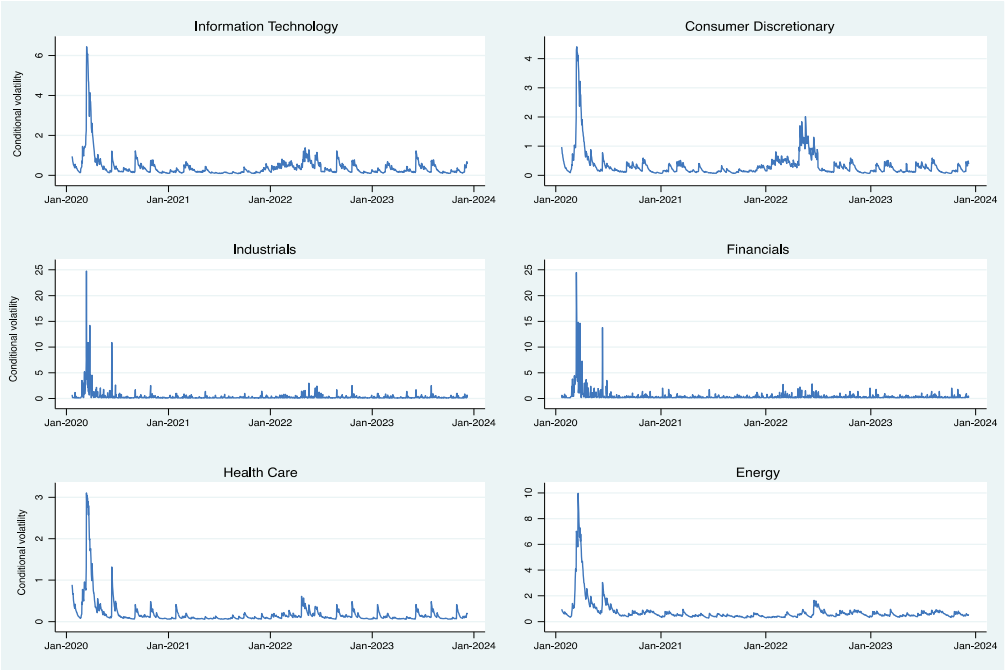

Fig. 1. The time evolution of conditional volatilities of US stock sector returns

Fig. 1 illustrates the time trend of the sectoral conditional volatilities throughout the sample period. Without exception, the individual sector indices experienced wildly elevated volatility spikes throughout the first half of 2020, which saw traumatic events centered on the COVID-19 disease, lockdowns and economic shutdown, the sudden spike in unemployment rates, Federal Reserve actions, and the outbreak and the Russia-Saudi Arabia oil price rift. For the rest of the sample period, sectoral volatilities are fairly stable, except for some spikes particularly during January 2022-November 2023. We observe that the sectors of Industrials, Financials, and Energy (Healthcare, Information Technology, and Consumer Discretionary) exhibit the greatest (lowest) magnitude of index price fluctuations. Moreover, Industrials and Financials tend to show similar volatility patterns over time.

3.2 Candidate volatility drivers

Although extant literature presents a broad universe of variables contributing to stock price swings, there is no manifest consensus on a single factor that can consistently explain such fluctuations across markets and over time. Our primary goal in this paper is to investigate

To start with, suppose a closing-price time series observed over a time period of days. Let be the log-price level at time , then the corresponding return is given as:

$$r_t = p_t - p_{t-1}, \qquad t = 1,2,..,T \tag{1}$$

The first order one-component Beta-skew-t-EGARCH model with a martingale difference property is expressed as:

$$r_t = exp(\lambda_t)\,\varepsilon_t = \sigma_t\,\varepsilon_t, \quad \varepsilon_t \sim st\,(0, \sigma_\varepsilon^2, \nu, \gamma), \quad \nu > 2, \quad \gamma \in (0, \infty), \tag{2}$$

$$\lambda_t = \omega + \lambda_t^{\dagger}, \tag{3}$$

$$\lambda_t^{\dagger} = \phi_1\,\lambda_{t-1}^{\dagger} + \kappa_1\,u_{t-1} + \kappa^*\,sgn(-r_{t-1})(u_{t-1} + 1), \quad |\phi_1| < 1 \tag{4}$$

$$\varepsilon_t = \varepsilon_t^* + \mu_{\varepsilon^*} \tag{5}$$

where denotes the conditional volatility of , and is the conditional error, which is distributed as a skewed *t* with zero mean, variance , degrees of freedom parameter , and skewness parameter . is the sign function, is the log-scale intercept (i.e., the long-run log-volatility), while denote the GARCH, ARCH, and leverage parameters, respectively. represents an uncentered skewed *t* variable with degrees of freedom parameter , skewness parameter and mean Further, is the conditional score defined as:

$$u_t = \frac{(\nu+1)[r_t^2 + r_t\,\mu_{\varepsilon^*}\,exp(\lambda_t)]}{\nu\,exp(2\,\lambda_t)\,\gamma^{2\,sgn\,[r_t + \mu_{\varepsilon^*}\,exp(\lambda_t)]} + [r_t + \mu_{\varepsilon^*}\,exp(\lambda_t)]^2} - 1 \tag{6}$$

3. Data description

We gather diverse daily time-series data over the period from 22/01/2020 to 08/12/2023, in order to deal with the issues of interest. The day the first COVID-19 case emerged in the US marks the beginning of the sample period. The selected sample encompasses the COVID-19 pandemic, which began to significantly impact global markets and economies from early 2020. Thus, this sample period presents a unique and relevant context for exploring market volatility due to the unprecedented disruptions caused by the pandemic. We fill in the blanks on weekends and other non-working days using a piecewise constant interpolation for variables that have only weekday data. With this process, the sample size for each variable amounts to 1417 observations. The focus of our empirical part is on the six most significant S&P 500 sector groups based on market capitalization. They are Information Technology (IT), Consumer Discretionary (CD), Industrials (ND), Financials (FN), Healthcare (HC), and Energy (NG), collectively constituting over 77 percent of the total S&P sector weightings (S&P Dow Jones Indices, 2023). During the pandemic, such sectors appear to play critical roles in shaping the economy and societal responses. For example, IT sector became pivotal as remote work and digital connectivity surged, relying heavily on tech services and products. Healthcare bore the brunt of the crisis, focusing on treatments, vaccines, and healthcare system resilience. Energy encountered volatility due to reduced travel and fluctuating oil demands, impacting global energy markets. The next subsections shed light on the volatility proxy and its putative determinants.

3.1 Volatility modelling

Financial and economic time series commonly exhibit distinctive features, including nonnormality, fat-tailedness, and leverage effects. These stylized facts are crucial considerations in empirical analyses, since they bear significant implications for asset pricing, risk management, and portfolio construction. Acknowledging and appropriately addressing these empirical regularities is essential for a more robust and realistic understanding of market dynamics and associated risks. Smales (2021) find that the distributions of daily returns of all US market sectors are fat-tailed and negatively skewed during the COVID-19 pandemic period. Ngene (2021) reports analogous results prior to and throughout the global health crisis. To tackle these potential issues in our analysis, we employ a Beta-Skew-t-EGARCH model developed by Harvey and Sucarrat (2014). Sucarrat (2013) shows that such modeling approach not only possesses the capability to effectively manage outliers or abrupt jumps in the data but also demonstrates a capacity to discern between short-term and long-term constituents of price volatility.

interest rates, and real effective exchange rates are negatively related to the commodity futures volatility in India. Chen et al. (2023) find that climate policy uncertainty is a viable determinant of stock market volatility in China.

The second strand of literature assesses the extent to which market volatility is induced by global events and different crises, whether of a political, economic, biological, or military nature (e.g., Apergis et al., 2022; Bakry et al., 2022; Bora and Basistha, 2021; Chatjuthamard et al., 2021; Choi, 2022; Curto and Serrasqueiro, 2022; Demir et al., 2022; Lúcio and Caiado, 2022; Mnasri and Essaddam, 2021; Rouatbi et al., 2021; Uddin et al., 2021). These types of crises can introduce uncertainty, disrupt economic activities, and alter investor sentiment, leading to increased volatility in financial markets. The interconnectedness of global financial markets implies that crises in one region or sector can potentially have spillover effects on other markets worldwide. For example, Shahzad et al. (2021) find that sectoral spillovers of US equity market tend to rise in the wake of global crises. Moreover, the financial sector exhibits a striking change in dynamics, because of being an information leader (receiver) during the 2008 global financial crisis (the COVID-19 pandemic period). Dufrénot et al. (2011) document that the deteriorating financial situation in the US market following the 2007-2008 subprime crisis exacerbates the level of stock price volatility in Latin American countries. Bakry et al. (2022) report evidence of a positive association between daily announcements of COVID-19 confirmed cases and market volatility in both developed and emerging economies. Their results are analogous to those of Uddin et al. (2021). Curto and Serrasqueiro (2022) establish that the spread of the COVID-19 exerts discrepant volatility effects on US stock sectors. Particularly, the most positively affected ones are information technology, telecom services, industrials, consumer discretionary, consumer staples, and energy. Wu et al. (2023) document that stock market volatilities of NATO and non-NATO countries decrease at the initial period of the conflict between Russia and Ukraine; nevertheless, as the crisis intensifies, stock market volatility starts to rise.

A main conclusion deduced from the above survey of related studies is that the current body of literature typically tends to examine only a limited set of potential predictors, leading to an incomplete comprehension of the factors that influence stock price volatility. Motivated by this research gap, our work contributes to the extant research by evaluating the explanatory power of a comprehensive collection of candidate factors representing global financial, political, health, and economic developments.

2. Related research

The literature on the factors driving the volatility of financial markets, particularly in chaotic times, is extensive and has garnered huge attention from academic and professional communities. During turbulent times, factors such as uncertainty, investor panic, deteriorating economic conditions, and financial system vulnerabilities play crucial roles in driving market volatility. Studies have examined the impact of specific events, such as the global financial crisis of 2008, the European sovereign debt crisis of 2010, and the COVID-19 pandemic, to understand how these crises have affected market volatility. Additionally, relevant literature explores the role of policy responses, including monetary and fiscal measures, as well as regulatory interventions, in mitigating or exacerbating market volatility during anxiety-ridden times. Market-specific factors, such as liquidity constraints, flight to safety, and contagion effects, have also been investigated to comprehend their impact on financial market volatility during periods of crisis. In reality, the literature on the potential determinants of market volatility can by no means be exhaustively reviewed, due to its breadth and diversity. In this section, therefore, we concentrate on two distinct strands of research to gain a more comprehensive understanding of the factors influencing stock price volatility. This helps to deepen our understanding of the key drivers and their interrelationships, allowing for a more insightful examination of stock market volatility.

The first line of research investigates the explanatory potential of macroeconomic fundamentals (e.g., Bouri et al., 2023a; Cai et al., 2017; Demirer et al., 2020; Dinh et al., 2022; Engle et al., 2013; Girardin and Joyeux, 2013; Lu et al., 2021; Lyócsa et al., 2020; Schwert, 1989; Si et al., 2021). Changes in macroeconomic conditions can have a significant impact on the level of uncertainty and risk perception, which can subsequently influence financial market volatility. For example, Dinh et al. (2022) find that stock returns, interest rates, money supply, inflation, trade balance growth, and consumer confidence are the most important predictors of the time-varying volatility and correlation of precious metals in G7 and BRICS countries. Mittnik et al. (2015) show that new orders of consumer goods and materials, VIX, TED spread, and realized variance are the most significant drivers of the volatility of S&P 500 index. Hernandez et al. (2022) document that oil volatility has a substantial causal effect on the spillover dynamics of US stock market sectors, and such an effect is amplified in a high volatility environment. Despite being one of the smallest on the US stock market, the energy sector is very important to the network connectedness of other stock sectors. Demirer et al. (2020) and Lu et al. (2021) show that oil price changes are a chief influence of stock market volatility. Mo et al. (2018) demonstrate that changes in consumer price index, money supply, short-term

epitomizing important financial, economic, political, and health dimensions. Notably, the collection also incorporates dummy variables that serve as proxies for significant events with the potential to impact volatility. These events include the price crash of the US stock market, the oil price rift between Saudi Arabia and Russia, the mass vaccination roll-out in the US, the presidential race in the US, and the detection of the Omicron variant infection. Secondly, considering the extensive range of factors under examination, our analysis leans on the elastic net technique developed by Zou and Hastie (2005). An extension of the Least Absolute Shrinkage and Selection Operator (LASSO) proposed by Tibshirani (1996), the elastic net method enables us to navigate the challenge posed by a vast array of variables by handling high-dimensional data and enhancing the accuracy of our predictions by incorporating both Lasso and Ridge regression penalties. In a data-rich environment, the variable selection problem is highly likely to emerge, since one could be lured to experiment with numerous combinations of candidate factors, each yielding different results. The elastic net method handles this problem and identifies the most informative predictors, while achieving a balance between model accuracy and model complexity. To our best knowledge, our approach marks the inaugural attempt to employ a lasso-type penalization technique specifically aimed at identifying the primary contributors to the volatility observed within sectors of the US equity market. This method allows us to pinpoint and prioritize the most influential factors driving sector-specific market volatility during the specified period. Thirdly, as pointed out by Ahmed (2018), Bampinas and Panagiotidis (2016), and Salisu et al. (2021), the examination of firm-level data may fail to provide a thorough picture of a country's market dynamics, while the use of market-level data may induce aggregation bias into empirical analysis. Owing to the heterogeneity of market industries, it is unlikely that the factors affecting volatility to be the same across them. Thus, our sector-level assessment serves as an indispensable complement to both firm- and aggregate market-level analyses. The results offer practical implications for investors wishing to diversify within multiple industries.

After this introduction, the rest of the paper proceeds as follows. Section 2 provides a brief overview of the extant literature. Section 3 outlines the datasets and the volatility modelling approach. Section 4 presents the methodology, whereas Section 5 shows the empirical findings. A discussion of our results and their policy implications are given in the penultimate section, while the final section concludes.

2021). On the other hand, a thorough understanding of the market dynamics may not be possible from the examination of sample firm-level data. Arguably, the sector-based inquiry is highly likely to produce more accurate results and fresh perspectives that might otherwise be challenging to discover using the other two approaches. It may also be a useful addition to conventional analyses relying on highly aggregated market data or firm-level information (Laborda and Olmo, 2021). Second, we seek to provide practical implications for investors, portfolio managers, and financial institutions. By identifying the underlying causes of sector volatilities, our study can help market participants develop more informed risk management strategies and make investment decisions during similar crises in the future.

The study aims to offer a greater understanding of market behaviour by looking at the factors that contribute to sector volatility, potentially lowering uncertainty and boosting investor confidence in the market's ability to accurately reflect underlying values. Furthermore, understanding the unique drivers of volatility could aid policymakers in the formulation of targeted policies and regulations aimed at stabilizing the market and mitigating risks associated with future crises.

In more detail, our aim is to thoroughly address these chief inquiries:

- What influences the fluctuations in sector-specific volatilities within the US stock market during the COVID-19 outbreak?
- Do these influencing factors demonstrate variations across different sectors within the market?

Our work contributes to the rapidly expanding literature on the financial and economic implications of the ongoing pandemic in at least three prime ways. Firstly, relevant studies (e.g., Ahmad et al., 2021; Baek and Lee, 2021; Baig et al., 2021; Bouteska et al., 2023; Chatjuthamard et al., 2021; Kamal and Wohar, 2023; Kanamura, 2022; Ngene, 2021; Salisu et al., 2021; Wang et al., 2021a) examine the factors that influence market volatility in both normal and stressful circumstances, with the goal of illuminating the potential for portfolio diversification and hedging. However, in doing so, these papers tend to concentrate their analysis on a small group of candidate predictors, giving rise to a partial understanding of the factors affecting the price volatility of US equities. To our knowledge, no empirical investigation has been undertaken to uncover the factors influencing the price volatility of sector indices. We add to the extant research by evaluating the explanatory power of an expansive collection of thirty two factors

the wake of the pandemic outbreak. Ngene (2021) shows that the intensity and direction of volatility shock transmissions across US equity market sectors tend to differ between times of economic recession and expansion. The results also show that domestic credit market conditions proxied by default spread, stock market uncertainty proxied by VIX, and global credit market uncertainty proxied by TED spread have substantial impact on cross-sector volatility spillovers at lower and higher quantiles. Baig et al. (2021) report evidence that COVID-19 positive cases and fatalities, investor sentiment, and lockdown-related measures lead to less (more) firm-level liquidity (volatility) levels in the US. Ahmad et al. (2021) show that US sectoral returns are more sensitive to changes in VIX than to changes in implied volatility of oil (OVX). Energy and materials (information technology, healthcare, and consumer discretionary) sectors are the most receptive of volatility shocks from OVX (VIX). The results of Bouri et al. (2023a) suggest that the correlations between expected inflation and US sector indices vary not only over time, but also across different frequencies Based on high-frequency data from the US, Eurozone, UK, Japan, China, and India, Bouri and Harb (2022) show that the propagation of volatility shocks within the system is shaped by the size (i.e., small, medium, large) of good and bad volatility.

Expanding on this research trajectory, our study endeavors to uncover the most important factors contributing to the volatility of US stock returns within specific industry sectors, amidst the influence of the COVID-19 pandemic. Due to its paramount leadership role in the global financial landscape and the lion's share of investor attention, the US stock market is the principal subject of our empirical inquiry. According to data from the World Bank, the US stock market, by the end of 2022, constitutes nearly 60% of all equities traded in the world and about 40% of global market capitalization as a proportion of GDP.[2] There are, indeed, two reasons underlying this empirical inquiry. First, our primary motivation is to investigate and understand the specific factors that contributed to the volatilities observed in different sectors of the US equity market during the Coronavirus pandemic. This helps shed light on the unique challenges and market dynamics faced by different sectors during this unprecedented crisis. Besides, with its focus on the sector-specific volatilities rather than the entire market volatility, our work fills an existing gap in the literature and provides a comprehensive analysis of the US equity market dynamics during such a tumultuous period. Since market-level data covers diverse businesses with varying market capitalizations, trading activity levels, and responses to market cycles, it may, on the one hand, introduce aggregation bias into empirical analysis (Salisu et al.,

2 Source: https://data.worldbank.org/indicator/CM.MKT.TRAD.CD

1. Introduction

Global catastrophes tend to pose substantial threats to the welfare of individuals, business entities, and entire economies, due to their extensive reach and profound consequences. A prime illustration of such crises is the implacable pandemic of the novel Coronavirus disease, which indeed instigated monumental transformations, both domestically and internationally. The repercussions of this pandemic have been far-reaching, affecting nearly every facet of life, from public health and societal standards to economic systems and global linkages. With seemingly no end in sight to the ongoing health emergency, countries continue to grapple with heightened unpredictability and uncertainty shrouding most aspects of life. Notably, the United States has borne a significant burden of the pandemic's toll, experiencing higher infection rates and casualties compared to other parts of the world. By the end of November 2023, the cumulative nationwide tally of COVID-19 positive cases and fatalities surged to 103,44 and 1,13 million, respectively, accounting for nearly 13.47 and 16.22 percent of the world's cumulative confirmed cases and mortality, respectively.[1] As a principal barometer of future economic conditions, financial markets are no exception to the vicissitudes of the pandemic and its aftermath. During February-March 2020, major benchmark stock indices underwent an all-time collapse on the back of negative economic sentiment and poor business confidence. In particular, the circuit breakers that apply to the entire US stock market were activated on March 9, 12, 16, and 18. This action temporarily paused trading with the aim of soothing investor anxiety.

The evolving global health threats have cast a shadow over financial market performance, prompting a growing body of research evaluating the distinct effects of the COVID-19 pandemic on many business and industry domains (e.g., Ahmad et al., 2021; Alomari et al., 2022; Baek and Lee, 2021; Baig et al., 2021; Choi, 2022; Curto and Serrasqueiro, 2022; Laborda and Olmo, 2021; Liu et al., 2023; Wang et al., 2023; Xu, 2022; Yu and Xiao, 2023). Choi (2022), for example, documents that, when the pandemic started, there was an increased degree of volatility spillovers among market sectors in the US. Alomari et al. (2022) provide evidence of a positive linkage between most US sectoral stock returns and COVID-19-related news, measured via a newspaper-based infectious diseases tracking index, during optimistic market conditions. Conversely, during pessimistic market conditions, they observe a negative correlation between most US sectoral stock returns and news regarding COVID-19. Laborda and Olmo (2021) find that the energy sector played a significant role as the primary source of transmitting volatility shocks in

1 Source: https://covid.cdc.gov/covid-data-tracker

محددات تقلبات الأسعار في سوق الأسهم الأمريكية خلال جائحة فيروس كورونا

ملخص:

تُشكل الأزمات العالمية تهديدات كبيرة لرفاهية الأفراد والشركات والاقتصادات بأكملها بسبب تأثيرها واسع النطاق وتداعياتها الشديدة. تسعى هذه الورقة إلى تحديد المتغيرات الرئيسية وراء تقلبات سوق الأسهم القطاعية الأمريكية تحت ضغط جائحة كوفيد-91، من خلال اختبار القوة التفسيرية لمجموعة كبيرة من العوامل المحتملة. تم تقدير تقلبات أسعار الأسهم في القطاعات المختلفة باستخدام نموذج Beta-Skew-t-EGARCH model، والذي يعالج بعض المشاكل الموجودة عادةً في السلاسل الزمنية مثل عدم تماثل التوزيعات والالتواء والقيم المتطرفة. يعتمد التحليل العملي للبيانات لتحديد المتغيرات الأكثر تأثيراً على تقلبات أسعار الأسهم على أسلوب Elastic-net Regularized Regression، والذي يُعد أحد الأساليب الهامة المستخدمة في معالجة مشكلة التعددية المتعلقة بالمتغيرات التنبؤية، وأيضاً تحسين أداء النموذج وزيادة قدرته على التنبؤ بالبيانات بشكل دقيق وموثوق.

أشارت نتائج البحث أن حجم التداول، وتقلب أسعار صرف الدولار الأمريكي، ومعدلات الإصابة بفيروس كورونا، ومؤشر VIX، واتجاهات بحث Google، وعدم اليقين في السياسة الاقتصادية الأمريكية، وبدء برامج التطعيم هي المحددات الأكثر شيوعًا للتقلبات القطاعية. من ناحية أخرى، أشارت النتائج أن تحركات أسعار الذهب والبيتكوين والنفط والأسهم الأوروبية والصينية ليس لها تأثير جوهري على تقلبات مؤشرات الأسعار لجميع القطاعات تقريبًا. هناك مجموعة هامة من المضامين والتوصيات التي يمكن استنتاجها من هذه النتائج.

الكلمات المفتاحية: سوق الأسهم الأمريكية، التقلب في أسعار الأسهم، أسلوب الشبكة المرنة، جائحة كوفيد-91.

On the determinants of price fluctuations during the COVID-19 pandemic: Evidence from US equity markets

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Abstract:

Global crises often present significant threats to the well-being of individuals, businesses, and entire economies because of their widespread impact and severe repercussions. This study aims to pinpoint crucial factors influencing volatility in US sectoral stock indices during the COVID-19 pandemic. A Beta-Skew-t-EGARCH framework is used to model the changing patterns of volatility in each sector's returns over time. The empirical analysis relies on both the elastic net penalization approach and the partialing-out LASSO instrumental-variables regression. The findings reveal that the predominant variables explaining sectoral volatility include trading volume, stringency of US policy responses, volatility of broad USD exchange rates, Google search trends of market sectors, positive cases of coronavirus, US economic policy uncertainty, Google search volume for coronavirus, VIX, and the roll-out of vaccination programs. On the other hand, Bitcoin, treasury bills, gold, default risk, and Chinese stock prices do not have a meaningful impact on the price swings for all sectors. A thorough understanding of the factors underlying sectoral volatility enables portfolio managers to devise sensible investment decisions, and policy makers to lay down regulations intended to curb excessive volatility.

Keywords: US stock market, Price swings, Endogeneity, COVID-19 pandemic; Elastic net technique.

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of ASAs used by MEs, which can reflect the whole picture of Palestine. Third, it would be interesting to perform the same investigation on customized and tailored ASAs adopted by MEs in Palestine. Fourth, a study based on the case-study research approach would also be useful to perform and compare its finding to those of this study. This approach can produce a more detailed explanation of the general quality features of ASAs in MEs and may complement our findings. Fifth, given the great heterogeneity of MEs, and their dependence on the O/M, it would be very illustrative to fully analyze the perspectives the O/Ms adopts on the general quality features of ASAs. Sixth, this an analysis of the impact of ASAs on the performance of MEs in Palestine would greatly complement this study. One possibility to do so is by using the net margin or return on investment to measure this impact on worker's productivity and efficiency. Finally, it would be interesting to extend this research across emerging economies of different latitudes or developed countries and perform comparative studies.

parties to acquire a better understanding of the benefits of ASAs to MEs and encourage more MEs to adopt ASAs. This study, as prior studies did, highlights the importance of training O/Ms on relevant technology and accounting skills. The training programs should be specifically designed for particular needs of O/Ms, such as planning, controlling, monitoring and decision-making skills and competencies.

The results suggest that ASAs providers need to always upgrade the ASAs, so that the ASAs become more user friendly and more satisfying for the needs and desires that are conformant to the prevailing accounting and auditing principles and norms. O/Ms need to conduct an in-depth and informed investigation on available ASAs when deciding to adopt an ASA. One possibility for doing so is by getting help from experienced professionals in ASAs. Finally, since the absence of government control over the performance of ASAs facilitates tax evasion, it is necessary for the Palestinian Ministry of Finance to establish adequate policies and guidelines regarding the adoption of software for accounting by MEs. It is also necessary for this Ministry to exercise an active monitoring role on the output of the systems used in these enterprises.

8.2. Limitations

This study is not free of limitations. It was conducted in an emerging economy, which has been highlighted as a research opportunity in prior research. The study was limited to the ready-to-use ASAs only. It was not possible for the researcher to incorporate some of the MEs based in the West Bank of Palestine, because borders crossing between the GS and the West Bank is currently not possible. Israeli occupation has been imposing a restricted military blockade on the GS for the past 15 years. This study may not fully reflect the overall users' perspectives on the ASAs used by MEs in Palestine, which may affect the generalization of the results. Additionally, this study assessed the extent to which the ASAs used in MEs in Palestine meet the needs and desires of the users, however, it did not explore and specify the needs and desires these systems meet.

8.3. Future research

The scarcity and limitations of research on the quality of ASAs used by MEs makes it imperative to do further research on this topic. First, it would be interesting to conduct a similar study on MEs based on West bank region, so a comparative study could be performed to generalize the obtained results for the entire Palestine. Second, this research can be improved by conducting a study with a larger sample of MEs from both regions (the GS and West Bank) to provide a better understanding of the general quality features

Al-Muhasib Al-Momtaz ranks first in both situations, while Al-Muhasib Azzaki ranks last in both features.

The rank of Al-Aseel in terms of the ability to meet the needs and desires of the users is much better than its rank in terms of the availability of general quality features. It ranks second for the first feature, but it ranks fourth in the second feature.

The rank of Babylon in terms of the availability of general quality features is better than its rank in terms of the ability to meet the needs and desires of the users. It ranks second in the first feature and third in the second feature.

The rank of the Al-Muhasib Assihri in terms of the availability of general quality features is better than its rank in terms of the ability to meet the needs and desires of the users. It ranks third in the first feature and fourth in the second feature.

8. Conclusions, Limitations, and Future Research

8.1. Conclusions

The study explored the extent to which the general quality features are available in ASAs adopted by MEs in Palestine. It also explored the extent to which these software applications meet the needs and desires of the users. To test the hypotheses of this study, the Signal, Chi-Square, and Kruskal Wallis tests were applied to the questionnaire data collected from the GS of Palestine. The study found that ASAs used by MEs in Palestine have the general quality features to varying degrees, and they have the ability to meet the current needs and desires of users in that region. The study also found that there is a strong correlation between the availability of general quality features in ASA (namely speed, accuracy, efficiency and effectiveness, flexibility, and control) and the abilities of these systems to meet the needs and desires of the users. The amount of correlation depends on the type of the ASA system.

This study contributes to the literature in many ways. First, it is the first study that explores the ASA in MEs in Palestine. Second it is the first study to investigate the extent to which the general quality features are available in these software applications and the extent to which these systems meet the users' needs and desires. Third, the study contributes to a better understanding of the MEs and the ASAs they use.

The results from this study provide meaningful insights for academician and researcher. They are also insightful for accountants, O/Ms, stakeholders, governments, software providers, and other related parties. The insight the results provide would allow these

Palestine to meet the needs and desires of the users. It shows that Al-Muhasib Al-Momtaz ranks first, followed by Al-Aseel, Babylon, Al-Muhasib Assihri, then Al-Muhasib Azzaki.

Table 16

Ranking the ASAs used by MEs in Palestine in terms of the ability to meet users' needs and desires

Accounting Software	Average Mean	Rank
Al-Muhasib Al-Momtaz	3.9487	1
Al-Aseel	3.7054	2
The Babylon	3.5370	3
Al-Muhasib Assihri	3.5333	4
Al-Muhasib Azzaki	3.333	5

Table 17

The ranking of each APA according to the availability of general features and the ability to meet users' needs and desires

Accounting Software Application (ASA)	Rank based on:	
	The ability to meet users' needs and desires	The availability of general features
Al-Muhasib Al-Momtaz	1	1
The Babylon	3	2
Al-Muhasib Assihri	4	3
Al-Aseel	2	4
Al-Muhasib Azzaki	5	5

The results obtained from the comparison of the ranks that each ASA gained in terms of the availability of general quality features and the ability to meet the needs and desires of the users, are presented in Table 17, which may indicate the followings:

13. The average means of the "availability of the ability of ASAs used by MEs to satisfy the needs and desires of users" show that Al-Muhasib Al-Momtaz (3.9487) has obvious advantage over the other systems. It is followed by Al-Aseel (3.7054), Babylon (3.5370), the Al-Muhasib Assihri (3.5333), then Al-Muhasib Azzaki (3.333). The calculated (12.880) value of the Chi-square (X2) is lower than the tabular value and shows a statistical significance at $\alpha = 0.05$. Accordingly, there are statistically significant differences at $\alpha = 0.05$ in terms of the availability of the ability to satisfy the needs and desires of all users among ASAs implemented by MEs in Palestine. The ability of ASAs used by MEs in Palestine to satisfy the users' needs and desires varies, and it depends on the kind of needs the users have and how much they are aware of and educated about professional accounting.

The above discussion for the findings of hypotheses reveals that there are statistically significant differences at $\alpha = 0.05$ among the ASAs used by MEs in Palestine in terms of the availability of all specified general quality features and their ability to meet the needs and desires of the users.

Table 15 show these software applications ranked based on the average means presented in Table 13. Table 15 reveal the extent of convergence among the systems in terms of the availability of general quality features. It shows that Al-Muhasib Al-Momtaz ranks first followed by Babylon, Al-Muhasib Assihri, Al-Aseel, then Al-Muhasib Azzaki.

Table 15

Ranking the ASAs used by MEs in Palestine in terms of the availability of general quality features

Accounting Software Application (ASA)	Average Mean	Rank
Al-Muhasib Al-Momtaz	3.9430	1
The Babylon	3.7843	2
Al-Muhasib Assihri	3.7643	3
Al-Aseel	3.7236	4
Al-Muhasib Azzaki	3.2305	5
Overall Average Mean	3.7318	

Table 16 shows these applications ranked according to the average means presented in Table (12). Table (14) reveals the extent of the ability of the ASAs used by MEs in

request maintenance if an annual maintenance contract is in place. However, they only offer upon-request maintenance in the absence of a maintenance contract.

10. The average means of the "availability of Effective Cost" in the ASAs used by MEs show that Al-Muhasib Al-Momtaz (4.0577) has obvious advantage over the other systems. It is followed by the Al-Muhasib Assihri (3.7500), the Babylon (3.6667), Al-Aseel (The Twilight) (3.4730) then Al-Muhasib Azzaki (2.4318). The calculated (31.173) value of the Chi-square (X2) is lower than the tabular value, and it shows a statistical significance at $\alpha = 0.05$. Accordingly, there are statistically significant differences at $\alpha = 0.05$ in terms of the availability of effective cost among the ASAs used by MEs in Palestine. The full cost of purchasing ASAs in the Palestinian market varies depending on the software quality and the nature of vendor's marketing policy. It should be highlighted, nevertheless, that certain Palestinian software vendors are eager to offer extremely low-price products to their customers, but other software venders stick to an almost fixed selling price for their software.

11. The average means of the "availability of scalability" in the ASAs used by MEs show that the Babylon (4.0222) has obvious advantage over the other systems. It is followed by Al-Muhasib Al-Momtaz (3.8923), Al-Aseel (3.1270), Al-Muhasib Assihri (3.0000), then Al-Muhasib Azzaki (2.4318) sequentially. The calculated (51.130) value of the Chi-square (X2) is lower than the tabular value, and it shows a statistical significance at $\alpha = 0.05$. Accordingly, there are statistically significant differences at $\alpha = 0.05$ in terms of the availability of scalability among the ASAs used by MEs in Palestine.

12. The average means of the availability of perceived "ease of use in the ASAs" used by MEs show that Al-Muhasib Al-Momtaz (4.1154) has obvious advantage over the other systems. It is followed by Al-Muhasib Assihri (3.9000), Al-Aseel (3.7027), Al-Muhasib Azzaki (3.6818) then Babylon (3.5370). The calculated (8.5880) value of the Chi-square (X2) is lower than the tabular value, and it shows a statistical significance at $\alpha = 0.05$. Accordingly, there are statistically significant differences at $\alpha = 0.05$ in terms of the availability of perceived ease of use among the ASAs used by MEs in Palestine. This result may indicate that the users of Al-Muhasib Al-Momtaz find the software interface so familiar and intuitive, which enables them to complete their tasks/goals easily and effortlessly. The results may also indicate that the software designers did an excellent job in understanding the fine details of the user's needs from the user's point of view rather than from the developer's point of view. The designers did great job in anticipating the use case scenarios and contexts in which their software will be used, and they devised simple/intuitive interface and procedures for this purpose.

when old ASA is used by an enterprise which its activities are being expanded and new investment projects are being added. Old ASA are usually not subject to development and hence no longer meet the needs of the enterprise. Some ASAs in Palestine have been operating in this environment for a long time without being updated.

7. The average means of the "availability of comprehensiveness" in the ASAs used by MEs show that the Babylon system (3.6825) has obvious advantage over the other systems. It is followed by Al-Muhasib Assihri (3.6286), Al-Aseel (3.6255), Al-Muhasib Azzaki (3.5548), then Al-Muhasib Al-Momtaz System (3.0330). The calculated (24.222) value of the Chi-square (X2) is lower than the tabular value, and it shows a statistical significance at $\alpha = 0.05$. Accordingly, there are statistically significant differences at $\alpha = 0.05$ in terms of the availability of comprehensiveness among the ASAs used by MEs in Palestine. This result is normal, as the ASAs used by MEs in Palestine varies in satisfying all users' needs and desires.

8. The average means of the "availability of built-in security" in the ASAs used by MEs show that Al-Muhasib Al-Momtaz (4.1282) has obvious advantage over the other systems. It is followed by Al-Muhasib Assihri (3.9667), Babylon (3.9047), Al-Aseel (3.7297), then Al-Muhasib Azzaki (2.8485). The calculated (32.512) value of the Chi-square (X2) is lower than the tabular value, and it shows a statistical significance at $\alpha = 0.05$. Accordingly, there are statistically significant differences at $\alpha = 0.05$ in terms of the availability of built-in security among the ASAs used by MEs in Palestine. The variation in the ability to safeguard and secure information and data among the ASAs used by MEs in Palestine may be due to the software's robust structural design, type of built-in security framework, and degree of fit to the nature and size of the enterprise's activities. It was observed that certain software applications have robust built-in security, which is a factor in regulating the performance of these applications.

9. The average means of the "availability of proper maintenance" to the ASAs used by MEs show that Al-Muhasib Al-Momtaz (4.2692) gets proper maintenance more than the other systems. It is followed by Al-Aseel (3.8886), Babylon (3.8333), Al-Muhasib Assihri (3.500), then Al-Muhasib Azzaki (2.7955). The calculated (52.042) value of the Chi-square (X2) is lower than the tabular value. and it shows a statistical significance at $\alpha = 0.05$. Accordingly, there are statistically significant differences at $\alpha = 0.05$ in terms of the availability of proper maintenance among the ASAs used by MEs in Palestine. The level of maintenance provided to the ASAs in MEs varies among Palestinian software vendors. These venders are required to provide periodic as well as upon-

significant differences at α = 0.05 in terms of the availability of efficiency and effectiveness among the ASAs used by MEs in Palestine. This is normal as ASAs vary in their efficiency and effectiveness, depending on many factors. Among these factors are: the operating environment of the system and the efficiency of the software vendors' programmers and designers.

4. The average means of the "availability of flexibility" in the ASAs used by MEs show that Al-Muhasib Assihri (3.800(has obvious advantage over the other systems. It is followed by Al-Aseel (The Twilight) (3.7399), Babylon (3.5972), Al-Muhasib Azzaki (3.2197), then Al-Muhasib Al-Momtaz (3.8462). The calculated (27.575) value of the Chi-square (X^2) is lower than the tabular value, and it shows a statistical significance at α = 0.05. Accordingly, there are statistically significant differences at α = 0.05 in terms of the availability of flexibility among the ASAs used by MEs in Palestine. This is normal as ASAs' flexibility varies in meeting what the user needs and desires. Such variations might be due to the how powerful the system structure was and whether the system was locally developed or was customized from a system imported from abroad to meet the needs of the Palestinian MEs.

5. The average means of the "availability of reliability" in the ASAs used by MEs show that Al-Momtaz (4.2923) has obvious advantage over the other systems. It is followed by Al-Muhasib Assihri (4.0400), Al-Aseel (3.9946), Babylon (3.8222), then Al-Muhasib Azzaki (3.7091). The calculated (18.972) value of the Chi-square (X^2) is lower than the tabular value, and it shows a statistical significance at α = 0.05. Accordingly, there are statistically significant differences at α = 0.05 in terms of the availability of reliability in the ASAs used by MEs in Palestine. This variability in reliability can be attributed to errors generated by some of the ASA applications, which reduces the reliability of these system and increase the need for continuous error checking in the outputs of the software.

6. The average means of the "availability of convenience" in the ASAs used by MEs show that Al-Muhasib Al-Momtaz (3.9423) has obvious advantage over the other systems. It is followed by Al-Aseel (3.7703), Babylon (3.7500), Al-Muhasib Assihri (3.6500), then Al-Muhasib Azzaki (3.4545). The calculated (11.2030) value of the Chi-square (X2) is lower than the tabular value, and it shows a statistical significance at α = 0.05. Accordingly, there are statistically significant differences at α = 0.05 in terms of the availability of convenience among the ASAs used by MEs in Palestine. The convenience of the ASAs used by MEs varies. The least convenience is encountered

($\alpha = 0.05$) between the availability of the general quality features and the ability to meet the needs and desires of the users attributable to the type of ASA used was tested using Kruskal Wallis test. The obtained results are presented in Table 14; and discussed as follows:

1. The average means of the "availability of speed" in the ASAs indicate that Al-Muhasib Assihri has an obvious advantage over the other systems (4.3667). It is followed by Al-Muhasib Al-Momtaz (4.3205), Al-Aseel (4.1577), Babylon (3.8704), then Al-Muhasib Azzaki (3.5606). The calculated (26.555) value of the Chi-square (X^2) is lower than the tabular value, and it shows a statistical significance at $\alpha = 0.05$. Accordingly, this result indicates that there are statistically significant differences at $\alpha = 0.05$ in terms of the availability of speed among the ASAs used by MEs in Palestine. This result also confirms that there is a disparity in the ASAs in terms of performance speed. This disparity varies depending on four important factors: the type of software used, whether it is a DOS-based or Windows-based software, whether the computers on which the software is installed and other used hardware devises are advanced or not, and whether the software is installed on a personal computer or a server involving a LAN or a WAN network.

2. The average means of the "availability of accuracy" in the ASAs show that both Al-Muhasib Assihri (4.2500) and Al-Muhasib Al-Momtaz (4.2500) has a significant advantage over the other systems. They are followed by the Babylon (3.9444), Al-Muhasib Azzaki (3.8182), then Al-Aseel (3.7410). The calculated (12.603) value of the Chi-square (X^2) is lower than the tabular value, and it shows a statistical significance at $\alpha = 0.05$. Accordingly, this result indicates that there are statistically significant differences at $\alpha = 0.05$ in terms of the availability of accuracy among ASAs used by the MEs in Palestine. The result also confirms the fact that the ASAs used by MEs differ among themselves in terms of performance accuracy, which is reflected positively and clearly in the accuracy and integrity of the information and reports they produce. However, there are few software applications that produce conflicting, erroneous, or illogical results, which always required direct intervention from their software vendors to fix the bugs as they occur.

3. The average means of the "availability of efficiency and effectiveness" in the ASAs used by MEs show that Al-Muhasib Al-Momtaz (3.8462) has obvious advantage over the other systems. It is followed by Al-Aseel (3.7410), Babylon (3.7315), Al-Muhasib Assihri (3.5500), then Al-Muhasib Azzaki (3.2197). The calculated (24.916) value of the Chi-square (X^2) is lower than the tabular value, and it shows a statistical significance at $\alpha = 0.05$. Accordingly, this result indicates that there are statistically

Table 14

Comparison of general quality features in the ASAs used by MEs and the ability of the systems to meet the needs and desires of the users

Description	The ASAs used by MEs						Chi-Square ($\chi 2$)	Signif. level
	Babylon	Al-Muhasib Assihri	Al-Muhasib Al-Momtaz	Al-Muhasib Azzaki	Al-Aseel	Average Mean		
Speed	3.8704	4.3667	4.3205	3.5606	4.1577	4.0778	26.555	0.000
Accuracy	3.9444	4.2500	4.25	3.8182	3.741	3.9967	12.603	0.013
Efficiency and Effectiveness	3.7315	3.5500	3.8462	3.2197	3.741	3.6689	24.916	0.000
Flexibility	3.5972	3.8000	3.1635	3.2159	3.7399	3.7233	27.575	0.000
Reliability	3.8222	4.0400	4.2923	3.7091	3.9946	3.9867	18.972	0.001
Convenience	3.7500	3.6500	3.9423	3.4545	3.7703	3.7433	11.203	0.024
Comprehensiveness	3.6825	3.6286	3.033	3.5548	3.6255	3.5467	24.222	0.000
Built-in Security	3.9047	3.9667	4.1282	2.8485	3.7297	3.7067	32.512	0.000
Proper Maintenance	3.8333	3.5000	4.2692	2.7955	3.8986	3.9667	52.042	0.000
Effective Cost	3.6667	3.7500	4.0577	2.4318	3.473	3.4633	31.173	0.000
Scalability	4.0222	3.0000	3.8923	2.3727	3.127	3.2480	51.130	0.000
Perceived ease of use	3.8333	3.9000	4.1154	3.6818	3.7027	3.8000	8.588	0.072
The ability to meet the needs and desires of the users	3.5370	3.5333	3.9487	3.333	3.7054	3.6613	12.880	0.012
Average Total	3.7843	3.7643	3.9430	3.2305	3.7236			

The level of statistical significance (α) was calculated on the basis of ($\alpha = 0.05$)

The hypothesis that there are statistically significant differences at the level of significance

13. Scalability	3.2480	64.9	13	0.043	This result may indicate that the ASAs used by MEs is not scalable as required, and does not grow in harmony with the growth of these enterprises. Consequently, there is a risk that most O/Ms will later discover and regret that these software applications only meet the enterprise's immediate needs but are unable to meet the emerging needs of the enterprise or help it grow in a beneficial way. They will also realize that purchasing and employing un-scalable software was a waste of money and the effort and the process of replacing it is an urgent necessity. This result may also indicate that the process of selecting the ASAs by the O/Ms may be done hastily or without careful search and study on the available ASA that can meet the current and future needs of the enterprise.

9. Efficiency and effectiveness	3.6689	73.4	9	0.000	This result may indicate that these ASAs lead to cost reduction, since they fit the assigned work, perform it with high productivity, and meet the objectives and requirements set for it. It also may indicate that these ASAs work within efficient networks that enables timely transmission of data and information, and use database management that have a high capacity in terms of storage, retrieval, deletion, display and printing.
10. The ability to meet the needs and desires of all users	3.6613	73.2	10	0.000	This is a clear and understandable result, as the software vendors in Palestine hire highly qualified software developers capable of producing ASAs with a high potential and advanced features. They are constantly competing with each other in interviewing their software users for the purpose of meeting their needs and solving the problems they encounter.
11. Comprehensiveness	3.5467	70.9	11	0.000	This result is due to the high competition that exists between software vendors to upgrade their products, to make their products comprehensive and more integrated, and to meet the users' needs and desires.
12. Effective Cost	3.4633	69.3	12	0.000	This result may indicate that the majority of respondents perceive the total true cost of owning any of these ASAs is reasonable, and the benefits obtained from using it is well worth the cost.

6. Relevance	3.7433	74.9	6	0.000	This result indicates that ASAs are able to generate accurate and orderly information. Such information is valuable enough to help the end-users make predictions/estimations about future events. This forecast will be important for making significant strategic or operational decisions.
7. Built-in Security	3.7067	74.1	7	0.000	This result confirms that these ASAs employ some type of built-in security framework that includes automatic updates, auto clean, password protection, user identification, and data encryption features. The security framework only allows authorized users to access the system. The provision of secured information and data produced by the ASAs implemented in MEs is necessary and imperative, in order to maintain privacy and confidentiality of the enterprise and to ensure that the application is completive.
8. Flexibility	3.7233	73.5	8	0.000	This result may indicate that, there is a provision in these ASAs for different users for the inclusion of changed information. They are adequately flexible in terms of data entry, retrieval of data, and the availability and design of various reports generated by them. They also offer some flexibility between the users of the software, the switch over between users, the operating systems and the hardware. Furthermore, they are capable of running on a variety of computers with different operating systems and configurations.

4. Proper Maintenance	3.9667	79.3	4	0.000	This result is normal and can be justified because all the ASA vendors provide varying degree of maintenance. Some O/Ms are not willing to pay for annual maintenance plan, because they don't see the point. They often say: "everything is working fine so far, why should I pay for something I don't need?" They prefer to pay for maintenance as needed; i.e., each time they call the vendor to solve a problem they are encountering. They don't realize that ASA maintenance plans are critical for not only maximizing the value of their software investment, but also for protecting MEs critical data.
5. Ease of Use	3.8000	76	5	0.000	This result is normal, as one does expect the software developers to keep the end-user in mind during the development process. Software developers, often use their staffs with the most technical and practical skills to not only understanding how the user perceive the concept of ease of use of their software, but also they are keen to meet their user's expectations. Vender's concern is always to achieve the highest level of customer satisfaction and the most competitive edge for their companies in the Palestinian software market.

Table 13: Average mean, weighted percentage, rank, and significance level for the inclusion of general quality features in the ASAs adopted by MEs with explanations to the results

General Quality Features	Aver. Mean	Weighted Percentage	Rank	Signif. level	Explanation of the results
1. Speed	4.0778	81.5	1	0.000	This finding shows that these applications are fast. Though, it is not clear whether these applications are intrinsically fast, or the observed speed is due to the speed of the computer hardware they are installed on. Regardless, it is extremely important that the ASAs are installed on computers with excellent specifications and speeds to make the compilation and evaluation of the business activities easier and faster.
2. Accuracy	3.9967	79.9	2	0.000	This result confirms that the software vendors are concerned with fixing errors, removing shortcomings, and bridging gaps in these computer applications as soon as they occur, because these venders compete to market their products to the largest number of MEs
3. Reliability	3.9867	79.7	3	0.000	This result confirms the high and excellent respondents' approval of the availability of reliability in ASAs used by MAEs. The availability of reliability in ASAs is an inevitable consequence of the availability of accuracy, and it ensure the integrity of the information generated by the software.

Table 12

Results of Testing the Hypothesis

General Quality Features	# of positive signs	%	# of negative and neutral signs	Sample size	Significance level	Average Mean
1. Speed	140	93	10	150	0.000	4.0778
2. Accuracy	140	93	10	150	0.000	3.9967
3. Efficiency and effectiveness	134	89	16	150	0.000	3.6689
4. Flexibility	124	83	26	150	0.000	3.7233
5. Reliability	140	93	10	150	0.000	3.9867
6. Relevance	132	88	18	150	0.000	3.7433
7. Comprehensiveness	108	72	42	150	0.000	3.5467
8. Built-in Security	128	85	22	150	0.000	3.7067
9. Proper Maintenance	128	85	22	150	0.000	3.9667
10. Effective Cost	108	72	42	150	0.000	3.4633
11. Scalability	86	57	64	150	0.043	3.2480
12. Ease of Use	120	80	30	150	0.000	3.8000
13. The ability to meet the needs and desires of all users	108	72	42	150	0.000	3.6613

The level of statistical significance was calculated based on ($\alpha = 0.05$)

The signs were determined based on: (the median of Likert scale 3 minus the median of respondents' opinions).

respondents' opinions on each of the questionnaire statements as well as the median of the fields, as a whole, is statistically different from the median of the scale used in the questionnaire. The null and alternative hypotheses for the Sign Test are: H0: M 3 =< and H1: M 3 = >. All hypotheses are listed in Section (6) above.

1.1. Results of testing the first hypothesis:

As the first hypothesis states that "the general quality feature including speed, accuracy, efficiency and effectiveness, flexibility, reliability, relevance, comprehensiveness, built-in security, proper maintenance, effective cost, scalability, perceived ease of use and the ability to meet the needs and desires of the users are available in ASAs used by MEs in Palestine", the results indicate that the average means in Table12 show that there are statistically significant differences between the respondents' median opinions and the scale used in the questionnaire (3.0) regarding the availability of the general quality features in the ASAs used by MEs in Palestine. The overall median of the respondents' opinions is primarily between (3.2480) and (4.0778), and the overall significance level of the sign test is (0.000) which is less than (0.05). The respondents' agreement with the inclusion of all general quality requirements in those ASAs is supported by this finding.

Table 10

Micro Enterprises' locations

Description	# of respondents	%
Gaza City Region	74	49
South GS Region	45	30
Middle of GS Region	16	11
North GS Region	15	10
Total	150	100

It is clear from the data presented in Table 11 that Al-Aseel accounting system is the most popular system in use by MEs in the GS.

Table 11

Type of ASAs currently used in MEs

Description	# of respondents	%
Al-Aseel Accounting System	74	49.3
Al-Muhasib Al-Momtaz Accounting System	26	17.3
Al-Muhasib Azzaki	22	14.7
Babylon Accounting System	18	12
Al-Muhasib Assihri	10	6.7
Total	150	100

7.2. Testing the Hypotheses

This research explored the extent the general quality characteristics realized in the ASAs employed by MEs in Palestine and the extent these computer applications meet the needs and desires of the users. For statistical analysis nonparametric tests, namely the Sign Test, was applied, because it neither requires any specific conditions concerning the shape of the population nor the value of any parameters. This test suits the data of the study as they are arranged in an ordering scheme. It also verifies whether the median of the

Table 8

Distribution of respondents based on working experience period with a AS

Description	# of respondents	%
Less than 6 years	82	54.7
6 – 10 years	38	25.3
11 – 15 years	14	9.3
More than 15 years	16	10.7
Total	150	100

The data in Table 9 show that most of the respondents are under age of 30, while few of the respondents are over age of 51, which indicates an increasing demand for the use of ASAs among the younger generations of accountants working for MEs in Palestine.

Table 9

Age of respondents

Description	# of respondents	%
Less than 30 years	62	41.3
30 – 40 years	44	29.3
41 – 50 years	36	24
More than 51 years	8	5.4
Total	150	100

It is very clear from the data presented in Table 10 that a high percentage (49%) of the MEs in the sample are located in the Gaza City. This should not be a surprise, because Gaza city is the capital of the Gaze Strip, and it is it's the largest and most economically active region.

Table 6

Distribution of respondents by Education Qualifications

Description	# of respondents	%
Graduate Degree	14	9.3
Bachelor degree	122	81.3
Below Bachelor Degree	14	9.4
Total	150	100

The data presented in Table 7 indicate the vast majority of respondents (more than 73%) is specialized in accounting, and that 22% of the respondents are specialized in management and economic. These percentages mean that most respondents have an appropriate background that enables them to understand the questions in the questionnaire and provide answers that express their perspectives.

Table 7

Distribution of respondents by academic major

Description	# of respondents	%
Accounting	110	73.33
Management	21	14.00
Economics	12	8.00
Have no major	7	4.67
Total	150	100

The results presented in Table 8 indicate a high percentage (80%) of respondents have used ASAs for less than 11 years, which indicates an increasing prevalence of the use of ASAs among accountants working for MEs in Palestine.

the average response rate for survey-based management research (Hiebl and Richter, 2018). High response rates and probabilistic samples usually increase the sample's representativeness, allow for statistical inference (Van der Stede et al., 2005; Hiebl and Richter, 2018), and reduce sampling biases (Spekle and Widener, 2018).

6.3. Data Analysis

This study adopted the analytical descriptive approach of the Sign Test and Kruskal Wallis test, and it used the SPSS statistical analysis software for data analysis.

7. Results

7.1. Analysis of the Sample Characteristics

Table (5) shows that the MEs in the collected sample represent almost all sectors of the Palestinian economy. It also shows that the commercial sector has the highest percentage of MEs that use ASAs. Based on these results one can conclude that the sample design reflects an appropriate and proportional distribution of the general characteristics of the population (Spekle and Widener, 2018).

Table 5

Distribution of MEs in the sample according to the type of business

Description	of enterprises #	%
Commercial	91	60.7
Construction Industry	26	17.3
Manufacturing	20	13.3
Service	13	8.6
Total	150	100

According to the data in Table 6, the majority of the respondents who use ASAs adopted by the MEs in the sample are bachelor's degree holders.

The results from the Cronbach test presented in Table 4 indicate that the value of the Cronbach's alpha coefficient for each theme of the questionnaire was significantly high (not less than 0.8904), and for the themes as a whole is more than 90%. This finding confirms the validity and stability of the questionnaire used for the purposes of this study.

Table 4

Reliability coefficients of the questionnaire themes using Cronbach's Alpha Coefficient

#	Themes of the Questionnaire	# of Sentences	Cronbach's alpha coefficient
1	General quality Features	70	0.8904
2	Capability of AS to meet users' needs and desires	8	0.9408
All Themes of the Questionnaire		78	0.9230

The targeted population of the study consists of Palestinian MEs that have one Owner/ Manager, employ not more than 5 employees, employ an accountant, and use an ASA. With the help from the professional accountants who are members of the Palestinian Accountants Association, the author identified the total number of MEs that meet the predetermined specifications which is 495, and obtained the names and locations of those MEs. Thirty-five percent of the 405 MEs (173 units) was decided to be the sample size (Sekaran, 1992, pp.250-254). To ensure careful selection, each ME was given a serial number starting from one. When the enterprises have been all numbered, a list of random numbers is generated by Microsoft Excel using this equation: Rand = (int()*(1-sample size to be placed here)). The MEs with numbers that match the numbers in the list are drawn from the population. The researcher and other friends delivered the questionnaires to the respondents and then collected the completed ones.

With the help of some friends who are experts with surveys all the questionnaires were directly distributed to the accountants who are representing the MEs in the sample and are using the ASAs adopted by those enterprises, of which 162 questionnaires were completed and returned. Twelve questionnaires were excluded because of the lack of seriousness of the answers**.** For example, some questions were incomplete, some had double answers on a Likert scale, and others had contradictory answers. This exclusion brings the number of valid questionnaires to 150 resulting in a response rate of 30%, which is well above

6.2. The Validity and Stability of the Questionnaire

To confirm the authenticity of the questionnaire, the researcher presented the questionnaire to

a. five accounting professors with teaching experiences in Accounting Information Systems at two universities located in the GS (namely, the Islamic University of Gaza and Al-Azhar University),

b. five professionals who specialized in the design of ASA widely spread in the GS, and

c. three experts in statistics.

Based on the feedback received for the above experts, the wording of some paragraphs in the questionnaire had to be amended, some paragraphs had to be completely deleted, and some paragraphs had to be moved to other areas. The revised draft of the questionnaire was then used for consistency verification.

To verify the consistency of the questionnaire, the (78) statements Spearman Correlation Coefficients and the Cronbach's alpha, were calculated. These metrics evaluate the accuracy of the paragraphs structure of the two themes of the questionnaire.

The results from the Spearman test shown in Table 3 indicate that the coefficient of stability of the questionnaire was 0.983, which is statistically significant at a confidence level $\alpha = 0.01$. This finding confirms the stability of the questionnaire used in this study.

Table 3

Stability coefficients of study themes using Spearman coefficient

#	Themes of the Questionnaire	# of Sentences	Spearman Correlation Coefficient	Stability Coefficient	Significance Level
1	General quality Features	70	0.964	0.981	0.000
2	Capability of AS to meet users' needs and desires	8	0.802	0.890	0.000
All Themes of the Questionnaire		78	0.968	0.983	0.000

6. Methodology and Method

6.1. Data Collection and Sampling

The data used in this study were collected through means of a questionnaire, which was based on a pilot study and literature review. This literature is mainly those studies that researched the general quality features. The questionnaire was divided into two parts. Part I: is devoted to collecting data about the individual who uses the ASA adopted by an ME. This data includes the age, gender, location, educational qualifications, name of the ASA, and years of experience with the ASA. Part II: is devoted to collecting data about the ASA adopted by the ME. It includes two subparts, each of which contains several elements. The first subpart concerned with the extent to which the ASA contains general quality features. It collects data about speed, accuracy, efficiency and effectiveness, flexibility, reliability, relevance, comprehensiveness, built-in security, proper maintenance, effective cost, scalability and perceived ease of use. The second part collects data about the extent to which the ASA has the capacity and the capabilities necessary to meet the needs and desires of the users. The questionnaires used to collect the data consisted mostly of close-ended questions with Five-Likert Scale with the following values: Strongly Agree (5), Agree (4), Neutral (3), Disagree (2), and Strongly Disagree (1).

The population of the study is composed of all MEs operating in all sectors of the Palestinian economy in the GS that use ASAs (Palestinian Central Bureau of Statistics, 2021). The selected MEs have no more than 5 employees, have adopted a Ready-to-Use ASA, have been established at least three years ago, are owned and managed by one person, and are represented by an individual who is good at working with an ASA. The selected MEs are also distributed among the following ASAs: Al-Aseel, Al-Muhasib Al-Momtaz, Al-Muhasib Azzaki, Babylon, and Al-Muhasib Assihri.

The MEs that meet the predetermined selection criteria were identified and located with the help of both the software vendors and the field software maintenance personnel. A total sample size of 173 MEs (constituting almost 35% of the population) was selected for this study. The population was stratified according to the business type of those enterprises, which satisfies the purpose of the study. The selection of those enterprises was based on the number of each strata (stratified random sample) to ensure a balance in the selection of the samples between those enterprises while taking into consideration the size of their spread to achieve an objective evaluation. All of the selected enterprises were voluntarily willing to participate in this study.

When the importance of criteria was identified, it was unrealistic to measure all of the criteria in a study with limited resources. To measure the criteria more effectively, 12 general quality criteria were selected as they are determined to be extremely important from the academics' and experts' point of view with importance values above 4. The following general quality criteria that we will use to assess the alternatives for ASA in MEs: Speed, Accuracy, Efficiency and Effectiveness, Flexibility, Reliability, Convenience, Comprehensiveness, Scalability, Proper Maintenance, Effective Cost, Built-In Security, and Ease of Use (Choe, 1998; Doll and Torkzadeh, 1988; Meiryani, Susanto, and Sudrajat, 2020). However, some ASAs may have all the general quality features as demonstrated by the vendor, but some of these features may generate errors once they are exercised.

The focus of this research on Ready-to-Use ASA could be rationalized by the fact that this type of software is well suited for MEs, where the frequency or volume of accounting transactions is very low, the cost of installation is generally low, number of users is limited, it is relatively easier to learn, and people adaptability is very high. The training needs are simple and sometimes the vendor (supplier of software) offers free training. However, the software gives little opportunity for connection to other information systems, has a relatively poor level of security, and is vulnerable to data fraud.

Considering the existence of a very limited number of studies on the general quality features of ASA implemented by MEs, the following research questions are raised: Do the majority of ASAs used by MEs in Palestine today realize the general quality features? Do these computer applications meet the users' needs and desires? To answer these questions, we developed and tested several hypotheses.

The following hypotheses were actually proposed based on the very little literature available on the quality of ASAs in MEs as well as on both the literature on the same topic that is related to small enterprises and the experienced experts who are specialized in ASAs.

H1. The general quality features, including speed, accuracy, efficiency and effectiveness, flexibility, reliability, relevance, comprehensiveness, built-in security, proper maintenance, effective cost, scalability, perceived ease of use, and the ability to meet the needs and desires of the users, are available in the ASAs used by MEs in Palestine.

H2. There are statistically significant differences (at the level of significance $\alpha = 0.05$) between the availability of general quality features and the ability to meet the needs and desires of the users in MEs attributable to the type of ASA used.

Table 2

The importance of 31 criteria

Criterion	Importance
1. Flexibility	4.4976
2. Convenience	4.4928
3. Built-in security	4.4773
4. Comprehensiveness	4.4638
5. Proper maintenance	4.4300
6. Effective cost	4.3575
7. Reliability	4.3430
8. Accuracy	4.3140
9. Efficiency and Effectiveness	4.3092
10. Scalability	4.2899
11. Ease of Use	4.2899
12. Speed	4.2850
13. Reporting capability	3.9406
14. Operational	3.8154
15. Documentation	3.7402
16. ASA providers	3.7301
17. IT environment and infrastructure	3.3414
18. Functionality	3.2566
19. Technical	3.2367
20. Enterprise's current and future needs	3.2354
21. Degree of versatility	3.2319
22. Customization	3.2236
23. Possibility of using on various software-adapted platforms	3.2077
24. Enterprise size	3.1957
25. Users' requirements	3.1849
26. Variability	3.1708
27. Training	3.1594
28. Commercial	3.1498
29. Compatibility	3.1263
30. Enterprise type	3.1159
31. Social influence	3.0628

legacy platform to a new platform? Will the interface of the new ASA package remain the same after an upgrade or a bug fix, and will the interface significantly reduce the depth of the needed training? Do current ME customers who opt to upgrade receive price incentives and how much? Will reports and other customized features still run when the old ASA package is upgraded? and will the user's data be overwritten as a result of the upgrade?

12. **Perceived Ease of Use**, which reflects the extent a user believes it is easy to use the ASA (Davis, 1989). According to Wang and Ha-Brookshire (2018), the perceived ease of use refers to the extent the user considers the use of the ASA is effortless and hassle-free. Users look for packages that are easy to understand and operate. They prefer applications that are easy to install, easy to navigate, provide simple error messages, easy to update, have a good graphical user interface, easy to uninstall, and are not bloated with unnecessary features. Thus, software developers need to understand user expectations regarding their perception of the system's ease of use (Lanlan and Popoola, 2019).

5. Research Hypotheses

The generalization of the previous studies and the consultation of nine accounting information system academics of local universities and software developers allows us to identify 31 criteria for general quality features Therefore, a questionnaire with the identified criteria was designed to evaluate the importance of these criteria.

The Cronbach's a is 0.9417, which represents the internal consistency reliability is excellent (George and Mallery, 2003). The Kaiser–Meyer–Olkin (KMO) measure of sampling adequacy provides an index (between 0 and 1) of the proportion of variance among the variables that might be common variance (i.e., that might be indicative of underlying or latent common factors). A high KMO indicates the existence of a statistically acceptable factor solution representing relations between the parameters.

The survey was taken among 25 academics and experts in September 2022 by asking the importance of each criterion with five point Likert scale, where 1 and 5 represent very unimportant and very important, respectively. The number of valid questionnaires is 25. In this study, the Kaiser–Meyer–Olkin (KMO) value was found to be 0.9036, which is far better than the suggested 0.6 value (Kaiser, 1974). The criteria as well as the importance of the criteria are summarized in Table 2 which indicates that the importance values of 31 criteria fall in the range of 4.4976 and 3.0628.

critical business aspects. A comprehensive ASA helps provide continuity and order to produce the financial statements that project the commitment and responsibility of the enterprise. The software should be responsible for processing and updating all the accounting information safely and reliably. It should also formalize and integrates the various features and functions of the electronic accounting, a task that supports generating reports and storing records and books of accounts that allow O/Ms to observe the financial condition of the enterprise.

8. **Built-in Security**, which means that the ASA ensures data and information confidentiality and safety, provides multiple levels of protection for system databases from unauthorized people, determines permissions for users, and allows the possibility of retrieving data and information in case of data loss. It also refers to the tools and permission restrictions that provide the ME with additional protection to the enterprise's sensitive data against the risk of business fraud (Aduamoah, et al. 2017).

9. **Proper Maintenance**, which means that the ASA is provided with changes made to correct problems that are discovered within the system ("bug fixing"), changes that help the software keeps up with the industry and changing market conditions so that it better reflects the current technology and business environment, changes to improve the software over a long period of time such as new performance upgrades, new features, new design updates, and changes that are aimed at preventing future software problems, particularly when it comes to potential cybersecurity threats. These types of maintenance keep the ASA running and performing its best.

10. **Effective Cost**, means that the benefits reaped from an ASA used by the ME, as it meets the enterprise's accounting needs, are commensurate with the money invested in it. Although the information generated from an ASA can be effective in decision-making process, purchase, installation, and usage of such a software are beneficial when the benefits exceed its costs (Ogah, 2013).

11. **Scalability**, refers to the flexibility and ability of the ASA to manage a growing number of users and higher loads of transactions. The ASA must be implemented to process various financial transactions depending on the degree of expansion of the enterprise. The ASA must be able to accommodate more business activities, and when the need arises for expansion, the enterprise should be able to upgrade it to a more advanced version in a consistent, easy, and within-budget manner. Another aspect of scalability deals with how flexible and quickly would the existing data convert from the ASA

3. **Efficiency and effectiveness,** which means that the ASA is cost effective, provides useful output, and has the flexibility to meet future needs. It also means that the ASA provides management with the necessary reports, reduces the routine procedures, enables users to exchange information easily and conveniently, displays data according to the needs of the beneficiary, and enables multi-users. An efficient and effective ASA can contribute to the organizational goals. The effective implementation of ASAs in MEs is positively associated with performance, productivity, and profitability (Wilkinson et al., 2000; Mehdi et al., 2015). The effectiveness of ASA depends on the perception of decision-makers on the usefulness of information generated by the software to satisfy informational needs for operation processes, managerial reports, budgeting and control within organization (Ogah, 2013).

4. **Flexibility**, which means that the ASA has the ability to meet the needs of management with new reports, provide the possibility of obtaining all the data that the users need easily, does not need a long period of training, communicates information easily and simply, eases the effort for change in functions or in data that corresponds to the requirements, keeps pace with the current development in information technology, and can be updated and modified according to the current requirements and working conditions.

5. **Reliability**, which means that the ASA is able to produce up-to-date information that is characterized by its authenticity, integrity, unbiased, free from error, reflecting the actual reality and representationally faithful. This makes the information useful for planning, control and decision making. Topash (2014) suggested that the generated information through reliable ASAs is a key feature to guarantee generation of convincing accounting reports and encourage adherence to enterprise policies.

6. **Relevance**, which means that the ASA is able to provide only the desired information, that is aligned with the purpose for which the software was established. In other words, relevance is the concept that the information generated by an ASA should influence business decisions. The concept can involve the content of the information (must have a level of detail significant enough to show trends, comparisons, etc.) and/or its timeliness, both of which can impact decision making.

7. **Comprehensiveness**, which means that the ASA is integral and can record financial transactions and generate periodic and special reports with sufficient information covering all aspects of business activities. A comprehensive ASA can help users automate most steps of the accounting cycle, enabling O/Ms to spend time on other

encouraged to expand and develop business and employment opportunities (Mokodompit and Usman, 2020). Palestine Monetary Authority, a key component in promoting economic development and ensuring financial inclusion in Palestine, cares greatly about MEs (Palestine Monetary Authority, 2017). Most providers of finance in Palestine secure themselves with financial accounting information generated from an adequate ASA to reduce their risk (Qubbaja and Talahmeh, 2020). MEs activities cover almost all business sectors in Palestine, therefore they contribute greatly to Palestinian people's income (particularly, to those with low income). Therefore, it is necessary to carry out relevant research on the MEs in Palestine.

4.4. General Quality Features of ASAs

Qaoud (2007), Siam (2004), and Al-Hintawi (2001) listed some general characteristics of the efficient ASAs. These features can be summarized as follows:

1. **Speed,** which means the ability of the ASA to
    a. allow fast data entry on the computer using its formatted screens and built-in databases of customers and supplier details and stock records,
    b. do fast processing and adjustment, and
    c. provide information to the beneficiaries on time,

so that the ASA becomes useful and influential in planning, control, and decision-making.

2. **Accuracy,** which means
    a. there is less room for technical errors and inconsistencies in the outputs of the ASA,
    b. the information resulting from the ASA can be relied upon and it enhances the quality of financial reports.
    c. the ASA is tuned to automatically flag inconsistent data and mismatches or to at least make it easier to find the mistake and correct it.

Accuracy of the operational information produced by ASA would help the enterprise to be efficient and able to produce timely reports (Aggranni, and Hassanah, 2018; Intuit Inc., 2018). However, ASA's accuracy does not imply immunity to human errors arising from data entry or interpretation mistakes.

al. 2012). Without the adoption or implementation of some ASAs, it becomes difficult for a business to gain a competitive advantage or even to survive (Harash et al. 2014). ASA assists in the provision of internally generated financial statements that provide useful information to users (Martani et al. 2012), and it contributes to the enterprise's value added (Mokodompit and Usman, 2020). Furthermore, with the help of ASA, management can make a variety of decisions to solve the enterprise's problems (Fitriyah, 2006). ASA plays an important role in evaluating the performance of MEs (Hanafi, et. al. 2021). It provides information to O/Ms of MEs to use in measuring financial performance (Maseko and Manyani, 2011). There is a relationship between the use of ASA and the performance of MEs (Lavia and Hiebl, 2015). MEs that adopt ASAs significantly increase their performance compared to those that do not (Kharuddin et al. 2010).

Fordham and Hamilton (2019) assumed that MEs have widely adopted ASA for their bookkeeping. In their research on 1,625 small businesses in the USA, they found that 64% of their sample did use some kind of computer-based software for their accounting (either accounting software, spreadsheets, or any other kind of information system-based application). Chen and Hamdan (2014) revealed that about 65% of MEs in the country of Brunei used basic software packages (Excel) to assist with their accounting needs. Mokodompit and Usman, (2020) found that the majority of MEs in Indonesia use ASA in its operational activities. Sam, Hoshino, and Tahir (2012) disclosed that approximately 80% of the SMEs have implemented ASA at different application levels. According to Alsaaty (2012), the information era has made it vital for every business to adopt automation technologies like ASAs. Mpofu and Mathys (2011) posit that O/Ms who fail to adopt ASA into their regular business operations risk being disadvantaged competitively in terms of meeting deadlines and taking business opportunities. MEs are becoming more and more competitive in the market as a result of implementing and using ASAs (Kanyanga, 2022).

4.3. MEs in Palestine

Palestine is considered an appropriate case for evaluating and assessing the ASA in MEs. As an emerging economy, the Palestinian economy relies heavily on MEs as they contribute 95% of the volume of the local GDP (Palestinian Business Forum, 2014). Palestine has nearly 140,934 registered MEs representing more than 92% of the total number of enterprises in the country, and 88.6% of the country's workforce is employed by these MEs (Palestinian Central Bureau of Statistics, 2021).

MEs existence and operation in Palestine should be supported, and they should be

importance to household livelihoods is undeniable (Donner and Escobari, 2010). In some countries, the MEs employ about 25% of the working-age adults (Mead and Leidholm, 1998). They often account for most of self-employments or serve as complementary sources of income (Dyt and Halabi, 2007). They are important players in reducing poverty levels (Santos and Guzman, 2017).

MEs may be considered the engines of growth. They are usually the focus of many programs at the largest international development agencies (Snodgrass, 2005). Therefore, policies set to foster them should be carefully designed (Greenbank, 2000; Gherhes et al., 2016).

Previous research on this topic either completely ignored MEs or bundled them together with SMEs in spite that fact that MEs are very different organizations than SMEs (Dyt and Halabi, 2007; Alattar et al., 2009; Sian and Roberts, 2009; Liberman et al., 2010; Berrone et al., 2014; Shields and Shelleman, 2016; Ruiz and Collazzo, 2021). MEs are not just smaller versions of larger firms, but they are indeed meaningfully unalike (Marriott and Marriott, 2000; Danielson and Scott, 2006; Dyt and Halabi, 2007). They can't be considered as a special case within the SME group. They have very different organizational structures compared to those of the larger enterprises (Liberman et al., 2010; Grande et al., 2011; Lavia and Hiebl, 2015; Shields and Shelleman, 2016). They are the most resource-scarce type of enterprise. They face very different challenges and have very particular restrictions than most of small enterprises (Berrone et al., 2014). Therefore, research directed to understand the characteristics and processes that are unique to MEs in developing economies relative to those characteristics and processes found in larger firms in developed countries (Dyt and Halabi, 2007; Lavia and Hiebl, 2015; Senftlechner and Hiebl, 2015) is considered very relevant and timely.

4.2. Definition and Importance of ASAs

An ASA is a software application that automates and integrates all the business operations, (e.g., sales, finance, purchase, inventory, and manufacturing) to make them faster and more accurate. It is usually an integral part of the computerized accounting system used by the enterprise. On a global basis, the basic features of all ASA are the same. However, the legal reporting requirements in a given country and the business needs to affect the contents of the ASA. The ASA reduces manual entry of data, eliminates redundant operations, and employs built-in security to reduce the risk of accounting errors. It also, helps the enterprise to easily and cost-effectively handle all financial transactions (Wang and Huynh, 2013). ASA has become an integral part of most business processes (Wen et

This study is distinguished from other similar studies in three ways. First, it focuses on micro enterprises with not more than 5 employees and one manager. Second, the study was conducted in Palestine, which is a developing economy that has not yet gained its independence from the Israeli Occupation. Third, it was conducted in the unique territory of the GS[1] of Palestine. The GS is one of the most populous areas in the world, and it has been under a comprehensive and suffocating Israeli blockade for the past 15 years. Fourth, the SAS in the MEs in Palestine generally and in the GSs specifically has not been researched before up to the researcher's knowledge.

4.1. Definition and Importance of MEs

There is no uniform criterion across countries that would specify what is an ME (Ayyagari et al. 2007; OECD, 2010; Lavia and Hiebl, 2015), and different countries may have different definitions for MEs. Altough the most developing world consider an enterprise that have less than ten employees an ME (Donner and Escobari, 2010), the Palestinian Central Bureau of statistics defines ME as an enterprises with not more than 5 employees[2] (The Palestinian Central Bureau of Statistics, 2021). The Palestinian definition is adopted for this research, since the focus of this research is the GS of Palestine.

MEs are especially important for emerging economies at both the local and national levels (Wiklund and Shepherd, 2005; Alattar et al., 2009; Liberman et al., 2010; Berrone et al., 2014; Shields and Shelleman, 2016; Subagyo et al., 2020; Sohilauw et al., 2020). As a group, MEs have undeniable relevance in the economy, as measured by the sheer number and relative weight (more than 90%) of economic units (Liberman et al., 2010; Berrone et al., 2014; Senftlechner and Hiebl, 2015; Shields and Shelleman, 2016). They represent a large fraction of the economic units (Berrone et al., 2014; Liberman et al., 2010) and their

1 The GS of Palestine is a 360 square kilometers (141 sq. miles) strip of land (Daibes, et al., 1996) located on the Mediterranean Sea and the Egyptian Israeli borders in the Southwest of Palestine. The GS is a home to 2.1 million people living in five governorates: North Gaza, Gaza City, Middle Gaza and South Gaza, of them, roughly half are under the age of 18 years (the United Nations, 2023). Many Palestinian refugees fled to this area during the 1948 Arab-Israeli war. Since 1967 occupied the GS. The GS had been granted a limited administrative autonomy in 1993 from Israel, after 46 years of occupation, as a result of the Oslo peace agreement with the Palestinian Liberation Organization (PLO). Since then the GS has been controlled by a new Palestinian Entity namely the Palestinian National Authority (PNA). In June 2007, following the military takeover of GS by Hamas, the Israeli authorities significantly intensified existing movement restrictions, virtually isolating the GS from the rest of the occupied Palestinian territory (oPt), and the world. This land, sea and air blockade has significantly exacerbated previous restrictions, limiting the number and specified categories of people and goods allowed in and out through the Israeli-controlled crossings. More recently, a significant disengagement from Israel which has severed the main lifelines of the Gazan economy and subsequently any opportunities for the Gazan population to seek employment outside of Gaza. The GS does not have the conditions – open borders, free movements of goods and labor – for a stable economy.

2 The Palestinian National Authority (PNA) has adopted the definition of MEs in Palestine as set forth by the Ministry of National Economy (MNE) pursuant to the Cabinet decision dated 4/10/2011 number (01/105/13/) Article 2, year 2011, as those enterprises with not more than 5 employees.

Table 1

The Criteria identified by researchers

Previous Studies	Quality Criteria identified
Carpenter, et al. (2005)	technical, functional, documentation, and vendor information aspects of the ASA.
Abu-Musa (2005)	enterprise's current and future needs, enterprise size and type, features of the accounting software, IT environment and infrastructure, and vendor reliability
Muhrtala and Ogundeji (2014) Yürekli and Haşiloğlu (2017)	operational, commercial, technical, security, and strategic determinants
Jadhav and Sonar (2011)	functional, technical, quality, vendor, output, cost/benefit, and opinion
Ramazani, et al. (2014)	general features, compatibility, flexibility, control, reporting capability, and training
Tram and Tuan (2019)	users' requirements, features of ASA, ASA providers, cost of using AS, support conditions, and social influence
Paul and Sadath (2019)	user-friendliness, navigation & control, reporting function, flexibility, security, customization, and vendor support
Grabchuk and Lyakhovich (2017)	system functionality and price
Grinko (2009)	functional completeness, features of software system construction, principles of adaptation to the peculiarities of accounting work of specific enterprises, the possibility of using on various software-adapted platforms (office software of own development or third-party manufacturers), and the size of the company's accounting.
Dykiy and Dovgal (2008) Kolumbet (2014)	the authority of the developer, cost-benefit ratio (efficiency), the degree of versatility, functionality, clarity of the software, user-friendly interface, reliability, software compatibility, technical parameters, level of service, variability, degree of information protection, and data control
Thuan and Huong (2019)	ease of use, reliability, flexibility, and other criteria

As indicated in Table 1 above, the analysis of prior literature reveals that each of the published research ends with a list of criteria for evaluating ASAs used by SMEs without providing a practical evaluation result to confirm the reliability of using such criteria. It also reveals that there is a lack of a general, standardized, or unified set of criteria (call it convergence criteria) for ASAs evaluation. In our opinion, such a criterion should be a weighted sum of all the important criteria previously proposed. Each weight should indicate the importance of the corresponding criterion, and its value can be modified according to the needs of the person (i.e. an accountant or O/M) concerned with the results.

results obtained for SMEs can be extended to MEs (Gherhes et al., 2016; Mitchell and Reid, 2000; Armitage et al., 2016). Despite the importance of the economic role of SMEs in developing countries and the role of ASAs in these enterprises, it can be argued that there is a lack of research accessing the quality of the ASAs used by MEs (Alattar et al., 2009; Liberman et al., 2010; Berrone et al., 2014; Shield and Shelleman, 2016; Ruiz and Collazzo, 2021).

This study is unique as it contributes specifically to the knowledge-building on MEs in developing countries. Per the researcher's knowledge, this study is one of the very few studies that focused exclusively on the quality of ASAs adopted by MEs in Palestine. Knowing the extent to which these applications realize the general quality features is very important. It is arguably relevant for regulators and policymakers, who design policies and programs aimed at strengthening the capabilities of these ASA systems (Greenbank, 2000) and who introduce legal requirements regarding the use of ASAs for generating information and financial reports.

The remainder of the paper is organized into five different sections. Section (2) presents a literature review and our research hypotheses; Section (3) introduces our research methodology, the data collection method, and our data analysis; Section (4) discusses our findings relative to the previous research; finally, section (5) includes our conclusions, the limitations of this study, and some directions for further research.

4. Literature Review

Several previous studies focused on the factors that influence the usage of ASA in various economic sectors and countries; however, very few studies focused on the assessment or evaluation of ASAs in MEs. Researchers proposed different sets of criteria and features to evaluate ASAs in SMEs as shown in Table (1).

After the Israeli disengagement from Gaza in 2005 and clashes between the two main Palestinian parties following the Hamas electoral victory, two separate executive governments took control in the Palestinian territories of the West Bank and the Gaza Strip. Historical Palestine has a geographical area of 10,420 square miles (26,990 square kilometers). The West Bank, a landlocked territory, covers a total area of 2,262 square miles (5,860 square kilometers). The Gaza Strip, on the other hand, shares a 32-mile (51 kilometers) border with Israel and a seven-mile (11 kilometers) border with Egypt. It has a total area of 139 square miles (360 square kilometers).

A recent report by the World Bank suggests that the Palestinian economy is expected to experience a slowdown in 2023. Although the economy had shown a 4% growth rate in 2022, primarily fueled by the recovery of private consumption following the easing of COVID-19 mobility restrictions, the escalation of conflicts in the Palestinian territories and the potential impact of the Russian invasion of Ukraine remain significant risks that could negatively affect the economy (World Bank, 2023).

Despite some signs of recovery in 2022, the growth of the economy still depends heavily on the situation in the Palestinian territories. The ongoing restrictions on mobility, access, and trade also continue to affect the economy. To improve the standard of living, make fiscal accounts more sustainable, and reduce unemployment, significantly higher growth rates are necessary. However, there are also external risks, such as food and energy prices, that could harm the economy. Therefore, the overall economic outlook remains bleak (Emblad, 2023).

2. Objective of the Study

Our study aims not only to explore the users' views on the availability of the general quality features in the ASAs adopted by the MEs, but it also aims to explore the users' views on whether these systems meet the users' needs and desires. This study investigates ASAs in terms of the following twelve general quality features: Speed, Accuracy, Efficiency and Effectiveness, Flexibility, Reliability, Convenience, Comprehensiveness, Scalability, Proper Maintenance, Effective Cost, Built-in Security, and Ease of Use.

3. Importance of the Study

Although there is some research on the quality of the ASAs used by small and medium size enterprises (SMEs), MEs have been consistently left out of the researchers' investigation samples (Davila and Foster, 2005; Jankala and Silvola, 2012; Andersen and Samuelsson, 2016; Da Silva et al., 2016; Samuelsson et al., 2016). It is commonly assumed that the

guaranteed for any one of them. They are usually developed by designers, programmers and vendors with varying skills and competencies. Therefore, choosing, adopting, and implementing an ASA for an ME must be carefully done. The ASA must be chosen to best serve the needs of the particular ME that will use it; it must solve the ME's current problems and meet its future requirements. It should also be able to handle the ME's financial and managerial information as well as monetary and non-monetary statements.

Using an improper or inadequate ASA will be an absolute catastrophe for an ME. It may result in a huge loss of money, enterprise closure, and even insolvency (Aduamoah, et al., 2017). Moreover, the O/Ms of the ME may keep spending much time and funds on buying and implement an updated version of the ASA (Pulakanam and Suraweera, 2010). Investing in an incorrect ASA will definitely waste ME resources and causes dissatisfaction. Owners, managers, accountants, and employees have often get disappointed when the adopted ASA is difficult to use or when its general quality features does not meet the users' needs and desires (Heikkila et al, 2013). It is common for O/Ms to complain that they do not understand how the ASA they us works, because a little or no training was provided to them by the ASA vendor. Some ASAs come with no training materials, and some ASAs are accompanied with manuals that contains confusing tutorials (Michael et al, 2016). Some ASA vendors do offer implementation and training on the purchased ASAs, but their trainers are often IT vested without accounting skills. They don't train the user on the core aspect of using the ASA to pass the double-entry journal recording and ledger posting in order to generate trial balance and financial statements. Also many vendors do not understand the client MEs business processes, but they do recommend to them costly ASAs that often do not meet the users' needs and desires.

Palestine is the geographic region from the Mediterranean Sea in the east to the Jordan River in the west. It is bordering Lebanon, Syria, Jordan, Egypt, and the Mediterranean Sea. In 1948, Israel captured all the region except the West Bank and the Gaza Strip. Following the 1948 Palestinian expulsion and flight, also known as al-Nakba, the 700,000 Palestinians who fled or were driven from their homes were not allowed to return by Israel. Both of these territories were captured by Israel in 1967. In these areas combined, around 7 million Palestinians are living under the control of Israel. The conflict over these lands has left these Palestinians facing humanitarian crises, like lack of water, food, electricity, and little access to proper medical care. Under the Oslo Accords in 1995, the Palestinian National Authority was created to provide a Palestinian interim self-government in the West Bank and the interior of the Gaza Strip.

1. Introduction

Expanding the business activities in any ME necessitates the need to implement an ASA and setting up a database for the business. This accounting system is necessary to facilitate many essential business tasks, that includes tracking expenses and revenues, on-time filing of Value Added Tax (VAT) returns, using Employee Pay-As-You-Earn system, administering Employee Pension Insurance, and etc.

ASAs are usually used to record accounting activities (i.e., record and store accounting data) and generate reports per the requirements of the user. Typically, these ASAs can be classified into three categories: ready-to-use, customized, and tailored systems. Each of these systems offers a set of distinctive features. However, we will focus on the ready-to-use software, since it is within the scope of this research. The choice of which ASA to use depends on the accounting needs of the organization.

Selecting the right ready-to-use ASA is very important regardless of the business type being it a micro, small, medium, or large enterprise. However, the set of features and accounting functionality included in any ready-to-use ASA package is solely defined by the ASA vendor, and the type and sophistication of these features may vary from one vendor to another. The ASA may include features ranging from basic expense tracking and invoicing to more advanced features, like inventory and fixed asset management and project accounting. Some venders just offer basic recording of what's coming in and what's going out, while other vendors offer more advanced features that automat tasks that would otherwise have to be performed manually. Sophisticated ASAs offer automated tasks such as daily data transfers through a bank feed, reconciliation, and recurring invoicing

Using an appropriate ASA has several merits and advantages to an ME. (1) it makes the recording of the financial data and information easier, quicker and more accurate. (2) It makes the recording process more efficient with less overhead (Ahmad, 2005). (3) It improves and enhances the performance of most accounting functions because it generates high quality financial and managerial accounting information (Collins, 1999; Fisher et al, 2001; Abu-Musa et al, 2004). (4) it enables accurate, timely, and reliable financial reporting (Aduamoah, et. al, 2017). (5) it helps alleviating the stress accountants go through during manual recording of data and when they need to process and present financial reports to both O/Ms and government agencies (Ahmad, 2005). Despite these advantages, not all ASAs are created equally, and an optimal performance is not

البرامج المحاسبية التي تستخدمها المنشآت الصغيرة جداً في فلسطين: هل تتوفر فيها السمات العامة للجودة؟ وهل تلبي احتياجات المستخدمين؟

الملخص

الغرض: تهدف هذه الدراسة إلى الإسهام في تعزيز المعرفة حول المنشآت الصغيرة جداً في الاقتصاد الناشئ لقطاع غزة في فلسطين. توفر الدراسة أدلة واقعية حول مدى توفر السمات العامة للجودة في التطبيقات البرمجية المحاسبية المستخدمة من قبل المنشآت الصغيرة جداً، ومدى تلبيتها لاحتياجات المستخدمين.

النتائج: تشير نتائج الدراسة إلى أن السمات العامة للجودة تتوفر بمستوى مقبول في التطبيقات البرمجية المحاسبية المستخدمة من قبل المنشآت الصغيرة جداً في قطاع غزة بفلسطين، وأن هذه التطبيقات تلبي احتياجات المستخدمين بدرجات متفاوتة.

قيود البحث: لهذه الدراسة ثلاث قيود رئيسية. أولاً، تقتصر على المنشآت الصغيرة جداً التي لا يتجاوز عدد موظفيها ٥ أفراد، حيث يكون للمنشأة مالك واحد يديرها. ثانياً، تقتصر الدراسة على المنشآت الصغيرة جداً في قطاع غزة بفلسطين باعتباره اقتصاداً ناشئاً، ولم تشمل المنشآت الصغيرة جداً في الضفة الغربية بسبب عدم السماح بعبور الحدود بين الضفة وقطاع غزة بسبب الحصار الإسرائيلي الصارم المفروض على قطاع غزة منذ خمسة عشر عاماً. ومع ذلك، لو كان الباحث قادراً على الوصول إلى الضفة الغربية، لتمكن من التواصل مباشرة مع المنشآت الصغيرة هناك لتكوين العينة، ثم إرسال الاستبيانات إلى تلك المنشآت عبر البريد الإلكتروني، واستلام الردود بالطريقة نفسها. ثالثًا، رغم أن الدراسة استكشفت مدى توفر السمات العامة للجودة في التطبيقات البرمجية المحاسبية المستخدمة من قبل المنشآت الصغيرة جداً في فلسطين ومدى تلبيتها لاحتياجات المستخدمين، إلا أنها لم تستكشف أو تحدد نوع الاحتياجات التي يجب أن تلبيها هذه التطبيقات.

الاعتبارات العملية: توفر هذه الدراسة فرصة لفهم أفضل للتطبيقات البرمجية المحاسبية المستخدمة من قبل المنشآت الصغيرة جداً. كما تسلط نتائج الدراسة الضوء على ضرورة أن تركز السياسات العامة، التي تهدف إلى تعزيز هذه المنشآت، على تسهيل وصولها إلى التكنولوجيا، وأن تقوم بمتابعة أداء التطبيقات البرمجية المحاسبية المستخدمة فيها. إضافة إلى ذلك، تساهم الدراسة في دعم جهود الحكومة لتطوير استراتيجية تشجع على تعزيز استخدام هذه التطبيقات من خلال تحسين جودة المنشآت الصغيرة جداً. وبما يتماشى مع الدراسات السابقة، تؤكد النتائج على أهمية تدريب مالكي المنشآت الصغيرة جدًا الذين يقومون بإدارتها في مجالات تكنولوجيا المعلومات ذات الصلة بأعمالهم.

الأصالة/القيمة: تعد هذه الدراسة الأولى من نوعها التي تبحث في التطبيقات البرمجية المحاسبية المستخدمة من قبل المنشآت الصغيرة جداً في فلسطين، التي يعد اقتصادها اقتصاداً ناشئاً. كما استكشفت الدراسة مدى توفر السمات العامة للجودة في هذه التطبيقات ومدى تلبيتها لاحتياجات المستخدمين. وتتميز هذه الدراسة بأنها فريدة، حيث أجريت على منشآت صغيرة جداً تعمل في منطقة تخضع لحصار اقتصادي وسياسي وعسكري إسرائيلي صارم، وهي جزء من اقتصاد نامٍ لم يحصل بعد على استقلاله.

الكلمات المفتاحية: المحاسبة، المنشآت الصغيرة جداً، الاقتصادات الناشئة، التطبيقات البرمجية المحاسبية، قطاع غزة.

to construct the sample. Third, although this study investigated the extent the ASAs used by the Palestinian MEs meet their users' needs, it did not explore and specify the type of needs these software applications should meet.

Practical implications: The study provides a better understanding of ASAs usage by the MEs. The results of the study highlight that the public policies aimed at fostering MEs should facilitate access to technology, and these policies should monitor the work of ASAs in MEs. The study also contributes to the government's effort for developing a strategy to strengthen ASAs adoption by strengthening the quality of the MEs. Consistent with previous studies, the findings also highlight the importance of training the Owner/ Managers (O/Ms) of the MEs on information technology issues related to their business.

Originality/value: This is the first study that investigates the ASAs used by MEs in the emerging economy of Palestine. It explored the extent the general quality features of ASA are being realized and the extent these features meet the user's needs. It is also a unique study because it is done for MEs in a territory under economic blockade in a developing economy that has not yet gained its independence.

Keywords: Accounting, Micro Enterprises, Emerging economies, Accounting Software, Gaza Strip.

Accounting Software Used by Micro Enterprises in Palestine: Do they meet general quality features and satisfy users' needs?

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Abstract

Purpose: This research aims to contribute to the knowledge-building on micro enterprises (MEs) in the emerging economy of the Gaza Strip (GS) of Palestine. It provides empirical evidences on the extent the general quality features, already implemented in the available accounting software applications (ASAs), are being used, and the extent these ASA applications themselves are meeting the users' needs.

Methodology: In this research, **s**ome hypotheses were developed to explore (1) the extent the general quality features available in the ASAs are used by MEs and (2) the extent these ASA software meet the users' needs. Based on these hypotheses, a structured questionnaire was designed and used to collect the data for this study. Copies of this questionnaire were hand delivered to a large sample of MEs in the GS of Palestine. A descriptive statistical analysis was performed on the collected quantitative data using the SPSS software.

Findings: The findings of this research suggest that the general quality features implemented in the ASAs used by MEs in the GS of Palestine meet the users' needs at varying levels.

Research limitations: This study has three main limitations. First, it is limited to MEs having no more than 5 employees and one Owner/Manager. Second, the study is limited to MEs operating within the emerging economy of the GS of Palestine. MEs based in the West Bank region of Palestine could not be included, because crossing the borders between the West Bank and the GS is currently not allowed. For the past 15 years, the Israeli military has been imposing a strict blockade on the GS. However, sending the questionnaires to the MEs in the West Bank by email and having them return them by email could be possible if the researcher was able to go there and directly contact the MEs

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Table 4

Correlation Test: Selection Processes with Interview's Focus

Interview's Focus	Basic attitudes		Specific Skills		Ambitions		Flexibility and adaptability	
Selection Processes	Correlation Coefficient (r)	Sig. (P)	Correlation Coefficient (r)	Sig. (P)	Correlation Coefficient (r)	Sig. (P)	Correlation Coefficient (r)	Sig. (P)
Application forms	.751**	.000	.759**	.000	.882**	.000	.814**	.000
Medical examination	.751**	.000	.759**	.000	.882**	.000	.814**	.000
Ability tests	.740**	.000	.681**	.000	.848**	.000	.805**	.000
Psychological tests	.519**	.003	.398*	.027	.744**	.000	.822**	.000
References checking	.426*	.017	.327	.072	.355*	.05	.004	.982
Employment interviews	.692**	.000	.938**	.000	.677**	.000	.454*	.010

** Significance level less than 0.01 according to the Pearson correlation test.

* Significance level less than 0.05 according to the Pearson correlation test.

Table 2

Correlation Test: Focus of recruitment with recruitment policies (make or buy your own employees)

Organization's recruitment focus	Make or buy your own employees policies	
	Correlation Coefficient (r)	Sig. (P)
Native men and women	-.508**	.004
Native women more than native men	-.065	.727
Foreign specialist from advanced countries	.124	.505
Arab expatriates	.124	.505
Non-Arab expatriates	.388*	.031

** Significance level less than 0.01 according to the Pearson correlation test.
* Significance level less than 0.05 according to the Pearson correlation test.

Table 3

Comparison Between Locals and Expatriates in Using Different Job Search Methods

Job search methods	Paired Sample T Test	
	T	Sig. (P)
Apply directly to organization	4.030**	0.000
Recommendations of present employees	-2.402*	0.025
Asked a friend or a relative	-2.747**	0.010
Nepotism	1.971	0.06
Answered advertisement	-5.906**	0.000
Private employment agency	-9.449**	0.000
Public employment agency	.902	.374
School placement office	1.438	.161
Labor union	1.000	.325

** Significance level less than 0.01 according to the Paired sample T test.
* Significance level less than 0.05 according to the Paired sample T test.

expatriates and recruitment polices has emerged. In other words, as the Qatari companies are focusing on recruiting non-Arab expatriates, the "Buying your own employees" policy comes first. The most interesting results indicate that there is no significant statistical relationship between the recruitment polices and other recruitment zones (native women more than native men, foreign specialists from advanced countries, and Arab expatriates).

On the other hand, over half of the surveyed organizations rely equally on both internal and external recruitment. As a result of this, the recruitment practices in Qatar reflect its attitude towards diversity. However, locals are granted priority in filling vacant positions, especially in the public sector. This is due to a national policy called "Qatarisation". Based on this policy, over 60% of the surveyed organizations are focusing on native Qatari men and women.

Regarding the tools used by job seekers, there is sufficient evidence that most locals apply directly. However, expatriates prefer job advertisements. Along with this finding, a paired sample t-test has shown a strong and significant difference between native Qataris and expatriates in terms of their use of job research methods. In addition to this, human resources mangers have identified that the employment interview is the most common selection technique presently being used. Finally, according to the correlation analysis, a strong relationship exists between the selection processes and the interview's focus.

Table 1

Correlation Test: Type of HR Needs Plans with Indicators of Estimating HR Needs

Indicators of Estimating HR Needs	**Type of HR Needs Plans**	
	Correlation Coefficient (r)	**Sig. (P)**
Current HR inventory	.811**	.000
Productivity Level	.629**	.000
Turnover rates	.326*	.046
Absenteeism ratio	.634**	.000

** Significance level less than 0.01 according to the Pearson correlation test.
* Significance level less than 0.05 according to the Pearson correlation test.

basic attitudes, specific skills, ambitions and flexibility. These results have confirmed that consistency between the selection processes and the job requirements need to be available in job applicants. This will facilitate achieving the necessary match between the applicants' qualifications and the job requirements. One interesting result from the table is that the reference checking has significant relationships only with basic attitudes and ambitions (r=0.426, p=0 .017 and r=0.355, p=0.05, respectively).

5. Conclusion

The objective of this study was to investigate recruitment and selection practices in Qatar. The research is part of an on-going project investigating the convergence and diversity in national HRM practices. Specifically, the study examines human resources managers' opinions and views on the recruitment and selection practices being used in their companies.

The findings reveal that almost half of the surveyed companies are involved in formulating detailed recruitment plans. This can be considered as a good indication that companies should pay significant attention to developing a beneficial and comprehensive recruitment plan. This can be positively reflected in improving the whole recruiting and selection process.

In formulating these plans, companies have used valid criteria. Productivity level and current human resources inventory came first. They are considered as very important indicators. However, other indicators were ranked as either important or unimportant. Prioritizing the productivity level in formulating recruitment plans means that these companies used the most efficient way of assessing their human resources needs. In support of the previous finding, the correlation coefficient results indicate a strong relationship between detailed HR plans and the use of specific indicators in assessing HR needs.

A further important conclusion can be noticed, namely the preference among most Qatari companies for the "buy your own employees" policy, rather than the "make your own employees" policy. The composition of the workforce in Qatar supports this result. There is a clear general trend in most of the Qatari companies surveyed in favour of recruiting skilled and qualified employees. It is believed that this approach can meet companies' immediate needs under the circumstances of the very rapid developmental process that Qatar is currently undergoing. The correlation coefficient results reveal a difference in the approach chosen by the Qatari companies in dealing with recruitment policies. From these results, it seems very clear that there is a strong negative relationship between focusing on native men and women in filling the vacant positions and recruitment polices, meaning Qatari companies prefer the "making your own employees" policy in this specific case. However, a positive relationship between the focus on non-Arab

HR inventory as indicator is r =0.811, which indicates a strong positive relationship (p< 0.000). The same conclusion can be drawn with respect to the other two indicators, productivity level and absenteeism ratio (r=0.629, p<0.000 and r =0.634, p< 0.000, respectively). Although the relationship with labour turnover rate shows a weak positive relationship with r =0.326, this relationship is still statistically significant (p = 0.046).

In addition, the research examines the relationship between the recruitment areas that organizations focus on and the recruitment policies being used by organization. As Table (2) shows, there are at least five mean zones available for the Qatari organizations to fill their vacant positions. The table presents the relationship between these recruitment zones and recruitment policies. The correlation coefficient for the relationship between focusing on native men and women and the recruitment policy chosen by the organization is r=-0.508, which indicates a strong negative relationship (p=0.004). In other words, if a Qatari organization focuses on the native men and women in recruiting efforts, that organization prefers a "make your own employees" policy rather than "Buy your own employees". Moreover, it is interesting that the results in the same table indicate a positive relationship between the focus on non-Arab expatriates and the recruitment policy (r=0.388, p = 0.031). One can conclude that, as Qatari organizations recruit more non-Arab expatriates, the "buy your own employees" policy is the preferred recruitment trend. However, the other three recruitments areas - native women more than native men, foreign specialists from advanced countries, and Arab expatriates - show non-significant statistical relationships with recruitment policies (r=-0.065, p=0 .727; r =0.124, p =0.505 and r =0.124, p =0.505, respectively).

Along with the previous descriptive results, and in order to identify the differences between natives and expatriates in terms of use of and preference for the various job search methods, a paired sample t-test was used. The results are very interesting, reflecting to some extent the real picture in the Qatari labour market. Table (3) illustrates the strong and significant differences between the two groups in experiencing methods like applying directly to organizations, answering advertisement, using a private agency, asking friend or relatives and recommendations from present employees. The test statistics are listed in the table with their respective significance levels. However, the other methods failed to reveal any significant differences between the two groups. In other words, the natives and expatriates have similar attitudes towards the other job search tools, such as nepotism, public employment agencies, school placement offices and labour unions. These findings make sense, as these job search methods either do not exists in the Qatari labour market or the job seekers in this market are not familiar with such methods.

Correlation analysis also shows that a strong relationship exists between some of the selection processes and the interview's focus. The correlation matrix in Table (4) reveals that selection processes such as application forms, medical examinations, ability tests, psychological tests and employment interviews have significant relationships with some

they specifically target and give priority to Qataris during the recruitment process. If they cannot find suitably qualified Qataris, they would then search for foreign specialists and experts from the developed world. Arab expatriates and non-Arab expatriates come third and fourth respectively after those from the developed world.

Concerning the methodology for applying for vacancies, the participants indicated that Qataris would directly contact the company or the organization, whereas expatriates would generally respond to job advertisements found in newspapers or on the internet. The Qataris also use these media; however, they prefer direct contact.

Another difference between Qataris and expatriates is the use of employment agencies. Participants stated that almost half of the expatriates use private employment agencies, while less than 10% of the Qataris utilize such services. There was general agreement on the issue of using labour unions in searching for work. Thirty out of the thirty-one participants believed that such unions do not really help in finding work, which is not a surprise, since there is no labour union in Qatar. With regard to other methods of finding work, such as asking a friend or relative, nepotism, government agencies and school placement schemes, there was not much difference between Qataris and non-Qataris in terms of their usefulness.

Turning back to the HR managers' responses to our questionnaire, it is found that 90% of them regard interviews as the most important tool or technique in the hiring process. In fact, this is true throughout the world, with Qatar being no exception to this general belief.

Application form, ability tests and medical examinations all come second (after the interview) for 50% of the managers. Regarding reference checking and psychological tests, only 42% and 23% of the participants respectively thought that these were valued means of testing someone's suitability to fill a vacancy.

In addition, over 87% of the HR managers would assess the job seeker's specific skills; 77% would look into their basic attitudes towards work, while 60% would focus on the flexibility and adaptability of the job seeker being interviewed. Lastly, only 38% of the managers used their interviews with prospective employees to discuss their future ambitions and aspirations.

Although frequencies analysis was performed, it is worthwhile looking at the correlation coefficients between some variables to investigate their relationships and how they are related to each other.

Pearson's correlation test reveals a strong correlation between detailed HR plans and preferences for using specific indicators in assessing HR needs (Table 1). The results show that the correlation coefficient between utilizing detailed plans and using the current

Human resources managers were asked about indicators used in estimating their companies' human resources needs. They were also asked about the focus of the current recruitment effort and the recruitment polices. This was followed by other questions about the recruitment sources used by their organizations. Finally, a number of questions covered the selection processes performed to select the right employees.

Both descriptive and analytical statistical techniques were used in analysing the results. Pearson's correlation test was performed to investigate the relationship between some variables.

4. Findings

It is generally believed that one of the most important roles of human resources management is to assess and predict future human resources needs. The main findings of this research have shown that nearly half of the HR managers stated that their companies had produced detailed plans outlining their companies' human resources needs over the next five years. Most of the remaining managers indicated that their future planning was not very formal and was only approximate in nature. However, perhaps the most striking results are the negative ones. Remarkably, the remaining participants admitted that their companies do not have any written plans to document their specific human-power needs. In order to produce adequate plans, HRM departments use a number of indicators, such as current HR inventory, productivity level, turnover rates and absenteeism ratio. The importance of these indicators was ranked differently by the respondents. Productivity level and current HR inventory were ranked the most important indicators overall, followed by absenteeism ratio and turnover rates.

Turning to recruitment, most of the companies (over 87%) confirmed that they specifically target prospective employees who require little or no training. HR managers believe that this is more economically viable. Therefore, it comes as no surprise that over 90% of the workforce is made up of expatriates and temporary workers who are hired on fixed contract bases. Depending on those results, it is generally believed that the return of training temporary workers is not economically viable.

The way in which each company recruits depends on the policies concerning internal and external recruitment that have been adopted by managers. Over half of those surveyed indicated that they rely equally on both internal and external recruitment. Another third depend heavily on external job seekers, while the rest generally fill vacancies internally.

One of the recruitment practices that must be implemented by every organization in Qatar and which is prioritized by the council of ministries is the national policy called "Qatarisation" which basically means that companies need to make sure that Qataris are given priority when they apply for vacancies. The government believes that it is their duty to help their natives in this way. Over 60% of the organizations readily admit that

website and more effective methods such as recruitment agencies. However, there is a tendency to reduce reliance on recruitment agencies and to expand the use of new media and technology to recruit compared with past years (CIPD 2010). Interestingly, the survey highlighted that more organizations are currently focusing on developing talent in-house and retaining rather than recruiting talent compared with the past. Moving to the selection process, the survey stated that competency-based interviews, interviews following contents of CV/application form, and structured interviews were the most common methods used to select applicants. The reliance on general ability tests has fallen, although the use of tests for specific skills, literacy and/or numeracy remains constant (ibid. 2010).

Having established the situation in the previous paragraphs, the current research is investigating recruitment and selection practices in Qatar as a contribution to the comparative HRM literature.

3. Research methodology

The date was collected through a questionnaire distributed to human resource managers working in different Qatari companies. To be eligible to participate, respondents should be HR managers who are involved in handling the responsibility of processing the HR functions. A total of eight pilot tests were conducted with HR managers who met the selection criteria. Pre-testing was also carried out with two leading academic members of staff at a leading local university. The purpose of the pilot tests and the pre-testing was to refine the questionnaire and to assess the validity and applicability of measures; corresponding amendments were made to the questionnaire after the pilot tests.

To increase the response rate, researchers administered the questionnaires in the form of face-to-face personal interviews. The procedures resulted in thirty-one completed questionnaires with a response rate of 82%. Out of the thirty-one usable questionnaires, all of the respondents identified themselves as Qatari nationals and HR managers with between three and eight years of service in the same position. The respondents' ages ranged from 20 to 42, with over 59% of them holding a college or university degree.

The questionnaire was originally drafted in English, and then translated into Arabic with help of two bilingual experts who were fluent in both English and Arabic. Consequently, the questionnaire was first translated into Arabic and then back-translated into English to ensure translation equivalence (Soriano and Foxall, 2002).

The questionnaire covered the main areas of recruitment and selection, such as recruitment plans, recruitment policies, interviews and selection processes. The questionnaire included nine questions (each question comprises several items) and several scales (such as very important, important, unimportant; high, medium, low; and yes, no) to measure a wide range of recruitment and selection functions.

Al-Homoud 2001). Facing tough competition, the mostly small to medium sized private sector organizations tend to compromise their HRM functions for economic considerations (Abdalla 2006). In the case of joint ventures, where the government invited multinational enterprises to establish businesses in Qatar, it wanted these foreign investors to bring not just capital but also "management know-how and technology" (Mellahi 2003: 92). However, Tayeb (1988; 2000) argues that it is more likely that the HRM function in a company will be culture-specific and similar to the common practices in the host country than for the business to implement the same HR practices that are used in the home country.

That said, it is argued that the management practices in Qatar are affected by the political ideology, the economic conditions and the socio-cultural characteristics of employees and managers (Abdalla 2006; Tayeb 1996; Mellahi 2003). For example, the managerial consequences of the state being the most powerful economic actor mean that the relationship with government bodies and officials has a strong influence on the success of the business (Mellahi 2003; Budhwar and Mellahi 2006). Another aspect of the political practice is the paternal type of superior-subordinate relationships (Tayeb 2000). Al-Horr (2008), Abdalla (2006) and Weir (2000) argue that Qatari society draws its structure and authority from the tribal structure whereby the head of the country is the head of the tribe that is the head of other tribes. Children are taught to refer to the Emir in the same way they refer to their fathers, that is, "papa Hamad", while questioning the decisions of the head of the state is seen as jeopardizing the national interests by compromising his position (Al-Horr 2008: 159). The implication of this structure is that nationals show less resistance to decisions made by the political leaders, since their loyalty to the Emir or the head of the state is expected to override loyalty to organizational strategies (Mellahi and Budhwar 2006). This type of attitude is supported by the hiring process, which is often compromised in favour of the social habits and values of the decision-maker, where the preference is usually for appointing "people of trust and loyalty" rather than "people of competence" (Abdalla 2006: 135).

The situation described above does not mean that HRM functions are absent in the Qatari context. Rather, it emphasizes the importance of examining HR practices and policies in a local context.

As to the common recruitment and selection practices, the literature states that they start with workforce planning, which includes reviewing the need for labour and conducting a job analysis to develop clear job and person specifications (Lockyer and Scholarios 2004; Ballantyne 2009). A thorough human resource need analysis is highly recommended in the literature, especially for forecasting the labour demand and supply to determine labour surplus or shortage (Noe et. al. 2008). As to the recruitment sources and methods, a recent survey by CIPD concluded that traditional methods such as advertising in printed media have lost their place to more efficient methods such as the organization's own corporate

and influence the organization of work in these countries (Hofstede 2001). The 'culturalist' approach argues that cultural differences are likely to affect the success or failure of the techniques described in the best practice model (Pramila Rao, 2013, Williams et al. 2009).

Having briefly illustrated the arguments regarding the variation in national HRM practices, it is critical to highlight how HR is managed in Qatar and the development of HRM systems in the country under investigation. Since oil was first commercially produced in Qatar in 1949, oil revenues have encouraged the government to abandon the traditional economic activities of fishing and diving for pearls. The development of the Qatari economy is led by the dominant broad public sector - that is, government departments, government enterprises, and semi-government firms - while the private sector, which consists mainly of small and medium family-owned commercial business, is still underdeveloped despite the support and the extensive protection it receives from the government (Abdalla and Al-Homoud 2001; Abdalla 2006). Abdalla and Al-Homoud (2001) add that since most of the private firms are family-owned, there is a lack of separation between ownership and management control. Schlumberger (2000) and Abdalla (2006) argue that the private sector in Qatar is dependent on the benevolence of state institutions in the form of government contracts to operate successfully, as the size of the domestic market is too small to support business with a local focus.

Having established the situation in the previous paragraph, it should be noted that the management of human resources in these different types of organizations varies considerably. Since the establishment in the 1960s of the government sector, that is, ministries and departments, human resource management has been centralized. In 1962, the Personnel Department was established in the Ministry of Finance and Petroleum and was responsible for manpower planning for the government sector, and for recruitment and reviewing and monitoring the budget allocated to government posts (Abdul-Hadi 1970). Two decades later, the size and the duties of the department had expanded. In addition to manpower planning, recruitment and budget revision, the department became responsible for promotions, job classification, performance evaluation, retirement, service termination and training (Annual Report 1980). Due to the increasing size of the government sector, the Personnel Department was transformed into a new ministry called the Ministry of Civil Service Affairs and Housing (MCSAH). Until it was replaced by the Ministry of Labour and Social Affairs (MLSA) at the end of 2007, the MCSAH was responsible for everything related to personnel management in the government sector, including the aforementioned duties of the Personnel Department; however, when the MLSA was established, most of those activities were decentralized.

Since October 2007, each ministry and government department has had its own personnel department rather than there being one centralized department for the entire government sector (MLSA 2008). Since the public sector in Qatar is rich and extensive, it has a more modern HRM function in comparison to that of the private sector (Abdalla and

2. Literature review

The literature suggests two approaches to global HRM practices: the 'universal approach', which holds that a specific sets of employment practices are applicable across all organizations, all sectors, and all geographical locations, and a competing view which rejects the notions of convergence around some form of global 'best practice' (Yi-Ying Chang, Adam Smale, Seng-Su Tsang, 2013, Williams et al. 2009). The best practice argument can be linked back to the work of Pfeffer (1998), who listed seven dimensions that enable systems to perform well. The list includes:

> Employment security; selective hiring of new personnel; self-managed teams and decentralization of decision making as the basic principles of organizational design; comparatively high compensation contingent on organizational performance; extensive training; reduced status distinctions and barriers, including dress, language, office arrangements, and wage differences across levels, [and] extensive sharing of financial and performance information throughout the organization (Pfeffer 1998: 64-65).

Pfeffer is not the only supporter for this argument: other researchers have come up with their own lists regarding what constitutes a high performance HR strategy (Becker and Gerhart 1996). There are, however, certain similarities running across most of these lists (Gilmore 2009), such as extensive training, decentralized team-working, sophisticated recruitment and selection practices, extensive communication with employees and relatively high pay-for-performance (Williams et al. 2009).

Despite being influential, the universal approach has been criticized for neglecting external factors, such as legislations, culture and employment relations structures, that affect the nature of HRM practices (Gilmore 2009). Opponents to this approach argue that national HRM models are shaped by institutional and cultural settings and it is unrealistic to assume that HRM practices that enhance the performance of US-based organizations will necessarily improve the performance of any other organization in any other part of the world (Lemanski 2014;Paauwe and Boselie 2007; Brewster 2004). The explanations for the diversity in national HRM practices can be summarized into two streams.

The first explanation is the 'institutionalist' approach, which argues that the most efficient HRM model cannot be replicated outside its institutional context because distinctive institutional frameworks, such as political, legal, educational and business systems, in different countries need to be considered when designing and implementing employment systems and HRM practices (Williams et al. 2009).

Another explanation for the diversity in national HRM practices is the relationship between managerial practices and cultural dimensions. One of the most influential studies in this field is Hofstede's framework, which identified five value dimensions that vary across borders

1. Introduction

There is a longstanding debate in the comparative human resource management (HRM) literature regarding national HRM practices. On one hand, some authors argue that the main template for human resource strategies and practices currently in use in organizations, especially those operating at international and global levels, is generally Western (Harrison and Kessels 2004). On the other hand, another argument that is also well supported in the literature is differences between national employment systems and practices still exist due to a number of factors (Williams et al. 2009). Among the studies that focused on the convergence and diversity approaches, Katz and Darbishire (2000) examined the telecommunications and motor industries in the US, the UK, Australia, Germany, Japan, Sweden and Italy. Another significant contribution was a European-based study undertaken by Marginson and Sisson (2004) examining the variations and commonalities across European countries on the level of different sectors.

It can be argued, however, that most of the studies in this field have been conducted in advanced economies or so-called developed countries. Therefore, investigating the convergence and diversity issues in other contexts, especially where the state has great influence over HRM policies and practices, could provide new insights into the subject (Scott 2000). In this paper, a type of regime that has received less attention is investigated. A regime where the state exercises significant influence on the employment practices through direct intervention in the economy and the labour market can be described as a 'developmental state' (Ashton et al. 1999; Ashton et al. 2000; Ashton 2004).

As a valid case study of the developmental state model, Qatar, where the state owns most of the productive and important sectors of the country and the government plays a dominant role in creating employment (Al-Horr 2010), was selected, since there is very little about this region in the HRM literature. The other reason for selecting this country is that despite the collapse in oil price, the financial crises and threats of economic downturn worldwide, many businesses in Qatar is currently hiring. Recent survey from the international recruitment firm, Antal, concluded that recruitment in the professional and managerial levels in Qatar is witnessing a strong resurgence with 77 per cent of firms currently hiring and 69 per cent is likely to hire during the coming quarter giving Qatar the highest rate of employment in the Middle East region (Antal 2011). This analytical examination of the recruitment and selection practices in Qatar is part of an on-going project investigating the convergence and diversity in national HRM practices and approaches.

استقطاب وجذب المواهب: دراسة تحليلية لممارسات الاستقطاب والتوظيف في عينة من الشركات بدولة قطر

الملخص

الهدف الرئيسي من هذا البحث هو استكشاف التنوع في ممارسات أساليب الاستقطاب والتوظيف المعتمدة من أدارات الموارد البشرية في عينة من الشركات بدولة قطر. شملت عينة الدراسة واحد وثلاثين مديرًا للموارد البشرية من شركات قطرية مختلفة الأحجام. اتضح من خلال تحليل النتائج، أن نصف هذه الشركات قد طورت خطط جذب وتوظيف مفصلة للسنوات الخمس القادمة، بناءً على معايير معتمدة. بالإضافة إلى ذلك أتضح أن معظم الشركات تفضل مصدر (التوظيف الخارجي) لعاملين جاهزين بالمقارنة مع الاعتماد على المصدر الداخلي (التطوير الداخلي للعاملين). كما وجدت الدراسة أن الشركات في اغلب الأحيان تعتمد اساليب التوظيف الداخلية والخارجية بشكل متوازن. علاوة على ذلك، أشار اغلب مدراء الموارد البشرية إلى ان شركاتهم تستهدف في عملية التوظيف بشكل أساس القطريين بالمقارنة مع غير القطريين. كذلك أظهر تحليل النتائج وجود علاقات ارتباط قوية بين عدة متغيرات متعلقة بالاستقطاب والتوظيف. كما تمت مناقشة نتائج مهمة أخرى تتعلق بسياسات الاستقطاب والتوظيف في الشركات القطرية.

الكلمات المفتاحية: الاستقطاب، الاختيار، التوظيف، قطر

Attracting and Acquiring Talents: An analytical study of recruiting and selection practices in the State of Qatar

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Abstract

The primary aim of this paper is to explore the convergence and diversity in national HRM practices and approaches in Qatar. The study sample comprised thirty-one human resources managers from Qatari companies of various sizes. The findings revealed that half of these companies have developed detailed recruitment plans for the next five years, based on valid criteria. Additionally, most companies prioritize "buying" employees (external recruitment) over "making" employees (internal development). The study also found that companies equally utilize both internal and external recruitment methods. Furthermore, HR managers indicated a focus on recruiting native men and women. Correlation analyses showed strong relationships between several recruitment-related variables. Other significant results related to recruitment policies are also discussed.

Keywords: attracting, selection recruitment, Qatar

Contents

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Journal of Administrative Sciences and Law

Volume 6, Number : 1/2 - 1442 - 2021

ISSN: 2410-6224

A Semi-Annual Refereed Journal

Issued by Ahmed Bin Mohammed Military College