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An Empirical Study of the Effect of FinTech Infrastructure on Competitive Advantage and Performance

Ehsan A. S. Al-qararah
Faculty of Business and Management Science, Universiti Sultan Zainal Abidin, 21300 Kuala Nerus, Terengganu, Malaysia

ehsanaliqararah@gmail.com

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Abstract

The information management community typically manages FinTech infrastructure capabilities through networking systems, shared technical platforms, and databases, which primarily offer a shared IT capability base for the development of business applications. This study intends to investigate the impact of Fintech infrastructure on organizational performance and competitive advantage in the Jordanian banking sector from 2016 to 2021. To gain an advantage over competitors and improve performance, banks can use their own FinTech infrastructure capabilities. The study also advances knowledge by showing how, in the context of the firm's resource-based view (RBV) theory, FinTech infrastructure capabilities as a resource could lead to competitive advantage. In order to accomplish the study's goal, data from 16 Jordanian banks were gathered quantitatively using a questionnaire; the intended audience consisted of 853 managers of Jordanian banks. The empirical findings demonstrated that FinTech infrastructure capabilities have a favorable impact on the competitive advantage and performance by giving the bank reliable immediate knowledge support to address changing difficulties in the financial markets. Furthermore, the study advances knowledge by illuminating how, in the context of the resource-based view (RBV) Approach of an organization, FinTech infrastructural capabilities might generate competitive advantage. In order to collect data from 16 Jordanian banks—whose managers make up the targeted population—a quantitative technique using a questionnaire was used to fulfill the study's objectives. The empirical findings demonstrated that FinTech infrastructure capabilities have a positive effect on the bank's performance and competitive advantage by giving it reliable and prompt knowledge support to address changing financial industry concerns.

1. Introduction

An emerging technological concept known as "FinTech," or "financial technology," is where the finance industry begins to use technology to enhance the capabilities of the current financial services models. It has been assumed that investing in FinTech infrastructure capabilities is necessary to provide competitive advantage through the implementation of business strategies (Havakhor et al., 2019) in order to create a successful business that uses high-quality information systems to process all data and statistics (Mithas & Rust, 2016). The amount of finances invested in physical assets is increasing which are being transformed by digital technologies in various fields (Al-Sharafi et al., 2023), and this trend has led to numerous technological advancements involving big data (Yin and Gai, 2015), trust management (Abawajy et al., 2016), cloud computing (Al-Sharafi et al., 2023; Gai et al., 2018), mobile embedded systems (Gai et al., 2017a), mobile networks (Gai et al., 2016a), and data analytics (Lee and Kim, 2015). Currently, there is no consensus definition of "FinTech." The following section provides a quick overview of how it is used in recognized academic literature. A definition is developed through a basic overview of the traits of FinTechs and a review of the numerous industries that make up the FinTech market. The foundation for applications that enable the automation of cross-functional business operations, FinTech infrastructure capabilities directly support the core of a firm's entire financial activities (Gai et al., 2016a). Here, the focus is on enhancing competitive advantage through the use of FinTech infrastructure capabilities in synergy by marketing new financial services with minimal cost increases or enhancing financial transactions and all services overall (Weibl & Hess, 2020).

In contrast to the traditional value-adding areas of a universal bank, a loose collection of businesses performing other functions, FinTechs can be distinguished on the basis of their presence in finance, wealth management, and payments, as well as other FinTechs (Gai et al., 2018). Prior research on FinTech infrastructure capabilities has tended to be more concerned with how it may bring value to financial institutions by managing their infrastructure and enhancing their competitiveness. However, just a few studies have examined problems with the new financial, asset management, payment, and other FinTechs incorporated in databases and information systems. There are also few studies examining how businesses might use the capabilities of the FinTech infrastructure to manage their business objectives (Marinagi et al., 2014; Makhloufi et al., 2018). This study focuses on how to make decisions regarding the deployment of FinTech infrastructure capabilities in response to changes in business practices and technical advancement. Using FinTech infrastructure capabilities strategically is a major problem for decision-makers. Therefore, according to Luftman et al. (2013), the purpose of the FinTech infrastructure capabilities is to represent a strategic capability in the hands of companies to address issues by using it as a tool to provide information for strategic planning. Information systems are also seen as a competitive advantage for organizational continuity and survival due to their ability to overcome challenges and achieve business goals (Martinez-Simarro et al., 2015). On whether FinTech infrastructure capabilities give firms an advantage and boost performance, researchers are still split. This study aims to fill this information gap by looking into how performance and competitive advantage are impacted by FinTech infrastructure capabilities. This study was designed to answer the research question "Whether FinTech infrastructure capabilities have contributed to the competitive advantage and organizational performance?" This study attempts to address this issue for Jordan's banking sector, which is one of the developing countries in the Middle East.

2. LITERATURE REVIEW

An area of FinTech that provides funding to both private individuals and businesses is involved in the finance sector. This category can be further divided into FinTechs that offer factoring or credit services without the participation of those who contribute (the credit and factoring sub-segment) and those whose transactions are focused on a large number of contributors (the sub-segment of crowdfunding). Crowdfunding is a term used to describe a sort of funding in which many different parties (commonly referred to as "backers") contribute money to achieve a single goal. In place of a conventional bank, a crowdfunding website acts as a middleman (Belleflamme et al., 2014; Klohn and Hornuf, 2012). Crowdfunding portals can be further divided into four sub-segments based on the type of consideration given to investors for their investments. Despite the fact that people may experience indirect personal benefits from their donations in donation-based crowdfunding (Andreoni, 1989), investors who take part in reward-based crowdfunding do receive some type of non-monetary recompense. Such compensation could come in the form of the ability to pre-order a good or another type of prestige, such having the donor's name appear in the sponsored movie's credits (Bradford, 2012). In the subsegments of reward-based and donation-based crowdfunding, there are typically no costs associated with creating a business. Some portals impose a fee that ranges from 5 to 11 percent of the entire amount of money in the case of a successful campaign (Dorfleitner, Hornuf, Schmitt & Weber, 2017). Other portals obtain funding from contributors' and project creators' voluntary contributions.

In the third subsegment, crowd investment, the investors obtain a portion of the equity, debt, or hybrid ownership. The contracts employed in crowd investing also imitate some facets of equity ownership using a mezzanine tool (Klohn et al., 2016a). The payments that crowd-investing websites receive from successfully backed firms are often profitable. According to Hornuf and Schwienbacher (2014), the average percentage of the amount funded for this charge is 8%. By requesting investors to withhold a specific percentage of a venture's anticipated profits, enterprise value, and exit proceeds (carried interest), crowd investing portals have lately begun to profit from the future success of drove firms (Klohn et al., 2016a).

In general, portals only handle a small number of campaigns for crowd funding. According to Klohn et al. (2016b), by mid-2015, funds totaling more than EUR 1 million had been raised across just five of the 174 crowd-investment projects that had been conducted in Germany up to that point. However, these five successful initiatives account for 29% of the total amount of support from successful campaigns. The fourth subsegment of lending involves platforms that let people and companies borrow money from the general public. In return for making the loan available, the borrowers receive an interest rate that has been predetermined (Bradford, 2012). There are two ways to pay the market leaders in the crowdlending sector. On the one hand, fees for borrowers are based on both their creditworthiness and the loan's term. On the other side, lenders are compelled to pay a predetermined sum, typically 1% of the invested amount or 1% of the interest rate.

The part on credit and factoring is another one. In this category, FinTech companies often work with a partner bank (or alternatively, a number of partner banks) to provide credit to private persons and enterprises without involving the audience. Loans are frequently given out over the course of a few days or weeks by cell phone. Additionally, these FinTechs offer cutting-edge factoring options, such selling claims online without a minimum threshold or offering factoring services. Companies in the credit and factoring sub-segment typically automate many of their procedures, enabling affordable, prompt, and dependable services. The asset management segment includes FinTechs that offer guidance, disposal, asset management, and aggregated personal wealth indicators. There are further sub-sections inside this section as well. According to Liu et al. (2014) and Pentland (2013), social trading is a sort of investing where investors (or "followers") can view, discuss, and copy the investment strategies or portfolios of other social network users. The collective knowledge of a large number of traders is anticipated to be advantageous to individual investors. Depending on the social trading network's business strategy, users may be compensated in the form of spreads, order prices, or percentages of the total amount spent. In addition, innovative technology approaches and computer systems greatly benefit from the business models of many FinTechs in the asset management industry.

The robo-advice subsegment describes portfolio management systems that offer algorithm-based, primarily automated financial advice, and even making investment decisions (ESA, 2015). The algorithms used by robo advisers are typically built using diversification and passive investment methods (Sironi, 2016). They take into account the investor's risk tolerance, the ideal duration of the investment, and other goals (Fein, 2015). Additionally, the German Federal Financial Supervisory Authority (BaFin 2016a, b) makes a distinction between "automated investment advice" and "automated financial portfolio management," which is defined by continuous recommendations and in which a one-time investment suggestion is made.

In light of the discussion of the aforementioned empirical evidence, it is clear that more research is needed to fully understand the impact of FinTech infrastructure capabilities on competitive advantage and performance.

Regarding how these variables interact, we provide the following hypotheses:

H1: FinTech infrastructure capabilities have a positive impact on competitive advantage in the Jordanian banking sector.

H2: FinTech infrastructure capabilities have a positive impact on performance in the Jordanian banking sector.

3. METHODOLOGY

Based on the exploratory deductive method, a quantitative approach to data analysis was chosen (Leedy & Ormrod, 2005). The developed questionnaire instrument was operationalized in accordance with previous studies in this sector that made use of 5-likert scores in order to find solutions to the research issue. The study's objective was to apply current concepts to find viable solutions for a particular business issue in a fresh environment (Neuman, 2003). Approximately 853 managers from all Jordanian banks made up the target group for the analysis. Based on their opinions of the study's topic, 270 respondents were randomly chosen to form a representative sample for the purpose of gathering the needed data (Ryan, 2013). Members of the business management of the aforementioned banks who were targeted for this study were asked to rank their organization on FinTech infrastructure capabilities and competitive advantage strategies. Sethi and King (1994) used the term CAPITA (Competitive Advantage Provided by an Information System Application) to assess how much a firm's overall IT skills contribute to its competitive advantage. A measure of "the contribution of IT to the competitive advantage" was then created using this instrument after it had been adjusted and changed. The measures used by CAPITA include cost effectiveness, functionality, and innovativeness. The cost efficiency dimension is connected to the extent to which IT capabilities enable a business to provide services/products at the lowest cost as compared to competitors' services/products. The ability of IT to carry out activities and operations, whether they are directed at internal or external organizations, is referred to as the functionality dimension. The final dimension, innovation, shows how IT helps businesses adopt creative behavior. All of the constructs employed in the present study are included in Table 1 along with the instruments used for measurement for each one.

For data analysis and hypothesis testing, this study employed the Structured Equation Modelling (SEM) and Partial Least Squares (PLS) methodologies. It is demonstrated that PLS is the statistical method that best fits the situation. The accuracy of the appropriate statistical conclusions has been confirmed by the completion of a number of statistical analysis procedures.

Construct	**Adopted from**	**Items**
FinTech infrastructure capabilities	Bharadwaj (2000)	Sufficient degree of integration of information technology infrastructure
		Sufficient organization databases
		Sufficient computer & communication technologies
		Extend IT infrastructure to improve of products innovationally and continuously
		Organization platform to launch related-business applications
		Sufficient degree of integration of information technology infrastructure
		Sufficient organization databases
Performance	(Powell & Dent-Micallef 1997)	Profitability
	(Capon et al., 1992)	Market-based performance
Competitive advantage	Sethi and King (1994)	effectiveness, functionality, and innovativeness

Table 1. The constructs measurement.

4. Results

The developed hypotheses are tested using PLS-SEM. The measurement and structural model are evaluated during the statistical analysis.

4.1 Measurement Model Assessment

The measurement validation is presented using internal consistency reliability, convergent validity, and discriminant validity analysis as recommended by (Hair et al., 2016, Ramayah et al., 2018). Internal consistency reliability was assessed using Cronbach's alpha and Composite Reliability metrics. The measured Cronbach's alpha values for each construct are shown in Table 2 as a consequence. These results, which range from 0.938 to 0.943 for each of the constructs and from 0.945 to 0.951 for composite reliability, are all higher than the 0.7 criterion value recommended by (Hair et al., 2016, Ramayah et al., 2018).

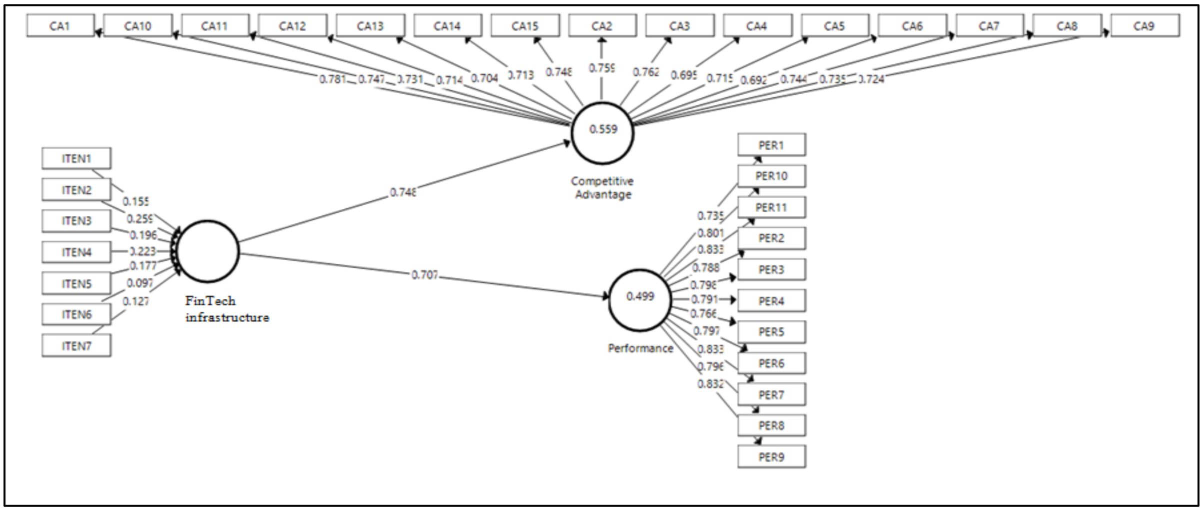

Figure 1. Measurement model assessment.

Convergent validity is calculated using the Average Variance Extracted (AVE), which is shown in Table 3 for all constructs. According to the suggestions provided by Hair et al. (2016) and Ramayah et al. (2018), the loading results for each dependent construct's items should be more than the 0.70 threshold. All constructs have adequate reliability and convergent validity values, as shown in Table 3. All the components should also have factor loadings that are greater than or equal to 0.708, with the exception of CA4 and CA6, which had factor loadings of 0.695 and 0.692, respectively, and were removed. To verify the convergent validity of each concept proposed by (Hair et al., 2016, Ramayah et al., 2018), the AVE value should be larger than 0.5.

Construct	Item	Factor Loading	CA	CR	AVE
Competitive Advantage	CA1	0.781	0.938	0.945	0.535
	CA10	0.747			
	CA11	0.731			
	CA12	0.714			
	CA13	0.704			
	CA14	0.713			
	CA15	0.748			
	CA2	0.759			
	CA3	0.762			
	CA5	0.715			
	CA7	0.744			
	CA9	0.724			
	CA8	0.735			
Performance	PER1	0.735	0.943	0.951	0.637
	PER10	0.801			
	PER11	0.833			
	PER2	0.788			
	PER3	0.798			
	PER4	0.791			
	PER5	0.766			
	PER6	0.797			
	PER7	0.833			
	PER8	0.796			
	PER9	0.832			

Table 2. Results of measurement model.

The scientists' recommended Fornell and Larcker criteria were then used to evaluate the discriminant validity (Fornell and Larcker, 1981). The Fornell-Larcker criterion is frequently employed to assess discriminant validity in PLS-SEM statistical research (Hair et al., 2016, Ramayah et al., 2018). In order to attain appropriate discriminant validity, the AVE square root values in the structural model should be larger than the other construct correlation values (Fornell and Larcker, 1981). According to Table 3, the AVE square root for each construct is greater than the diagonal elements.

Construct	Competitive Advantage	Performance
Competitive Advantage	0.721	
Performance	0.836	0.788

Table 3. Fornell-Larker Criterion.

Low multicollinearity is defined as a VIF (Variance Inflation Factor) value less than 3.3, which ensures that multicollinearity does not exist. VIF readings were found to be below the indicated cutoff limit of 5 based on the findings in Table 4 (Hair Jr et al., 2013, 2016). The t values must be higher than 1.64 to establish significant outer weights at 5% significance levels. The outer weights of the formative measurement model are significantly different from zero, and the t-value is used to assess the importance of each indicator weight. Analysis of all formative indicators is still possible.

Construct	Item	Outer Weights	t-values	VIF
FinTech infrastructure capabilities	FTECH1	0.154	1.561	3.540
	FTECH2	0.258	3.425	2.435
	FTECH3	0.195	2.216	3.055
	FTECH4	0.222	2.701	2.425
	FTECH5	0.176	2.394	2.323
	FTECH6	0.096	1.201	1.970
	FTECH7	0.126	1.659	1.935

Table 4. Construct assessment.

4.2 Structural Model Assessment

The bootstrapping technique is used in statistical analysis using 5,000 resamples to evaluate the developed model of this study. The path coefficients, p-value, and t-value should be used as indicators, with the values ranging between 0.05 and 1.96. All path coefficients are significant, according to Hair et al. (2016), and have p-values less than 0.000 and t-values greater than 1.96; see Table 5. The relationship between FinTech infrastructure capabilities and competitive advantage and performance is illustrated in Figure 2.

Hypotheses	Relationship	Coefficient	t-value	P-value	Results
H1	FinTech infrastructure capabilities -> Competitive Advantage	0.748	22.746	0.000	Supported
H2	FinTech infrastructure capabilities -> Performance	0.707	21.570	0.000	Supported

Table 5. Path Coefficients and hypotheses testing.

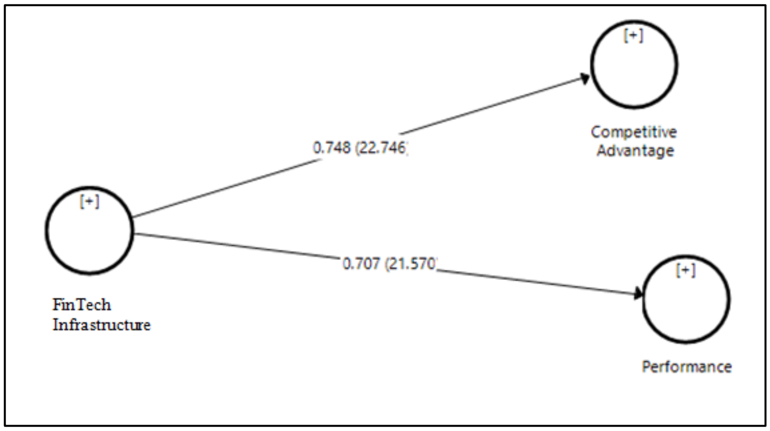

Figure 2. Path Coefficients.

5. Discussion

The study's findings confirmed as an indirectly of Bharadwaj's (2000) assertion that Fintech infrastructure capabilities could be developed into a significant component of IT capabilities. These capabilities can enhance firm performance by promoting and utilizing the firm's resources and capabilities by using tangible and physical assets effectively as resources to create competitive advantage. This grounded base described by resource-based view (RBV) theory (Wernerfelt 1984; Barney 1991; Grant 1991).

According to numerous researchers, physical IT infrastructure is a crucial component of the IT skills that businesses employ to succeed (Broadbent and Weill, 1997; Bharadwaj, 2000). More specifically, Sethi and King (1994) discovered that superior physical IT component combinations could facilitate innovation and continuous improvement; whereas Byrd, Lewis, and Turner (2004) proposed supporting business process integration and automation by using flexible and sufficient business applications and IT infrastructure platforms, which in turn increase the functionality over the competitors do.

6. Conclusion

In light of the RBV, it is crucial to comprehend how the development of a competitive advantage plays a crucial role in organizational practices. The current study was created to be more evaluation-specific for asset tangibles because, in the best-case scenario, tangibles are not accounted for and the pertinent expenses are seen as a cost rather than an investment.

Additionally, this study has made theoretical contributions by providing a board view of FinTech infrastructure capabilities in the IT field, as shown by the Grant model (Grant, 1996), which may in turn serve as a conceptual foundation for IS research in the IT area by comprehending the conversion of resources into useful capabilities. FinTech infrastructure capabilities should be taken into account in IT-related research, and while this IT component shouldn't be completely ignored, some thought should be given to replacing existing business models with these potentially more significant technologies in the future. This concept has been embraced by many industries, but the financial sector has reaped the greatest rewards. FinTech has replaced traditional financial services, enhancing their usability and accessibility, as financial inclusion has grown.

It has established a strong basis for developing future financial solutions, despite being relatively new and continually facing several challenges brought on by legislative restrictions, a lack of essential support, and infrastructure that jeopardize its survival. This research has examined a wide range of problems, success, and failure aspects related to FinTech from the perspectives of all ecosystem stakeholders, both conceptually and practically. The study of international FinTech hotspots and the elements that have contributed to their success, as well as an empirical analysis of Jordan to determine what has worked effectively and what is impeding or likely to impeding its growth and sustainability, are among the important topics.

References

Abawajy, J., Wang, G., Yang, L., Javadi, B., 2016. Trust, security and privacy in emerging distributed systems. *Future Gener.Comput.Syst*. 55, 224–226, (C).

Al-Sharafi, M. A., Al-Emran, M., Arpaci, I., Iahad, N. A., AlQudah, A. A., Iranmanesh, M., & Al-Qaysi, N. (2023). Generation Z use of artificial intelligence products and its impact on environmental sustainability: A cross-cultural comparison. *Computers in Human Behavior*, *143*, 107708.

Al-Sharafi, M. A., Iranmanesh, M., Al-Emran, M., Alzahrani, A. I., Herzallah, F., & Jamil, N. (2023). Determinants of cloud computing integration and its impact on sustainable performance in SMEs: An empirical investigation using the SEM-ANN approach. *Heliyon*.

Andreoni, J. (1989). Giving with impure altruism: Applications to charity and ricardian equivalence. *Journal of Political Economy*, 97(6), 1447–1458.

BaFin. (2016b). Robo-advice und auto-trading—PlattformenzurautomatisiertenAnlageberatung und automatischem trading. *Retrieved June 16, 2016, from http://www.bafin.de/DE/Aufsicht/FinTech/Anlageberatung/anlageberatung_node.html*

BaFin.(2016a). AutomatisierteFinanzportfolioverwaltung. *Retrieved June 16, 2016, from http://www.bafin.de/DE/Aufsicht/FinTech/Finanzportfolioverwaltung/finanzportfolioverwaltung_node.html*

Barney, J. B. (1991). Firm resources and sustained competitive advantage. *Journal of Management*, 17(1), 99–120

Belleflamme, P., Lambert, T., &Schwienbacher, A. (2014).Crowdfunding: Tapping the right crowd. *Journal of Business Venturing*, 29(5), 585–609.

Bharadwaj, A. S. (2000). A resource-based perspective on information technology capability and firm performance: an empirical investigation. *MIS quarterly*, 169-196.

Bradford, S. C. (2012). Crowdfunding and the federal securities law. *Columbia Business Law Review*, 2012(1), 1–150.

Capon, N., Farley, J. U., Lehmann, D. R., & Hulbert, J. M. (1992). Profiles of product innovators among large US manufacturers. *Management Science*, 38(2), 157-169.

Dorfleitner, G., Hornuf, L., Schmitt, M., & Weber, M. (2017).Definition of FinTech and description of the FinTech industry.*In FinTech in Germany* (pp. 5-10).Springer, Cham.

ESA.(2015). Joint committee discussion paper on automation in financial advice.*European Supervisory Authorities. Retrieved June15,2016,*https://www.eba.europa.eu/documents/10180/1299866/JC+2015+080+Discussion+Paper+on+automation+in+financial+advice.pdf

Fein, M. L. (2015). Robo-advisors: *A closer look (SSRN Working Paper Nr.* 2658701).

Fornell, C. and Larcker, D.F. (1981), Evaluating structural equation models with unobservable variables and measurement error, *Journal of Marketing Research*, 18(1), 39-50.

Gai, K., Qiu, M., Chen, M., Zhao, H., 2017a. SA-EAST: security-aware efficient datatransmission for ITS in mobile heterogeneous cloud computing. *ACM Trans. Embed.Comput.Syst*. 16 (2), 60.

Gai, K., Qiu, M., Tao, L., Zhu, Y., 2016a.Intrusion detection techniques for mobile cloudcomputing in heterogeneous 5G.*Secur.Commun.Netw*. 9 (16), 3049–3058.

Gai, K., Qiu, M., Zhao, H., 2018. Energy-aware task assignment for mobile cyber-enabledapplications in heterogeneous cloud computing. J. *Parallel Distrib. Comput*. 111,126–135.

Grant, R. M. (1996). Toward a knowledge-based theory of the firm. *Strategic management journal*, 17(S2), 109-122.

Hair Jr, J. F., Hult, G. T. M., Ringle, C., & Sarstedt, M. (2013). *A primer on partial least squares structural equation modeling (PLS-SEM)*: Sage Publications.

Hair Jr, J. F., Hult, G. T. M., Ringle, C., & Sarstedt, M. (2016). *A primer on partial least squares structural equation modeling (PLS-SEM) (2 ed.)*: Sage Publications.

Havakhor, T., Sabherwal, R., Steelman, Z. R., & Sabherwal, S. (2019). Relationships between information technology and other investments: A contingent interaction model. *Information Systems Research*, 30(1), 291-305.

Hornuf, L., &Schwienbacher, A. (2014). The emergence of crowdinvesting in Europe (*Munich Discussion Paper Nr*. 2014–43).

Klöhn, L., &Hornuf, L. (2012).Crowdinvesting in Deutschland—Markt, Rechtslage und Regulierungsperspektiven. *ZeitschriftfürBankenrecht und Bankwirtschaft*, 24(4), 237–266.

Klöhn, L., Hornuf, L., & Schilling, T. (2016a). Crowdinvesting-Verträge—Inhalt, Entwicklung und praktischeBedeutung. *ZeitschriftfürBankrecht und Bankwirtschaft*, 27(3), 142–178.

Klöhn, L., Hornuf, L., & Schilling, T. (2016b). The regulation of crowdfunding in the German small investor protection act. *European Company Law*, 13(2), 56–66.

Lee, T., Kim, H., 2015. An exploratory study on Fintech industry in korea: Crowd fundingcase. *In: Proceedings of 2nd International Conference on Innovative EngineeringTechnologies*, Bangkok, Thailand, pages 58-64

Leedy, DL & Ormrod, JE, (2005), *Practical Research – planning and design, 8th international edition*, New Jersey/US: Pearson Education

Liu, Y.-Y., Nacher, J. C., Ochiai, T., Martino, M., &Altshuler, Y. (2014).Prospect theory for online financial trading. *PLoS ONE*, 9(10), 1–7.

Luftman, J., Zadeh, H. S., Derksen, B., Santana, M., Rigoni, E. H., & Huang, Z. (2013). Key information technology and management issues 2012-2013: an international study. *Journal of Information Technology*, 28(4), 354-366.

Makhloufi, L., Noorulsadiqin, A. Y., & Fadhilah, Y. (2018, February). Effect of it personnel capabilities on the sustainable competitive advantages. *In Proceedings of the 2nd Conference on Technology & Operations Management (2ndCTOM)* Universiti Utara Malaysia, Kedah, Malaysia.

Marinagi, C., Trivellas, P., & Sakas, D. P. (2014). The impact of information technology on the development of supply chain competitive advantage. *Procedia-Social and Behavioral Sciences*, 147, 586-591.

Martinez-Simarro, D., Devece, C., & Llopis-Albert, C. (2015). How information systems strategy moderates the relationship between business strategy and performance. *Journal of business research*, 68(7), 1592-1594.

Mithas, S., & Rust, R. T. (2016). How information technology strategy and investments influence firm performance: Conjecture and empirical evidence. *MIS Quarterly*, 40(1), 223-245.

Neuman, WL (2003), *Social research methods, qualitative and quantitative approaches*, 5th edition, Boston/US: Allyn & Bacon

Pentland, A. S. (2013). Beyond the echo chamber. *Harvard Business Review*, 91(11), 80–86.

Powell, T. C., & Dent-Micallef, A. (1997). Information technology as competitive advantage: The role of human, business, and technology resources. *Strategic management journal*, 18(5), 375-405.

Ramayah, T., Cheah, J., Chuah, F., Ting, H., & Memon, M. A. (2018). *Partial least squares structural equation modeling (PLS-SEM) using smartPLS 3.0*. Kuala Lumpur, Malaysia: Pearson.

Ryan, T. P. (2013). *Sample size determination and power*. John Wiley & Sons.

Sethi, V., & King, W. R. (1994). Development of measures to assess the extent to which an information technology application provides competitive advantage. *Management science*, 40(12), 1601-1627.

Sironi, P. (2016). My Robo advisor was an iPod—Applying lessons from other sectors to FinTech disruption. In S. *Chishti& J. Barberis (Eds.), The FinTech Book—The financial technology handbook for investors, entrepreneurs and visionaries* (pp. 152–154). Chichester: Wiley.

Teece, D. J., Pisano, G., & Shuen, A. (1997). Dynamic capabilities and strategic management. *Strategic management journal*, 18(7), 509-533.

Vrachnos, E. (2008). Factors determining teachers' beliefs and perceptions of ICT in education. In A. Cartelli & M. Palma (eds.), Encyclopedia of Information Communication Technology (pp. 321-334). Hershey, PA: IGI Global.

Weibl, J., & Hess, T. (2020). Turning data into value–exploring the role of synergy in leveraging value among data. *Information Systems Management*, 37(3), 227-239.

Yin, H., Gai, K., 2015.An empirical study on preprocessing high-dimensional classimbalanceddata for classification. *In: Proceedings of the IEEE International Symposium on Big Data Security on Cloud*, New York, USA, pp. 1314–1319.