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Factors Influencing Smes' Performance in Adopting Blockchain Technology: Predictive Insights and Business Operational Implications in Alignment With Oman's Vision 2040

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Abstract:
This research investigates the relationship between blockchain technology adoption and SMEs' performance in Oman using the TOE model and RBV theory, considering Oman's vision for 2040. The study uses a questionnaire to collect data from 82 SMEs in Oman to develop a comprehensive framework for blockchain technology adoption. Structural equation modeling (SEM) was used to test the hypothesis. Several elements, such as innovative characteristics, technical context, organizational context, personal characteristics, and environmental context, are revealed by the research as factors that influence the deployment of blockchain technology by small and medium-sized enterprises (SMEs). Based on the p-value, the only context that was rejected was the environmental context. Blockchain technology can improve SMEs' business operations, and financial and market performance, and have implications for policymakers, SMEs, and other stakeholders interested in the adoption of blockchain technology in Oman. The research provides valuable insights into the factors that facilitate or hinder its adoption, within the context of Oman's vision 2040.

Keyword: Blockchain technology, small and medium enterprises (SMEs), economic development, digital society and Oman vision 2024.

1. Introduction:

The digital society has increasingly accepted new technologies, including blockchain technology and the Internet of Things (IoT), which are revolutionizing many sectors and enhancing productivity in a constantly changing technical environment (Kumar Bhardwaj et al., 2021). Blockchain technology in particular looks to be a big advance. Operating as a distributed digital ledger, it securely aggregates transaction records into blocks and connects them in a chain to guarantee that the data is immutable and dependable (Desplebin et al., 2021). The ideals of decentralization and encryption of this technology give high security and openness, hence presenting a persuasive option for traditional accounting systems (Kaur et al., 2024). Early users of blockchain technology, the GCC states began utilizing it in 2016, particularly in the financial and government sectors of Saudi Arabia, Bahrain, and the UAE (Kumar Bhardwaj et al.,

2021). With considerable repercussions for economic development, this trend signals a greater regional shift towards blockchain integration into vital businesses. Oman Vision 2040 envisages a strategic move from an oil-based economy to a more diversified economy that incorporates technologies like as blockchain, mobile infrastructure, and cloud in Oman (Al Hilali & Shaker, 2021). This aim represents the government's commitment to foster technical innovation to boost national efficiency and competitiveness. Although blockchain technology has enormous potential, small and medium-sized enterprises (SMEs) in Oman still employ it in rather low numbers compared to neighboring countries (Mishrif & Khan, 2023). Often having difficulty integrating new technology, SMEs—which are crucial to the Omani economy because of their position in employment production and economic development—often find themselves. This concern originates from misunderstanding of the benefits of blockchain technology and projected high costs, which can consequently prohibit SMEs from reaping operational gains and competitive advantages (Rakshit et al., 2022). The SMEs may be considerably benefited by reducing these impediments and delivering readily accessible guidance on blockchain adoption. Using the TOE (Technology-Organization-Environment) and RBV (Resource-Based View) models, this research intends to evaluate the influence of blockchain technology on SMEs performance in Oman and delivers a thorough study (Kumar Bhardwaj et al., 2021). This study seeks to offer in-depth research and policy insights by identifying variables impacting blockchain adoption and their influence on company performance. Ultimately, this research intends to deepen awareness of blockchain's potential to alter SMEs and extend the discourse on knowledge sharing and economic development (Rakshit et al., 2022).

2. Theoretical framework:

Blockchain technology has proven to be an irreplaceable communication revolution and driving adoption by businesses worldwide (Noor, 2022). The advantages of blockchain include higher transaction costs. Value Analysis and Market Transparency Stuart Haber and W. Blockchain technology introduced by Scott Starletta in 1991 is more attractive to small businesses where it can be used to improve efficiency, effectiveness, and efficiency (Chen, 2023). But there are problems, such as expenses and security concerns, for instance technical, equipment, and instruction needs. It is an obstacle to adoption 10% of the world economy is predicted to embrace blockchain technology by 2025 (Noor, 2022). The TOE (Technological, Organizational, and Environmental) model and the Resource Based View (RBV) are two examples of the same thing. Environmental changes to adopt and adopt new technologies. Technology use decisions include quality technology; strengths in organizational structures and processes etc. such as duplication of business activities (Tornatzky, L. G., & Fleischer, 1990). Business Development Strategic solutions Vendor support and competitive pressures. By combining the TOE model and the RBV theory, we can identify complex problems. The result is competitive advantage and efficiency. While the RBV theory emphasizes the importance of internal factors and capabilities.

New features will have a significant impact on SMEs' adoption of blockchain. It is important to consider comparative advantage or the extent to which blockchain technology outperforms conventional technologies in terms of advantages (Bag et al., 2023). Blockchain adoption by SMEs is more likely if it gives them a competitive edge. Additionally, a key factor is technical compatibility, or how well technology satisfies needs, attitudes, goals, experience, and the infrastructure of contemporary technology. Implementation is facilitated by high compatibility (Foster, 2023). However, a significant barrier is the intricacy or difficulty of the technology and its application. Because blockchain requires specialized

knowledge and is complicated, businesses may find it difficult to implement if consumers are reluctant to utilize it. The following are the presumptions about the novel features:

- **H1**: There is a positive relationship between Innovation Characteristics and Blockchain Adoption.
  - **H1a**: There is a positive relationship between Relative Advantage and Blockchain Adoption.
  - **H1b**: There is a positive relationship between Technology Compatibility and Blockchain Adoption.
  - **H1c**: There is a negative relationship between Complexity and Blockchain Adoption.

Technology readiness to adopt blockchain technology, including hardware, software, skilled labor, financial resources, and required training. Technology readiness has a positive impact on the adoption of blockchain by SMEs. The hypotheses related to technical conditions are as follows:

- **H2**: There is a positive relationship between Technological Context and Blockchain Adoption.
  - **H2a**: There is a positive relationship between Technological Readiness and Blockchain Adoption.

Organizational factors, including top management support, security concerns, and cost concerns, play a significant role in blockchain adoption (Clohessy & Acton, 2019). Top management's understanding and acceptance of blockchain' s technical capabilities is critical to successful implementation (Clohessy & Acton, 2019). Security concerns, such as the high level of security and privacy offered by blockchain, have a positive impact on the willingness of SMEs to adopt the technology (Abad-Segura et al., 2024). Cost concerns, including costs associated with software and hardware infrastructure, hiring new employees, and developing skills, can inhibit adoption (Ghobakhloo et al., 2012). hypothesis related to the organizational context are as follows::

- **H3**: There is a positive relationship between Organizational Context and Blockchain Adoption.
  - **H3a**: There is a positive relationship between Top Management Support and Blockchain Adoption.
  - **H3b**: There is a positive relationship between Security Concerns and Blockchain Adoption.
  - **H3c**: There is a negative relationship between Cost Concerns and Blockchain Adoption.

Individual characteristics, such as perceived usefulness and ease of use, influence blockchain adoption. The perceived usefulness means that blockchain technology can help get things done more efficiently and effectively(Sanka et al., 2021). Ease of use is a measure of how easily a technology can be understood and used. These factors are particularly important for SMEs because they show the potential of blockchain technology to be useful and user-friendly (Al Hilali & Shaker, 2021). Assumptions related to personal characteristics are as follows:

- **H4**: There is a positive relationship between Individual Characteristics and Blockchain Adoption.
  - **H4a**: There is a positive relationship between Perceived Usefulness and Blockchain Adoption.
  - **H4b**: There is a positive relationship between Perceived Ease of Use and Blockchain Adoption.

Environmental conditions, including government policy and vendor support, play an important role in blockchain adoption (Zhang et al., 2024). While government policies may encourage enterprises to adopt advanced technologies, current standards may not have a significant impact on SME blockchain adoption, even though they are at an early stage. Vendor support, training, information availability, and technical support have a positive impact on SMEs' willingness to adopt blockchain. Blockchain technology improves profitability and sales by improving forecasting, reducing inventory costs, managing inventory efficiently, reducing fraud, increasing customer satisfaction, and transaction management can improve performance (Kaur et al., 2024). Market efficiency can also be increased using the blockchain option, which is a company's dynamic ability to identify market opportunities and threats, gain market share, and develop new products and services.

- **H5:** There is a positive relationship between Environmental Context and Blockchain Adoption.

- H5a: There is a positive relationship between Government Policy and Blockchain Adoption.
- H5b: There is a positive relationship between Vendor Support and Blockchain Adoption.

Companies are able to improve their financial performance with the assistance of blockchain technology by strengthening their ability to foresee and predict future events. Small and medium-sized enterprises (SMEs) will be able to reduce the cost of maintaining inventory and manage their inventory in an effective manner. The chances of fraud and mistake will be decreased with blockchain. Consequently, financial performance will be enhanced. Because of this, it raises the level of pleasure experienced by customers by enhancing the quality of services and maintaining transparency. As profitability and sales will also be raised, this may be done with the help of smooth and effective transaction administration (Dehghani et al., 2022). The reputation of the SMEs will be formed by applying blockchain technology which in return increases financial performance (Rakshit et al., 2022).

As a consequence, the following hypothesis was developed

- H6: There is a positive relationship between Financial Performance and Blockchain Adoption.

Market performance refers to a company's ability to acquire a greater level of market share, penetrate other markets swiftly, and constantly offer new items and services with a better success rate. Blockchain technology will considerably raise the value for organizations and improve their performance in the market. This might be done by making smarter decisions about marketing strategy and innovation. Adopting blockchain technology may boost a company's dynamic capabilities, allowing them to detect market possibilities and threats, take advantage of chances to acquire a substantial portion of the market, and develop new goods and services by leveraging sophisticated technology (Maroufkhani et al., 2020). In reality, blockchain technology provides SMEs a competitive edge. Thus, aiding SMEs and enabling them to retain their clients is accomplished by using blockchain, and thus will increase the market performance (Bag et al., 2023). Consequently, the following theory was proposed:

- H7: There is a positive relationship between Market Performance and Blockchain Adoption.

Overall, the implementation of blockchain technology has the potential to drastically alter many elements of corporate operations, including individual characteristics, institutional characteristics, financial performance, and market performance.

3. Methodology

3.1. Participants

This research focuses on blockchain technology and its relevance to SMEs in Oman, investigating its influence on their productivity and performance. The target demographic comprises owners and workers of SMEs, as determined from a list issued by the SME's Development Authority of Oman (SME's Development Authority, 2023). The target sample selection is vital for reliable data collection, and the research intends to support blockchain technology adoption and create awareness among SMEs in Oman. The sample contains roughly 82 respondents, chosen using a convenience sampling approach, assuring accessibility and efficacy in data collection.

3.2. Instrument

Primary and secondary sources of data were gathered for this research to provide a wide range of information. A questionnaire sent via Internet communication technology collects the primary data, which encourages broad participation. This survey consists of closed-ended questions that gauge respondents' opinions using the Likert Scale (strongly agree, agree, neutral, disagree, and strongly disagree). Responders who are not acquainted with blockchain technology are provided with a quick educational

video. Research papers that have previously been compiled and analyzed by other academics are considered secondary data.

3.3. Procedure

The study approach consisted of sending an online questionnaire to 82 Omani SMEs' owners and staff, therefore guaranteeing ethical issues by asking participants to sign a non-disclosure agreement safeguarding their anonymity. Primary data from respondents and secondary data from past studies are part of data collecting. Using SPSS, Excel, and SmartPLS tools, data analysis is conducted using mean, percentage analysis, structural equation modeling, standard deviation, and frequency distribution. Interrater reliability, Cronbach's alpha, composite reliability, and average variance extracted (AVE) all help to determine the instrument's dependability. Skewness and Kurtosis statistics will help to evaluate data quality and normalcy thus guaranteeing dependability. Broken down by demographic traits and Likert scale replies, the findings are shown and analyzed using a graphical form.

4. Results:

4.1. Presentation, Analysis and Interpretation of Data

The findings of the questionnaire are described fully in this chapter backed by a graphical depiction. In reality, evaluating and interpreting the data is a critical step in doing research. In addition, numerous statistical tools were utilized to evaluate the data such as SPSS software, excel and SmartPLS software. Furthermore, the questionnaire completed was broken into two pieces, in which the first component comprises of questions concerning the demographic features of the respondents. As for the second segment, it featured questions utilizing the five-point Likert scale where the respondents may indicate their degree of agreement.

Table 1 Demographic characteristics of the respondents

Gender			**Nature of business activity**		
	Frequency	Percent		Frequency	Percent
Male	40	48.8	Building and Construction	12	14.6
Female	42	51.2	Electronics	10	12.2
			Education and training	10	12.2
			Other	50	61.0
Age			**Number of years with the enterprise**		
	Frequency	Percent		Frequency	Percent
Under 20 years	12	14.6	Less than 1 year	20	24.4
21 to 30 years	52	63.4	1-2 years	14	17.1
31 to 40 years	12	14.6	3-4 years	26	31.7
41 to 50 years	4	4.9	Above 5 years	22	26.8
Above 50 years	2	2.4			
Educational qualification			**Number of employees**		
	Frequency	Percent		Frequency	Percent
Higher school diploma	10	12.2	1-5	28	34.1

Undergraduate	28	34.1	6-25	32	39.0
Postgraduate	44	53.7	26-45	8	9.8
			Above 45	14	17.1
Job position			**Blockchain technology experience**		
	Frequency	Percent		Frequency	Percent
Owner	42	51.2	None	8	9.8
Manager	6	7.3	Less than 1 year	24	29.3
Senior employee	6	7.3	1-2 years	16	19.5
Employee	28	34.1	3-4 years	18	22.0
			Above 4 years	16	19.5

Source: The results were obtained using SPSS software.

The table above illustrates the frequency and proportion of gender, age, educational qualification, job position, nature of the company activity, number of years with the organization, number of employees and blockchain technology experience. The study sample contains 82 respondents from varied backgrounds. The female respondents were 42 (51.2%), which surpasses the 40 (48.8%) male respondents. Furthermore, a bigger number of respondents were from the age range of 21- 30 years old with a percentage of 63.4%, postgraduates of 53.7% and owners of firms with a percentage of 51.2%. Additionally, most of the respondents' nature of the activity is different than those specified in the questionnaire by 61%. Also, considering the number of years with the firm, the majority of respondents picked 3-4 years with 31.7%. Moreover, the responses were from firms that had 6-25 workers, and that is with a ratio of 39%. Lastly, the biggest number of responders, which had 29.3%, has less than one year of expertise with blockchain technology.

Table 2Descriptive Statistics

Descriptive Statistics					
	N Statistic	**Minimum Statistic**	**Maximum Statistic**	**Mean Statistic**	**Std. Deviation Statistic**
Gender	82	1	2	1.51	0.503
Age	82	1	5	2.17	0.829
Educational qualification	82	1	3	2.41	0.702
Job position	82	1	4	2.24	1.384
Nature of business activity	82	1	5	3.80	1.590
Number of years with the enterprise	82	1	4	2.61	1.130
Number of employees	82	1	4	2.10	1.061
Blockchain technology experience	82	1	5	3.12	1.299
Valid N (listwise)	82				

Source: The results were obtained using SPSS software.

The table above depicts the lowest statistic, maximum statistic, mean statistic and standard deviation statistic computed based on the replies of the questionnaire that have been gathered.

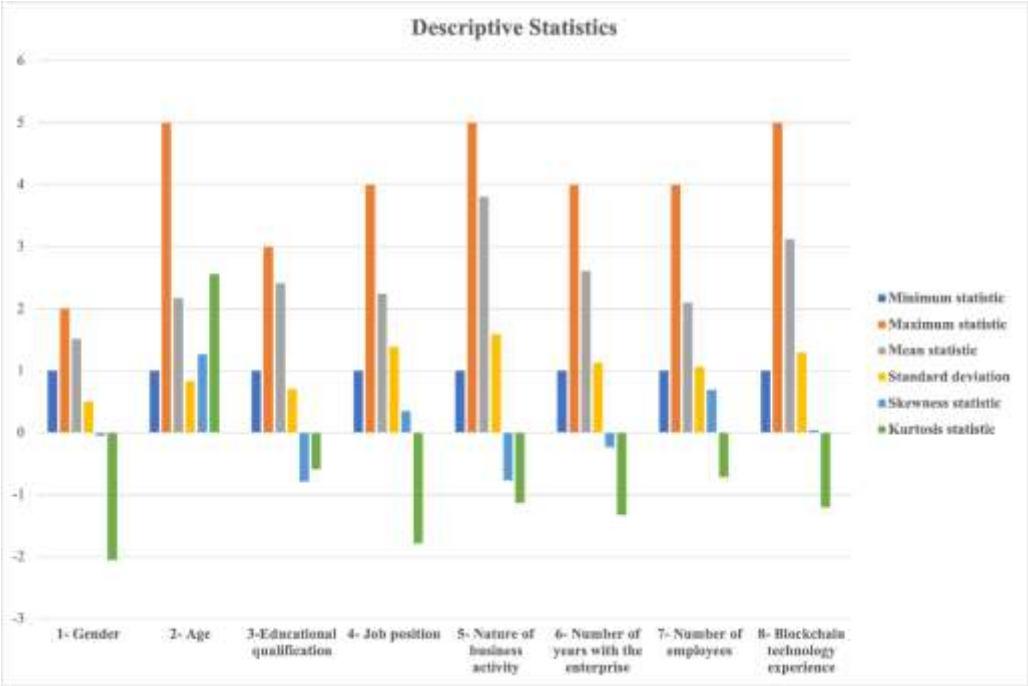

Figure 1 Graphical Chart of Descriptive Statistics

The findings of the descriptive statistics were expressed in a graphical chart as shown above.

Table 3 Skewness and Kurtosis Results

	Skewness Statistic	Kurtosis Statistic
Gender	-0.050	-2.048
Age	1.270	2.561
Educational qualification	-0.786	-0.592
Job position	0.350	-1.777
Nature of business activity	-0.766	-1.130
Number of years with the enterprise	-0.227	-1.331
Number of employees	0.691	-0.710
Blockchain technology experience	0.045	-1.203

Table 5 shows that for skewness, right-skewed values are those greater than positive one. On the other hand, left-skewed values—those less than negative ones—are left in 2022, p. 66 Apart from Age (1.270), all the statistics falls between -1 and +1. Furthermore, a positive kurtosis value indicates that leptokurtic, or greater peak than the normal distribution (>+2) is evident. Conversely, a flatter than usual form indicates a negative (<- 2) kurtosis value, also described as platykurtic (Sarstedt et al., 2022). Therefore, the age kurtosis value is greater than +2 based on the data, so the distribution is quite peaked. No values, however, less than -2.

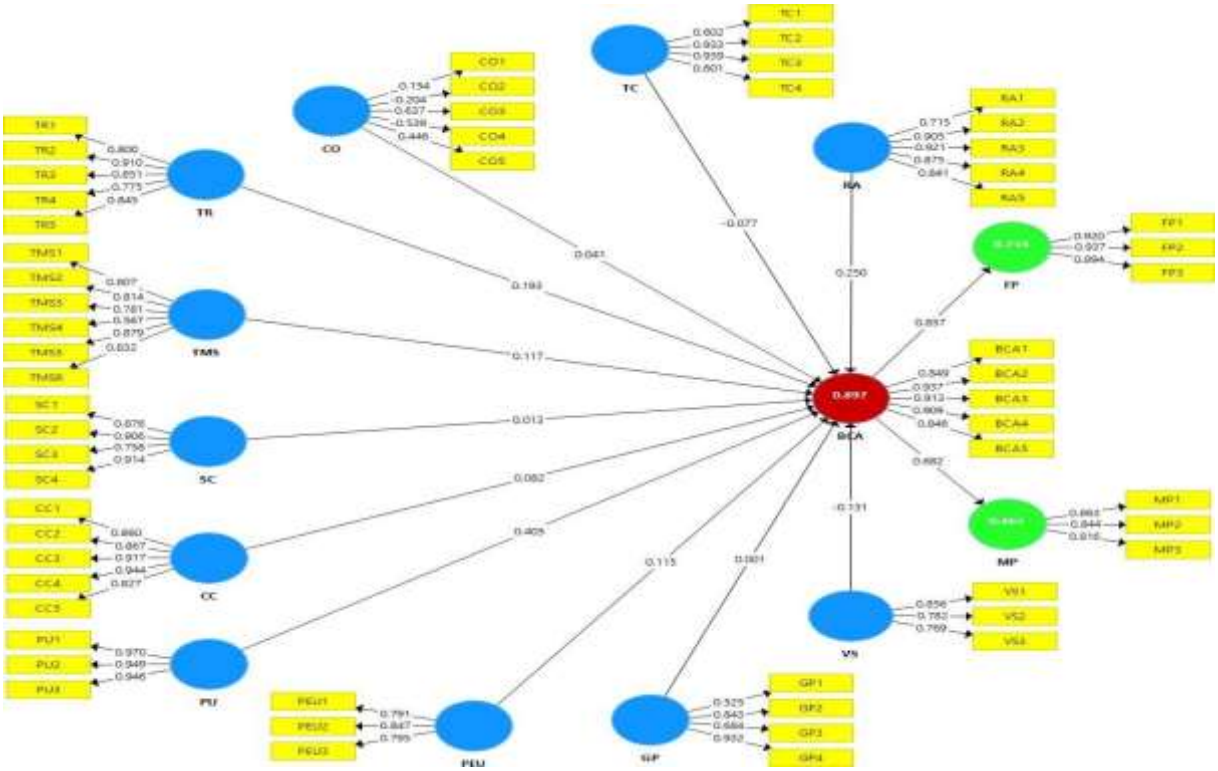

Figure 2 Results of the Measurement Model

Keywords: TR: Technological Readiness, TMS: Top Management Support, SC: Security Concerns, CC: Cost Concerns, PU: Perceived Usefulness, CO: Complexity, PEU: Perceived Ease of Use, TC: Technology Compatibility, RA: Relative Advantage, GP: Government Policy, VS: Vendor Support, BCA: Blockchain Adoption, FP: Financial Performance, MP: Market Performance

The link between the variables and the measurements is represented in the image above using SmartPLS software. Additionally, the arrows pointed from the latent factors to the items reflect values known as factor loadings. Factors Loadings reveal how effectively a particular item reflects the underlying concept. In fact, it is desired that the values should be bigger than 0.6. Furthermore, the Beta (path) coefficient reveals how strongly one variable impacts another one. In the image above, there are two negative beta values out of all the correlations which are the association between blockchain adoption and technological compatibility as well as vendor support.

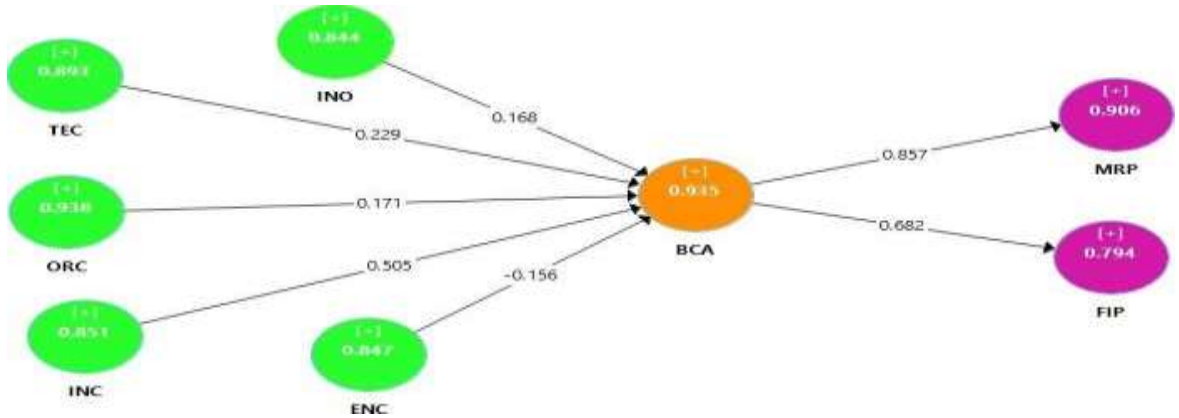

Figure 3 Results of the Measurement Model (main constructs)

Keywords: INO: Innovation Characteristics, TEC: Technological Context, ORC: Organizational Context, INC: Individual Characteristics, ENC: Environmental Context, BCA: Blockchain Adoption, FP: Financial Performance, MP: Market Performance

The chart above highlights the correlations between blockchain adoption and the key structures employing SmartPLS software. In reality, all the primary parameters are jointly assessing R2 93% of the adoption of blockchain technology

	Item Indicators	Factor loadings	Cronbach's Alpha	rho_A	Composite Reliability	Average Variance Extracted (AVE)
Relative Advantage						
RA1		0.715				
RA2		0.905				
RA3		0.921	0.906	0.920	0.931	0.730
RA4		0.875				
RA5		0.841				
Technology Compatibility						
	TC1	0.602	0.800	0.970	0.861	0.619
	TC2	0.933				
	TC3	0.939				
	TC4	0.601				
Complexity						
CO1		0.154				
CO2		-0.204				
CO3		0.637	0.640	-0.093	0.057	0.192
CO4		-0.539				
CO5		0.446				
Technological Readiness						
TR1		0.800				
TR2		0.910				
TR3		0.851	0.893	0.909	0.921	0.701
TR4		0.775				
TR5		0.845				
Top Management Support						
TMS1		0.807				
TMS2		0.814				
TMS3		0.781	0.872	0.884	0.905	0.618
TMS4		0.567				
TMS5		0.879				
TMS6		0.832				
Security Concerns						

SC1	0.876				
SC2	0.906	0.887	0.903	0.923	0.750
SC3	0.758				
SC4	0.914				

Cost Concerns					
CC1	0.860				
CC2	0.867				
CC3	0.917	0.929	0.933	0.947	0.781
CC4	0.944				
CC5	0.827				
Perceived Usefulness					
PU1	0.970				
PU2	0.949	0.952	0.952	0.969	0.912
PU3	0.946				
Perceived Ease of Use					
PEU1	0.791				
PEU2	0.847	0.747	0.777	0.852	0.658
PEU3	0.795				
Government Policy					
GP1	0.525				
GP2	0.843	0.771	1.092	0.842	0.581
GP3	0.684				
GP4	0.932				
Vendor Support					
VS1	0.856				
VS2	0.782	0.739	0.784	0.845	0.645
VS3	0.769				
Blockchain Adoption					
BCA1	0.849				
BCA2	0.937				
BCA3	0.913	0.935	0.939	0.951	0.795
BCA4	0.909				
BCA5	0.846				
Market Performance					
MP1	0.863				
MP2	0.844	0.794	0.802	0.879	0.707
MP3	0.816				
Financial Performance					
FP1	0.920				
FP2	0.937	0.906	0.914	0.941	0.841
FP3	0.894				

Table 6. Loadings, Reliability and Validity Analysis

Source: *The results of statistical analysis were obtained using SmartPLS software.*

The assessment of the measurement model was done to ascertain the validity and reliability of the constructs, as shown in Table 6. First, by looking at the factor loadings of each item in the model, it can be seen that, with the exception of CO1, 2, 5, TMS4, and GP1, every item is greater than the allowed value

of 0.6. Nothing was removed, however, since it will aid in future investigation. Second, Cronbach's Alpha, rho_A, and Composite Reliability were used to assess the constructs' reliability(J. Hair, M. Hult, M. Ringle, 2014). With the exception of complexity, all components satisfy the recommended value of 0.7 for Cronbach's Alpha, rho_A, and Composite Reliability, indicating strong reliability. Regarding that, the objects reliably convey the ideas. Thirdly, with the exception of complexity, every construct had an Average Variance Extracted (AVE) greater than the recommended threshold of 0.5, indicating strong convergent validity. Thus, the convergent validity of the measurement model is established.

	BCA	CC	CO	FP	GP	MP	PEU	PU	RA	SC	TC	TMS	TR	VS
BCA	**0.892**													
CC	0.713	**0.884**												
CO	0.679	0.499	**0.798**											
FP	0.857	0.655	0.668	**0.917**										
GP	0.361	0.230	0.214	0.253	**0.762**									
MP	0.682	0.512	0.570	0.708	0.481	**0.841**								
PEU	0.549	0.327	0.251	0.421	0.527	0.449	**0.811**							
PU	0.809	0.706	0.726	0.814	0.366	0.675	0.483	**0.955**						
RA	0.871	0.669	0.645	0.754	0.400	0.645	0.623	0.821	**0.855**					
SC	0.784	0.589	0.585	0.658	0.332	0.509	0.479	0.828	0.747	**0.866**				
TC	0.704	0.645	0.536	0.601	0.474	0.552	0.579	0.682	0.809	0.654	**0.787**			
TMS	0.787	0.599	0.598	0.701	0.574	0.628	0.553	0.779	0.762	0.766	0.719	**0.786**		
TR	0.874	0.790	0.632	0.776	0.414	0.582	0.506	0.852	0.842	0.753	0.767	0.781	**0.837**	
VS	0.422	0.471	0.353	0.319	0.695	0.451	0.599	0.446	0.491	0.482	0.614	0.603	0.504	**0.803**

Table 7. Discriminant Validity (Fornell–Larcker criterion)

***Keywords:** BCA: Blockchain Adoption, CC: Cost Concerns, CO: Complexity, FP: Financial Performance, GP: Government Policy, MP: Market Performance, PEU: Perceived Ease of Use, PU: Perceived Usefulness, RA: Relative Advantage, SC: Security Concerns, TC: Technology Compatibility, TMS: Top Management Support, TR: Technological Readiness, VS: Vendor Support*

***Source:** The results of statistical analysis were obtained using SmartPLS software.*

The table above shows the discriminant validity where the assessment of the relationships of the constructs is done by the use of the square root of AVE (Average Variance Extracted). The results shown in **bold (the square root of AVE)** in a diagonal line are the figures that should be higher than the result of the relationship between each pair of constructs. Therefore, if that is the case, the required criterion will be said to be satisfied in the study (Bag *et al.*, 2020). Thus, the discriminant validity of all the constructs is achieved except for CO, and between BCA and PU, as the square root of AVE clearly shows a lower number than the correlation coefficient of every pair of constructs.

Table 4 Hypothesis Testing

Hypotheses	Relationship	r	sd	T Value	P Values	Decision
H1a	RA -> BCA	0.250	0.184	2.450	0.001	Supported
H1b	TC -> BCA	-0.077	0.122	0.627	0.531	Not supported
H1c	CO -> BCA	0.041	0.110	0.377	0.706	Not supported
H2a	TR -> BCA	0.193	0.238	2.124	0.003	Supported
H3a	TMS -> BCA	0.117	0.173	2.008	0.004	Supported

H3b	SC -> BCA	0.013	0.167	0.075	0.940	Not supported
H3c	CC -> BCA	0.082	0.128	0.643	0.521	Not supported
H4a	PU -> BCA	0.405	0.238	4.500	0.000	Supported
H4b	PEU -> BCA	0.115	0.118	0.971	0.003	Supported
H5a	GP -> BCA	0.001	0.150	0.005	0.996	Not Supported
H5b	VS -> BCA	-0.131	0.145	0.901	0.368	Not supported
H6	BCA -> FP	0.857	0.050	17.066	0.000	Supported
H7	BCA -> MP	0.682	0.107	6.379	0.000	Supported

Keywords: RA: Relative Advantage, BCA: Blockchain Adoption, TC: Technology Compatibility, CO: Complexity, TR: Technological Readiness, TMS: Top Management Support, SC: Security Concerns, CC: Cost Concerns, PU: Perceived Usefulness, PEU: Perceived Ease of Use, GP: Government Policy, VS: Vendor Support, FP: Financial Performance, MP: Market Performance

Note: *Significant at *p < 0.05; ***p < 0.001*

To test the proposed hypothesis, the measurement model was transformed into the structural model. To estimate the conceptual model, 500 samples were employed in a bootstrapping procedure. As a result, Table 8 supports seven hypotheses: financial performance (H6, p<0.001), market performance (H7, p<0.001), perceived usefulness (H4a, p<0.001), perceived ease of use (H4b, p<0.05), technology readiness (H2a, p<0.05), top management support (H3a, p<0.05), and relative advantage (H1a, p<0.05). As a result, the seven assumptions have a big impact on people's desire to use blockchain technology. Therefore, the proposed hypotheses were accepted by the study that was done. Nevertheless, technological compatibility (H1b, p=0.531), complexity (H1c, p=0.706), security issues (H3b, p=0.940), cost concerns (H3c, p=0.521), government policy (H5a, p=0.996), and vendor support (H5b, p=0.368) are not supported. As a result, the adoption of blockchain technology is not significantly impacted by the other six theories.

Table 5 Hypothesis Testing (Main Constructs)

Hypotheses	Relationship	r	Sd	T value	P Values	Decision
H1	INO -> BCA	0.168	0.144	1.980	0.004	Supported
H2	TEC -> BCA	0.229	0.155	2.143	0.001	Supported
H3	ORC -> BCA	0.171	0.156	1.991	0.003	Supported
H4	INC -> BCA	0.505	0.168	3.014	0.000	Supported
H5	ENC -> BCA	-0.160	0.098	1.586	0.113	Not supported
H6	BCA -> FIP	0.857	0.057	15.098	0.000	Supported
H7	BCA -> MRP	0.682	0.107	6.349	0.000	Supported

Keywords: INO: Innovation Characteristics, BCA: Blockchain Adoption, TEC: Technological Context, ORC: Organizational Context, INC: Individual Characteristics, ENC: Environmental Context, FP: Financial Performance, MP: Market Performance

Note: ***Significant at *p < 0.05; ***p < 0.001 Source: The results were obtained using SmartPLS software.***

Table 9 displays the results of the key constructions' hypothesis testing. Six hypotheses are supported by the data: person qualities (H4, p<0.001), financial performance (H6, p<0.001), technical context (H2, p<0.05), organizational context (H3, p<0.05), and innovation characteristics (H1, p<0.05). As a result, the aforementioned theories have a big influence on blockchain acceptance. Thus, this study has accepted the proposed hypothesis. Environmental context (H5, p=0.113), on the other hand, is not supported and has no appreciable effect on blockchain adoption.

5. Discussion:

The study examined how several variables affected SMEs in Oman's adoption of blockchain technology. The technical context, organizational context, individual characteristics, environmental context, and innovation characteristics were the five constructs that were assessed. All of the constructs were accepted, with the exception of the environmental context, whose p-value showed that it did not satisfy the significance level. The first hypothesis was tested, and the results showed a clear correlation between innovative traits and blockchain adoption. More specifically, it was discovered that adoption was significantly boosted by the relative benefit of blockchain technology. According to earlier research, small and medium-sized enterprises (SMEs) who used blockchain technology might profit from its special attributes, including transparency, traceability, and data dependability (Kumar Bhardwaj et al., 2021). The results concerning complexity and compatibility of technology, however, contradicted the theory that was put out. Contrary to earlier study, SMEs do not see blockchain as complicated and do not appear to be flexible in integrating it with their current technology (Bag et al., 2023; Kumar Bhardwaj et al., 2021). Positive findings were obtained for the second hypothesis, which examined the connection between blockchain adoption and the technical environment. Technology readiness has a big impact on SMEs' desire to employ blockchain technology. This includes knowing how valuable blockchain is, having access to IT infrastructure, and having qualified human resources. This result supports the findings of the one the study of (Kumar Bhardwaj et al., 2021). The organizational context-focused third hypothesis likewise discovered a favorable correlation with blockchain adoption. Adoption required the backing of top management, demonstrating that managers are prepared to assume the risks involved with blockchain technology. Surprisingly, worries about expenses and security had little to do with the predictions. This difference may be explained by SMEs giving blockchain' s benefits priority above worries about costs and security, (Kumar Bhardwaj et al., 2021). According to the fourth hypothesis on individual traits, SMEs' desire to use blockchain technology was favorably affected by perceived utility and perceived simplicity of use. In line with (Kumar Bhardwaj et al., 2021), SMEs' knowledge with blockchain and conviction in its value corroborated this conclusion. The environmental context-related fifth hypothesis did not get any support. This may be because Oman is still in the early stages of blockchain standards development and vendors are not well-informed, which leads to a lack of clarity on rules and less impact from vendors and government policies on adoption.

The dependent variable, financial and market performance, was shown to be closely connected to the use of blockchain technology. Adopting blockchain technology may enhance financial performance by minimizing fraud and transaction mistakes, enhancing customer happiness, and streamlining inventory management. Furthermore, the blockchain technology gives a competitive edge, facilitates market access, and enhances efficiency. According to research, the use of blockchain technology may enhance the

financial and market performance of small and medium-sized businesses while also contributing to the Omani economy (Chen, 2023). This study contributes to the existing literature and provides valuable insights into the factors influencing blockchain adoption. This highlights the importance of innovative features and personalization concepts in the certification process. However, this study also has its limitations. The focus on Omani SMEs limits the generalizability of the findings to other regions. In addition to qualitative methods such as interviews, the small sample size of 82 participants from Muscat and time constraints limited the scope of the study. In addition, lack of access to high-quality journals limits the depth of analysis. Future research could extend the framework to other regions or sectors using qualitative methods to gain better insights. Additionally, exploring the ethical implications of blockchain technology and addressing limitations such as sample size can provide a more comprehensive understanding of blockchain adoption and its benefits to society in the coming years.

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