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The digital adoption of blockchain technology in the project management information systems: A value creation mediation model

Abeer Hmoud Al-Faouri[a], Sakher A. I. Al-Bazaiah[b], Muhammed S. Alnsour[c], Asma A. Abuanzeh[d*], and Muhammad Turki Alshurideh[e]

[a]*Associate Professor, Department of Management Information Systems, Faculty of Business, Al-Balqa Applied University, Al-Salt 19117, Jordan*
[b]*Assistant Professor, Department of Business Administration, Faculty of Business, Al-Balqa Applied University, Al-Salt 19117, Jordan*
[c]*Dean Of Faculty Of Business, Associate Professor, Department of Marketing, Faculty of Business, Al-Balqa Applied University, Al-Salt 19117, Jordan*
[d]*Department of Planning and Project Management, Faculty of Business, Al-Balqa Applied University, Al-Salt 19117, Jordan*
[e]*Department of Marketing, School of Business, The University of Jordan, Amman 11942, Jordan*

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A B S T R A C T

Blockchain technology adoption among the businesses has become a new updated technological improvement and calls all businesses to care with it. This research aims to address its effect with project management information systems with a possible moderation effect of the value creation gained of this factor. The study used a quantitative research method to meet its objective and collected the data from Jordanian e-commerce enterprises with a total of 320 participants. PLS-SEM technique was used to perform the key analyses. The results found a significant effect of all hypothesized research assumptions and a significant moderating effect of value creation on the respective effect of study's variables. The findings also expanded the current understanding and application of this technology and showed some implications and applicable insights that supported the existing literature and evidence in this field. The study would contribute to cover the limited research works and knowledge gaps with a suggestion to integrate this technology and application within different contextual settings.

1. Introduction

The value chain has become globalized, and the companies buy cheap raw materials to produce products in the low-cost states to sell them to the world market. This links with the process of value creation since the logistics services are regarded as connected from the view of network theory. An added value to the supply chain aspect for the shippers as node, and the supply chains which the added value can be managed by the companies (Nguyen et al., 2021). For a given and sustainable value creation, today's business operations integrate and use the advanced blockchain technology among their processes. This technology can provide new solutions and solve the emerging issues and problems to create a value (Abdollahi et al., 2022). This also connects with creating a sustainable innovative activity of companies. In particular, the emerging applications of the blockchain technology and digital adoption of this approach through the supply chains for instance allow reliable as well transparent transactions like fair trade because it cooperates with different participants and prevents disruptive actions like hacking by sharing the information (Wang et al., 2022).

Therefore, the companies apply blockchain technology to different key operations to create a sustainable value since the actions that occur are transparent and available for all parties. The research on information management systems has been

* Corresponding author.
E-mail address: asma.abuanzeh@bau.edu.jo (A. A. Abuanzeh)

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conducted from different viewpoints (Saurabh & Dey, 2021). In general, the literature in this area confirmed that the information management systems as a resource of the companies have an important role to improve their performance (Batubara et al., 2018). On the other hand, the relevant research works indicate that there is a timely attributed lag between the applications of information systems and performance (Akram et al., 2020). To minimize this lag, the companies develop a relationship between information management systems and performance based on employee development and education for information management systems and create rewards for using information systems in the projects (Woodside et al., 2017). The field of project management information systems mostly focused on the manufacturing businesses. But the research on information systems of projects is still limited and not adequately conducted.

The claim that the project information systems can create value and has a relation with the advanced technology adoption encourage the organization management to consider this issue (Amoah & Oh, 2021). In this respect, the project's information systems have a positive effect on communication and cooperation with key stakeholders of the companies. In addition, the need of research on the management information systems supports for blockchain technology adoption in projects to achieve the greatest outcomes (Sonmez et al., 2021). However, the evidence in this research field understands the needs of business and uses this technology to improve the activities. However, research on the resources of projects to build solid and reliable information systems has not yet been done. Information management systems as a resource for the firms can provide the directions to applicable ways and methods of the successful projects information systems applications (Berdik et al., 2021). There is a lack of research on the effect of digital blockchain adoption in the management information systems among projects which may have a role to create a value and enhance the benefits of application management information systems of projects. The current study concerns conducting research including new technological implementation with more focus on the outcome of value creation and consider the project management information systems.

2. Literature Review & Hypothesis Development

Based on its core, the blockchain is described as a digital ledger that includes chronological chains of 'blocks', where the new blocks are records of network activities that are added to the end of the current chains of the blocks (Renwick & Tierney, 2020). Thus, the basic units of the blockchain technology are single transactions that involve various entities. This has also become payment procedure and information transfer (Liang et al., 2021). Defining each single block in the blockchain indicates an encrypted information piece that is stored and time automatically distributed at once to many servers. The different transactions combine with a single block, which in most cases is verified by the network users who deploy the computing resources and compete among each other to establish the next block (Akhavan et al., 2021). The successful block is validated and appended to the chains of the previous blocks, thus the concept of blockchain. The adoption of blockchain is pioneered through the different technologies such as Financial Technology and now it has been expanded to many different sectors, particularly with management information systems applications (Wang et al., 2022).

The open resources of the blockchain generally are used to host the projects management prototypes with smart contact. Over the close sources of the blockchain, the developers or administrators create a stakeholder ID with a permission blockchain of the networks (Khalfan et al., 2022). The unique blockchain accounts and users correspond with the identified parties of the project operations that are listed and secured by using generated public keys. In project management, the blockchain-based project activities track and budget the management platforms that deploy on the testing net servers that display the possibility of launching a decentralized project management approach (Bai et al., 2018). Further, the tools showed blockchain' ability to utilize its inherent features with validation of the records and secure the digital ledgers based on the smart interactive contract (El Khatib et al., 2021). The projects transactions that validated over the blockchain platforms require the users to authorize these transactions by sign through wallets for example. And each transaction needs a confirmation count within a few seconds for this action. In this regard, the details of the projects are relatively basic, and the verification timing is little (Guo et al., 2022). However, the larger projects with significant high numbers of the transactions that could improve the verification time. The blockchain adoption associated with its features e.g. security and privacy encourage the project management information system to increase the slower platforms and transactions and minimize the longer wait time that influence the project schedules and cause a delay. Based on the above discussion, the research postulates the following hypothesis:

H_1: *Blockchain technology adoption (privacy constraints, security vulnerability, blockchain applications) has a significant effect on project management information systems.*

In fact, information technology generally has been seen as a cause of sets of privacy problems and issues, there are many ways in which information technology can provide critical solutions for complex issues and help to solve the problems. Furthermore, the advanced technologies have rules, guidelines and required practices that can be utilized to design the privacy-protection approach (Esposito et al., 2018). The possibilities ranged from ethical and informed design of the methods that use the emerging technologies to protect the personal information and maintain the privacy from unauthorized hacking. In general, the methods from the field of project management information systems while considering the security aim to protect the sensitive information and data against unauthorized access (Mohanta et al., 2020). A key role plays in personal data protection. In the literature, the findings and implications outlined how the traditional current technologies might influence privacy, as well constraints the contribution to mitigate the undesirable outcomes (Shin, 2019). However, the future emerging technologies that have a profound effect for example blockchain consider privacy constraints. In the case of management information

systems, the application of blockchain is linked directly to maintain this issue. A discussion about the behavioral characteristic that is subject to the privacy consideration, and thoughts about the risks becoming more public with the decisions that are based upon them (Konstantinidis et al., 2018). In addition, the issue of privacy has become possible due to the changes of individual's behaviors by the means of such technologies. The developments hence require further considerations of the reasons to protect and ensure adequate privacy and protection. Based on the above discussion, the research postulates the following hypothesis:

$H_{1.1}$: *Privacy constraints have a significant effect on project management information systems.*

Information systems of the organizations are armed with security-consciousness among the managers in these organizations. They have a responsibility to advise the senior management about the different possible forms of the risk that may face their project information systems. This issue requires the managers to perform an evaluation of the systems vulnerability and risks analysis methods (Bélanger & Crossler, 2011). However, a lack of reliable data with security threats develops a view with an axis of these threats. It also develops some schemes for a probabilistic assessment of the effect on the security vulnerability and the proposed risks (Carew & Stapleton, 2005). The information management system among the projects consists of various-step approaches. The key goal is to evaluate the expected risks or damages resulting from the attacks, and handling these attacks (Mohanta et al., 2019). The data about people and companies before computer automation was maintained and secured in a form of paper record and dispersed to the separate organization units. Project information systems in particular focus the data in the files which can be accessed by large numbers of individuals and groups. Current modern technologies while dealing with the large amounts of data store the data within electronic forms which may be vulnerable to some attacks or threats when they are sorted in a manual form (Feng et al., 2019). Through the revolution of the communications networks and information systems, the interconnection has become more easy, and potential unauthorized accesses can happen. This calls for projects to develop management information systems through integration of modern technology like blockchain to reduce this phenomenon. The question that triggers why the security systems are vulnerable illustrates the most common vulnerabilities against the contemporary project information systems (Shi et al., 2020). And this stems from the diverse factors like technical and organizational that are compounded by poor information management system decisions. Based on the above discussion, the research postulates the following hypothesis:

$H_{1.2}$: *Security vulnerability has a significant effect on project management information systems.*

Blockchain applications through the research collaboration with research initiatives reported early in this era about the blockchain transformation of the organization and projects practices. The practices identified some areas where the blockchain-based application and platforms support the practices and efforts of the project management information that include create and manage the digital records and exchange the digital assets (Feng et al., 2014). Furthermore, these applications can also verify and reinforce the desirable performance and can build a reputation system and execute smart contracts. The digital specialist at blockchain pointed out "The most benefits of blockchain application are the ability of maintaining immutable records for the events by using an approach of distributed ledger technologies (Pouransafar et al., 2013). In the future of project management workflow, the project team may rely on this technology for some crucial functions, like maintaining the unalterable sources of the truth. Blockchain applications with an association with the information management systems can connect with some differing applications. Far beyond crypto-currency, the blockchain application enables the payments to complete without bank accounts or intermediary (Warkentin & Willison, 2009). The blockchain applications can be used in the different financial projects and services like remittance, and online payment. Moreover, this application still faces sets of technical issues and challenges. They also can be seen as open messaging systems that are verified by keys with digital created aspects (Mohanta et al., 2020). An issue of the security of the entire blockchain depends generally on the secure generations, usage, and storage of the digital aspects and keys. And realizing the fundamental security threats and risks in the blockchain application, importantly to understand the variations in the blockchain applications. Based on the above discussion, the research postulates the following hypothesis:

$H_{1.3}$: *Blockchain applications have a significant effect on project management information systems.*

Mukri (2018) indicated many different value chains that significantly needed to embed the blockchain technologies in the current systems in order to create an agile value chain with a close customer relation. In the same setting, Tse et al. (2017) stated similar views that the value chain of the blockchain technology applications in the agri-food for example have typical choices that contribute to fulfilling the supervision requirement and adaptation in the food markets. More particularly, Kumar and Mallick (2018) construed that the value perceived from the blockchain technology come from the wide applications in the value chain like food delivery and shipping, ordering food online transactions, and quality assurance. In order to integrate the blockchain technology in the existing business systems for value chain, some studies have tried to address this issue from different perspectives. Tian (2016) indicated the value of the chain systems based on the blockchain technology can help markets to improve the safety and quality of the products during the logistics operations. The creation value as an aim of the organization focuses on sustainable outcomes with value for stakeholders. Therefore, the blockchain technology is used to guarantee the shared and published data in a traceability reliable system (Chen et al., 2021). However, the literature argued that blockchain technology based on this system has a defect in terms of solving a counterfeit issue. Overcoming the drawbacks also triggered the study of Boehm et al. (2017) which proposed an updated system by using blockchain technology in

accordance with an approach to verify the users. Based on the above discussion, the research postulates the following hypothesis:

H_2: *Value creation mediates the effect of blockchain technology adoption on project management information systems.*

3. Method

The current research concerns using a quantitative research approach to meet the research objectives. Since the key aim of this study is to study the digital adoption of blockchain technology in the project management information systems with a mediation model of value creation, the study is interested to explore the sample perspectives of this topic. Accordingly, the included discussions and literature provided this study with some evidence and supported theoretically the research assumptions which result in proposing a conceptual model as illustrated in Fig. 1, which illustrates sets of the hypothesized paths. The model shows that the independent construct (blockchain technology adoption) which is assumed has a significant effect on the dependent variable (project management information system). Moreover, value creation is formulated to significantly moderate the blockchain technology adoption on project management information systems. The research sample targeted Jordanian e-commerce enterprises which take a variety of approaches to innovate the e-commerce industry in the kingdom. As the emerging benefits and outcomes of the function of blockchain technology adoption over all businesses and the concern to present more effectiveness and transactions to continue a sustainable relationship with the key customers. The study concerns using a convenience sampling method to collect data due to the easy reach out the target sample.

An instrument of research, the current study used a survey questionnaire to collect the data from the study population, and the researcher depends on the previous studies and literature to prepare this instrument and it was validated from professionals in this field. The frame time of collecting data was extended several weeks. A total of 320 responses were considered for final analysis. The measurements of the blockchain technology adoption were measured using three dimensions namely: privacy constraints, security vulnerability and blockchain applications. The measurements were ranked by using a five-point Likert scale (1 = strongly disagree to 5 = strongly agree). Further, the research has used an approach of Partial Least Squares Structural Equation Modeling (PLS-SEM) by SmartPLS3 program to conduct the key statistical analyses.

This approach provides sets of advantages which enable the researcher to analyze many different variables at once through a complicated framework within sub-constructs. It also presents some of the important validity and reliability tests needed to test this issue (Hair et al., 2019). However, the study provided two types of models namely measurement model and structural model, the measurement model used to validate the model and test the reliability through some validities called convergent and discriminant, and the structural model used to test the hypothesized research model (Hair et al., 2019).

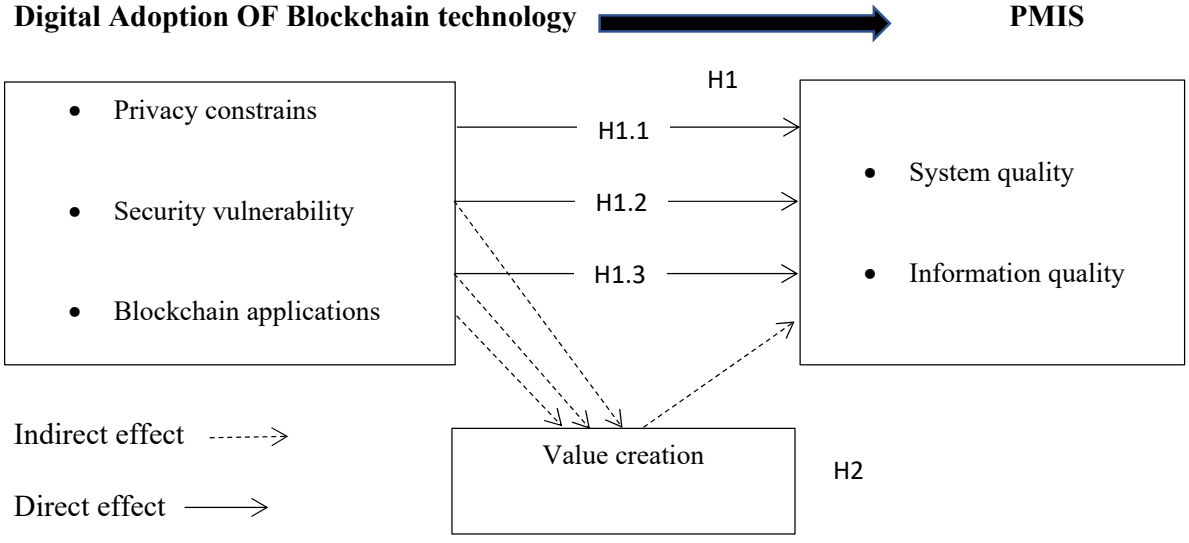

Fig. 1. Research Conceptual Model

4. Results

Through using the approach of Partial Least Squares (PLS-SEM), the study results have been given by this method which is widely suggested and recommended in the most empirical studies. The study further has suggested these analyses due to the ability to provide further analyses with a good view about the data analysis, procedures and measurements validation (Sarstedt et al., 2016). Further, this study has selected this method to examine also the moderation role of value creation which can be tested in this analysis to support the hypothesized model. Conducting analysis using the PLS-SEM in this research also enables good handling of the complicated issues linked with the procedures of analyzing the conceptual framework (Hair et al., 2017).

In general, this method has two types of models that are used in this analysis namely measurement and structural model which are presented in the next sections.

4.1 Measurement model assessment

The procedures of evaluation of the model measurement generally require examining the main requirements that link to the indicators validation for the measurements to ensure their ability to measure the variables. Hair et al. (2017) indicated some key tests of this assessment include factor loadings for the indicators and checking their reliability by using a calculation by a common approach largely used in this analysis called Average Variance Extracted AVE, Composite Reliability CR as well Cronbach's Alpha. This analysis also enables the research to provide some process that generally addresses and checks to know indicator's reliability (Afthanorhan et al., 2020). The study ran and conducted this test and checked the reliability issues using the outputs of the PLS-SEM. Table 1 provided these outputs that mostly achieved a satisfactory level and exceeded the minimum cut-offs. For example, the convergent validity is calculated by both AVE and CR and the findings showed great outputs of the measurement model. The results also indicated acceptable ranges of >0.50 and >0.60 respectively of the convergent validity (Fornell & Larcker, 1981). However, the findings of the measurement model for the current research also supported all proposed assumptions and confirmed the constructs' reliability and validity. The first initial run of the measurement model indicated no poor lower factor loadings indicators, so all research indicators met good factor loadings (>0.70).

Table 1
Descriptive Statistics, Validity, & Reliability

Constructs	Items	Mean	SD	FL	VIF	CR	Alpha	AVE
Privacy constrains	Q1	3.92	1.13	0.83	2.32			
	Q2	3.82	1.10	0.84	1.80			
	Q3	3.81	1.15	0.88	1.93	0.81	0.89	0.73
Security vulnerability	Q4	3.94	1.12	0.87	1.99			
	Q5	3.83	1.22	0.81	1.21			
	Q6	4.08	1.03	0.86	1.36	0.81	0.88	0.72
Blockchain applications	Q7	4.00	1.03	0.86	1.19			
	Q8	3.91	1.11	0.83	2.04			
	Q9	3.86	1.13	0.83	2.12	0.79	0.88	0.71
System quality	Q10	3.91	1.15	0.81	2.06			
	Q11	3.81	1.17	0.85	2.37			
	Q12	3.78	1.16	0.85	2.10	0.85	0.90	0.70
	Q13	3.83	1.11	0.82	2.37			
Information quality	Q14	3.90	1.07	0.85	2.59			
	Q15	3.87	1.15	0.84	2.80			
	Q16	3.89	1.15	0.85	2.55	0.87	0.91	0.71
	Q17	3.80	1.16	0.83	2.80			
PMIS use	Q18	3.89	1.13	0.89	3.04			
	Q19	3.90	1.11	0.87	2.64			
	Q20	3.77	1.17	0.87	3.04	0.89	0.92	0.75
	Q21	3.88	1.23	0.82	1.87			
Value creation	Q22	3.82	1.23	0.84	1.87			
	Q23	3.76	1.16	0.85	1.87	0.83	0.90	0.75
	Q24	3.82	1.09	0.90	1.87			

FL: Factor loading; SD: Standard deviation; VIF: Variance inflation factor

The research work has also been checked with using different types of validity such as discriminant validity which used to assess the issues linked to the interrelationship between the respective study variables. Henseler et al. (2015) suggested that a procedure used in this procedure to check this validity using an approach of cross-loadings. The study provided the required analysis and outputs such as Fornell-Larcker and Heterotrait-Monotrait (HTMT) which generally indicate the variable correlations as given in Table 2 and Table 3. The results were calculated using the square root the AVE and they illustrated in the bold diagonal cells and indicated no problematic issue of the constructs' correlations (Fornell & Larcker, 1981). Thus, the measurement model confirmed good results associated with the discriminant validity, further this research study also involved another required analysis used to evaluate the discriminant validity through the approach of HTMT. The results were given in Table 3 and found that the HTMT met a good threshold of (≤ 0.90) therefore, this fulfills the analysis of discriminant validity of HTMT ≤ 0.90 (Kline, 2015), with satisfactory indications of this analysis for all research variables.

Table 2
Fornell-Larcker Criterion

	Variables	1	2	3	4	5	6	7
1	PMIS use	**0.868**						
2	Blockchain applications	0.744	**0.844**					
3	Information quality	0.855	0.794	**0.828**				
4	Privacy constrains	0.746	0.765	0.923	**0.857**			
5	Security vulnerability	0.757	0.809	0.939	0.804	**0.853**		
6	System quality	0.881	0.795	0.849	0.779	0.790	**0.839**	
7	Value creation	0.802	0.786	0.810	0.758	0.713	0.814	**0.867**

Table 3
Heterotrait-Monotrait (HTMT) Ratio

	Variables	1	2	3	4	5	6	7
1	PMIS use	0.844						
2	Blockchain applications	0.753	0.743					
3	Information quality	0.735	0.534	0.836				
4	Privacy constrains	0.646	0.346	0.357	0.846			
5	Security vulnerability	0.604	0.863	0.657	0.684	0.863		
6	System quality	0.723	0.776	0.756	0.468	0.685	0.656	
7	Value creation	0.364	0.567	0.684	0.658	0.736	0.764	0.803

4.2 Structural model assessment

The next step of the analysis using PLS-SEM is testing the structural model after evaluating the measurement model. The procedure of the structural model is generally suggested over many scholarly research works to test the research hypotheses. Hair et al (2017) indicated some important critical analysis processes that are important to evaluate the research model goodness. This study depends on the main results used in this analysis to provide a clear review of this analysis which include path estimates, corresponding t-value and p-value that are involved in the study to represent the structural model analysis using an approach called bootstrapping as shown in Figure 1. The given direct effects findings in Table 4 found that the most of blockchain technology adoption (privacy constraints, security vulnerability, blockchain applications) had a significant influence on project management information systems ($p < 0.05$), so the research results supported all research hypotheses. On other hand, the results of the moderation effect of value creation on the influence of blockchain technology adoption on the project management information systems revealed a significant role as a moderator, so H2 was also supported ($p < 0.05$).

Table 4
Hypotheses Testing

	Hypotheses	Beta	T-value	P-value	Result
H_1	Blockchain technology adoption → project management information systems	0.861	3.218	0.000	Supported
$H_{1.1}$	Privacy constrains → project management information systems	0.272	5.019	0.000	Supported
$H_{1.2}$	Security vulnerability → project management information systems	0.292	4.989	0.000	Supported
$H_{1.3}$	Blockchain applications → project management information systems	0.364	5.553	0.000	Supported
H_2	Blockchain technology adoption → value creation → project management information systems	0.066	2.027	0.043	Supported
	R^2 for project management information systems		0.741		
	Q^2 for project management information systems		0.489		

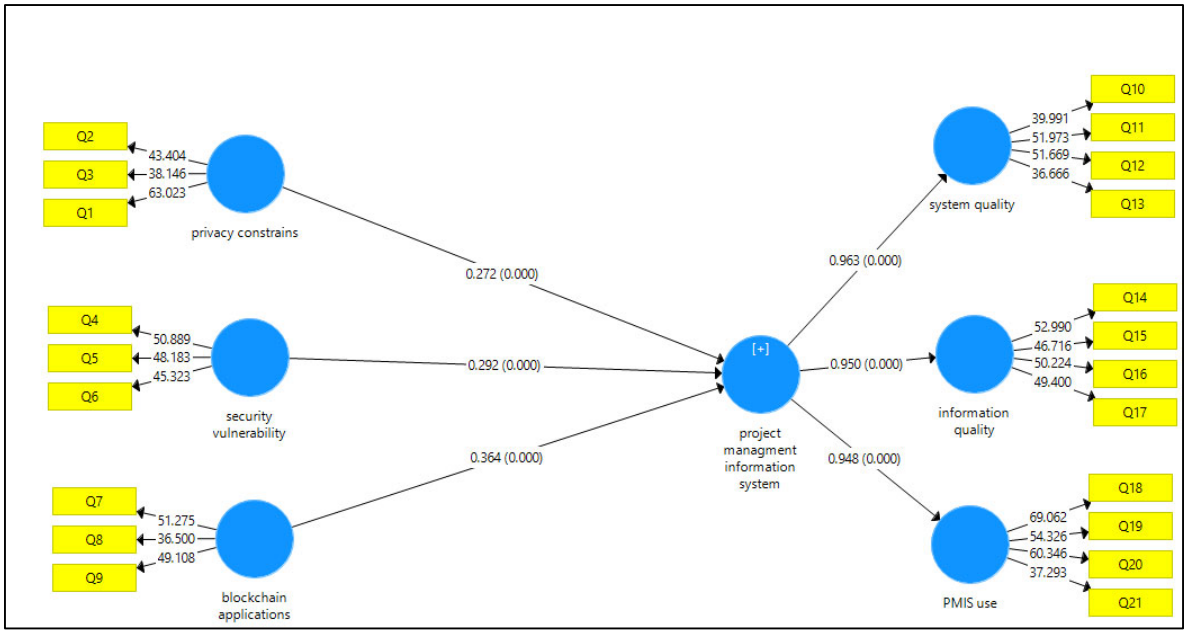

Fig. 2. Structural Research Model

Hair et al. (2017) stated another critical important test should be also conducted in the study that is linked with the amount of variance explained at the dependent called coefficient of determination which symbol (R^2) and the cross-validated redundancy (Q^2) that significantly performed and checked which indicate the quality of model of prediction. The results of the structural model explained 74.1% of the variance in the project management information systems. Because the results had ranged from 0 to 1, the structural model data also confirmed a good explanatory power (Shmueli et al., 2019). To confirm the model goodness of the predictability, the current research examined the predictive value of Q^2 of the dependent (endogenous) construct which should be more than zero to assert this analysis, the results of this test as given in Table 4 supported this analysis with a level with more than zero.

5. Discussion

The current research concerns addressing the effects of the blockchain technology adoption related factors with project management information systems in the commerce enterprises in Jordan. And the findings found significant positive effects for all these factors. The study also revealed the important role of the adoption of this technology to develop the practices of management information systems among the projects. However, the study findings confirmed the assumptions regarding the growing concern with the advanced technology and integration of this method into the key business operations for development and business outcomes. However, the increasing privacy issues of blockchain technology call the businesses to consider this aspect and focus on the nature of technology applications while integrating this technology among their main operations. Customers' demands also encourage today's business to go beyond with the changes in the technological developments and pursue to meet these needs. The findings also indicated the important aspects of the management information systems such as information and systems quality which lead to solid and reliable management information systems in the projects. The research results supported the potential useful applications of the blockchain technology to ensure the data integrity that is being transmitted over the data networks.

The research conceptual model is divided into several aspects that touch upon different factors of the relationship between blockchain technology adoption and project management information systems. The aspect of blockchain technology adoption considering the possible effect on the management information systems of the project is addressed and explored. The goal of reducing full reliance on a third party, thereby increasing the security aspect of the information and systems that interacted through the blockchain-driven applications that are expanded among the current projects. The study would infer the efforts performed by the blockchain technology research works and the relevant literature explored the hidden aspect of this subject to discuss and improve the efficiency and ability of the blockchain technology. Further discussion involved in this study traces back to focus more on the issues pertaining to faults compatibility aspect and explore the ways to broaden the adoption of blockchain technologies to run the key activities with more accessible to the customers. The issues discussed in this work regarding the blockchain technology adoption had some issues also pertaining to the computation applications and power throughout the companies component devices. Also the modern solutions toward cloud computing for example address similar issues that are incapable of addressing the growing needs of the business.

Based on the results, it would state that the complete potential outcomes through adoption of blockchain technology has not yet been explored and discussed. Though some diverse applications of this technology have been researched, plenty of research opportunities for development should be conducted for comprehensive overview. The results stand with the existing literature (e.g Wang et al., 2022) that addressed the value created among the blockchain-driven in the supply chains in the finance industry. Furthermore, this provides some expectations about the beneficial tools of blockchain technology adoption that has become a commonly and available tool and it would allow easy implementation of business technology. As well as the current study consistent with the research trend about creating open sources of the blockchain technology for common usage to enable the businesses to incorporate this technology. In this regard, the adoption of blockchain technology has become harnessed and more widely, doing the transaction confidence and understanding this technology should be improved and expanded to lead self-maintaining cycle of the projects growth and movement forwards for blockchain-driven technology and applications (Sonmez et al., 2021). Conducting the blockchain adoption into a project-level information system in this aspect also helps define fully both of strengths and weaknesses to project parties.

Other findings of this study pertain to the issues of validation information/system quality of the transactions, as well the blockchain implications of adopting the blockchain within different tasks. The growing concern works toward the improvement of blockchain usage and appeal over the projects by making blockchain technology that help the project managers to decide and monitor the reality of the business or project (Khalfan et al., 2022). On the other hand, the value creation of adopting blockchain technology linked with the tremendous changes in digital transformation in different industries (e.g supply chain management) (Blossey et al., 2019). The findings demonstrated that digital technology currently alone can't meet the business requirement and needs of the different stakeholders who are involved in the enterprises operations. To support the vital significance of the digital adoption of the technology, the research trends and new thoughts are addressed and introduced. For instance, business to business B2B integration requires secure information exchanges between the different parties using the internet. And establishing a secure end communication, the services can be reduced through adopting the blockchain technology. Korpela et al (2017) for example focused on the issue of digital technology adoption and integration in the sector of supply chain to improve the transactions security which occurs between the different parties. In particular, blockchain technology is mainly used among the enterprises in order to offer cost-effective, fast and secure transactions.

6. Conclusion

The study discussed the importance of blockchain technology adoption among the Jordanian e-commerce enterprises. The results found an expected positive significant effect of this adoption through the identified stated factors in the respective conceptual framework of this research. The study provided some implication in practice and theory would support the scholarly debates in this topic. Theoretically, the findings stand in line with the technology acceptance model TAM which contains business intelligence and addresses the effects of the significant beliefs such as perceived ease of use and perceived usefulness, with consideration the users' attitudes toward the system. Practically perspectives, the results also provided a further better investigation of the blockchain technology adoption and the digitalization processes for the enterprises. The practitioners can benefit from the results of this study and give more attention to the best practices and factors in accordance with the effective adoption of blockchain technology. In addition, the project managers can broaden their knowledge about their management information systems to establish systems with quality information and application lead to achieve the business goals.

Although the growing awareness of blockchain technology, the business practices could benefit from this work research findings by understanding a future development of this technology. Blockchain also can ensure enormous gains of organizational efficiency, particularly in terms of streamline the key processes. The results linked the scalability of the blockchain to creating a new business model with driven opportunities interconnected with creating the conditions for the blockchain ecosystem. Thus, the blockchain can also create a value for the business model, and more particularly when it is embedded within an ecosystem. The study concluded the project managers have to consider the blockchain technology and non-human strong causes and. An important result for commerce enterprise practice is that off-chain solutions can become standard in the future which result in the blockchain types and perspectives that may no longer matter. The blockchains in the future enterprises development and activities are expected to be an interest for the organizations' settings. Besides enabling the entire business models, the adoption of blockchain would ensure decentralization of the value of the internet, hence replacing the current management information systems. And the organizations seriously consider the prospects of adopting blockchain as a storage possibility and a central database.

The study limitations linked with its nature as a forecasting work that has future uncertainty of professionals' developments with a subjective judgment involved in the information/data quality and applications. Over time using the developed business methods and tools, which cater to short-term prediction and quantitative empirical research that monitor the developments occurring by the blockchain technology among the business and markets, could improve the results of this study. Blockchain adoption into different industries and evidence of a business model transformation it makes, generally in the business in which privacy and trust issues prevail, and provide interesting research future avenues. This study in particular emphasized the intents and implications of digitalizing the blockchain technology. Most likely the project management information systems foresee the blockchain to communicate with other digital technology for better understanding of outcomes interdependency that emerges as a future research avenue. The study analysis used revealed various fields in which the practitioners and scholars have commonly divergent the expectations. Despite this not unexpected outcome of management information systems

studies, it revealed the future research avenues that can explore and reduce the uncertainties associated with the beneficial outcomes that may be caused by adoption of blockchain technology.

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