

Accelerating and Optimizing Digital Businesses through IT Governance

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Abstract—A disruption era has led to the transformation of digital businesses. This circumstance brings the complexity of managing such businesses to family companies. Capabilities to reach the fine performance of acceleration and optimization of utilizing application portfolios of IT services are unsuccessful yet. This survey study involved a total of 102 family companies running the digital businesses in Pontianak, West Kalimantan, Indonesia, as the sample. Questionnaires were directly completed by the heads. IT processes sorted based on levels were displayed on them. Finding out the maturity levels of IT governance, COBIT 4.1 Framework was referred to. Likert Scales were in use for data processing. Research objectives were formulated to determine gap values and propose novel IT governance in order to obtain the expected maturity levels. Outcomes show that PO10, PO9, PO8, PO7, PO2, DS1, DS2, DS5, and DS7 are IT processes with the lowest maturity values in the second level (repeatable but intuitive). Here, PO8 (management of quality) and DS7 (education and training of users) are those with the least values (2.287 and 2.238).

Keywords—IT Governance; Maturity Level; Digital Businesses; Plan and Organize; Deliver and Support.

I. INTRODUCTION

Using Information Technology (IT) becomes increasingly significant and has impacts on all levels and types of companies. Its role is unrestricted to the need to support the information presented in managerial decision making. Significantly developed, IT has become a critical medium to realize the sustainability of company performance [1]. Its existence has resulted in a fundamental transformation for all business processes towards digital disruption [2]. This era has very broad impacts at all levels, including internal business process models, management of sales and marketing, interaction with customers, and collaboration with company partners. Managing digital businesses is connected to changes in consumer attitude and the ability to interact with each other [3,4]. Their existence is inseparable from adoption and

transformation of the ability to create values through IT empowerment consisting of social media, mobile and cloud technologies, internet of things, and big data analytics [5].

This evidence is reinforced by previous research claiming that acceleration and optimization of digital business performance are strongly influenced by IT governance [6] because it is the primary driver in transforming the business processes and reducing the operational costs. It can be more innovative and efficient through the improvement of the performance of information services [7]. To assure successful implementation of IT governance, it is necessary to evaluate the maturity value of each IT process. Next, gaps between actual conditions and performance of IT services expected in managing digital businesses should be identified [8]. Maturity values are essential for the conformity of digital business goals and application portfolios of IT services. Preventing and overcoming failure risks and unsuitable IT service applications and digital businesses should be connected to the management mechanism of transaction data and current and upcoming IT service performance [9].

An important implication is that realization and enhancement of maturity levels of IT governance in managing the digital businesses, unexceptionally for all family companies in West Kalimantan. Those managing digital businesses are currently apt to refer to a seniority pattern and a family hierarchy without the involvement of numerous professionals [10]. There is a similar characteristic of properly and professionally managing IT governance for digital family businesses and other public ones [11]. In essence, to support operational activities, each family company generally has an IT department, line management, and information services [12,13]. Possessing a strategic role of more interactively realizing business communication integrated with the service system and information exchange refers to digital disruption [14]. Effective information service performance aligned with improved digital business performance and added values for

users is further required [15,16]. The former performance vitally influences the latter one to ascertain the continuity of acceleration and optimization of empowered application portfolios of IT services [17,18].

Survey results and literature review show that most family companies in West Kalimantan manage digital businesses in separateness according to work unit needs [19] and exclude integrated IT services. Also, information services tend to be centralized and only accessible by particular work units. Moreover, the system of the management is still oriented towards seniority and positions in the family hierarchy, and temporary IT investment with a concentration on operational, partial finance provides none of the added values for companies. Contextually, obvious, specific mapping of maturity levels is absent. Finally, there is no alignment of acceleration and optimization of digital business performance.

There is a likeness of obstacles in current and previous studies. It is particularly noted that the success of marketing products online via digital businesses requires IT governance-related capabilities [20] becoming a complex component covering the whole IT assets and IT service mechanism in an integrated manner [21]. The simplicity of accelerating and optimizing digital businesses is powerfully influenced by maturity values of IT governance [22,23] derived from levels strategically performing as a form of compliance, reliability, and certainty in conducting business processes [24]. Acceleration and optimization can, hence, empower application portfolios of IT services to perform smoothly.

Some previous research indicates that maturity values of IT governance can be the basis for consideration to conduct information service dissemination [25]. They guarantee the patterns and risks of IT investment [26] as well as conformity between digital business strategies and IT strategies [27]. Additionally, they are useful for risk prevention of business failure [28] and mismatch of all IT processes through the reference of propriety facets of data management mechanism and current and upcoming IT service performance [29]. Lastly, they identify the extent of all IT processes in meeting the standardization of synchronization and interoperability in mapping information services [30].

Existing conditions evidently imply that capabilities to accelerate and optimize the digital business performance of Plan and Organize (PO), as well as Deliver and Support (DS) Domains, are necessities. Concerning a number of previous studies [31,32,33], these two domains empower application portfolios of IT services to improve digital business performance. Their maturity values represent the performance and relationships of IT processes. Specifically, PO Domain is more on capabilities to use and manage finances, ensure the suitability of procedures and standardization of IT services between companies and business partners or service providers, provide continual IT services, manage quality, and optimize IT investment management costs. On the other hand, DS Domain is associated with skills of managing and determining IT service levels and third parties, sustaining IT service security, and training or educating internal and external users in relation to IT service composition.

One of the goals of this study is to discover the extent of maturity values of IT governance and assure the acceleration and optimization of applying application portfolios of IT services in digital family businesses. Such values can further be the basis for recognizing the implications of managerial aspects and recommending a proposed platform model of IT governance for family companies. The priority value obtained reflects aforesaid capabilities ensuring smooth IT processes.

II. LITERATURE REVIEW

A. IT Governance

IT governance means the responsibility of top management related to all central parts of the business functions of corporate governance [25,26]. IT governance represents an appropriate, accountable decision framework driving the behavior of using IT [28], directs the use of application portfolios of IT services aligned with efficient organizational aims, and facilitates the dissemination of accurate information [30]. Becoming a series of processes of managing and adjusting IT strategies with business objectives, IT project resources, and IT performance monitoring [31,32], IT governance maps the management system of these portfolios, distributes IT decision rights and responsibilities to all stakeholders, and encourages the expansion of organizational strategies [33]. Generally, this governance also includes measuring and controlling tools utilized to empower individuals' roles as well as to complete their tasks and responsibilities of implementing IT services. The core purpose of IT governance is to ensure that business results are aligned with strategic requirements [34].

B. IT Governance Maturity Levels

Maturity levels are from 0 (zero/non-existent) to 5 (optimized) [35]. Measured ones reflect current and expected conditions [35]. All IT processes of each domain have various priority values and management expectations [36]. When these values are obtained, they can be a measurement standard used to ascertain gaps existing in all IT processes [37] and identify maturity criteria for managing application portfolios of IT services. All of them have dissimilar levels of importance based on the fulfillment criteria. [36,37]. Besides, it supports relationship alignment to ensure the mapping continuity of all IT activities and to identify IT resources and control mechanism [38].

C. Digital Businesses

Digital businesses are those virtually conducted by utilizing IT. All transaction processes no longer require direct interaction between sellers and buyers [39]. Digital businesses include online sales of products with various innovative variants through social media. Recognized as real businesses with IT-based transaction [40], they have more capabilities in comparison to the e-business, e-marketplace, e-mail, and e-commerce [39,40]. Their growth has implications of reorganization and reengineering of economic cycles through digital transformation. Through digital businesses, target market shares can be expanded globally [41].

III. RESEARCH METHOD

This survey study implemented the Research and Development (R&D) Method. In order to assess maturity levels of PO and DS Domains, COBIT 4.1 Framework was in use [35]. All family companies which have recently managed their digital businesses for five years became the population. Respondents were heads or managers of family companies in West Kalimantan managing digital businesses in more than five years. Primary data was obtainable from questionnaires with tested validity and reliability. Modified from the ones used in the previous studies, they were distributed to 132 respondents selected through a random sampling technique online via Google Form. However, only 102 of them completed and returned the questionnaires (response rate = 77.27%). Data processed referred to Likert Scales with intervals of strongly agree (score 6) to strongly disagree (score 1). It is noted that ordinal numbers of such scales can provide more accurate data [42]. Following this, in-depth interviews with 5 key informants were applied to validate previous answers. The higher the validity and reliability are, the more consistent the instruments become so that the results are acceptable [43]. Finally, the whole answers were reprocessed with reference to each IT process of PO and DS Domains. Therefore, maturity values became evident.

Calculating maturity values of IT governance, COBIT 4.1 Framework was referred to [34]. Other stages were to process the maturity level of each IT process of PO and DS domains and to determine aggregation values computed by means of arithmetic averages. The formula: Index Value = $\{\Sigma (\text{number of answers} \times \text{maturity value}) : (\text{number of questions} \times \text{number of respondents})\}$ [44,45] was in use. Strengthening previous study results, the maturity values were further interpreted through elucidation given by key informants. Eventually, all aggregation values were in the representation of radar graph media. The rounding index scales of levels of the maturity model were presented in table I.

TABLE I. ROUNDING INDEX SCALES

Scale	Level of Maturity Model
4.51 – 5.00	5 – Optimized
3.51 – 4.50	4 – Managed and Measurable
2.51 – 3.50	3 – Defined Process
1.51 – 2.50	2 – Repeatable but Intuitive
0.51 – 1.50	1 – Initial/Ad Hoc
0.00 – 0.50	0 – Non-existent

IV. RESULTS AND DISCUSSION

Maturity values of IT governance are immensely needed by the management and stakeholders of family companies to cognize the extent of the gaps or discrepancy of current conditions and maturity levels of desired IT processes in digital businesses. The values can also be guidance in determining the positions of IT process capabilities compared to the performance of business needs. They represent the capabilities of PO and DS Domains to ascertain the performance of application portfolios of IT services and digital business management. After maturity values are obtained, they can be the basis for predicting and determining

priorities of making changes or minimizing the gaps. Capacity, performance, and control of each IT process can, accordingly, be depicted.

Based on survey data and calculation results, acceleration and optimization of utilizing application portfolios of IT services, specifically regarding PO and DS Domains, are weak in supporting operation since a number of gaps of family companies are found. Most IT processes fail to achieve expected maturity values of IT governance and are essentially unable to support activities of providing IT services to stakeholders. Apart from this, only some values obtained reach the fourth level (managed and measurable). The averages are still in these ranges: 1.51-2.50 (repeatable but intuitive) and 2.51-3.50 (defined process). Depending on social media, digital business management is unable to realize acceleration and optimization through IT governance. Maturity values of PO Domain indicate minimal efforts of family companies in managing digital businesses. This can be seen from the measurement results (see Table II).

TABLE II. GAPS IN MATURITY LEVELS OF PO PROCESSES

Domain	Process	Current Maturity Result	Maturity Level
PO1	Definition of strategic IT planning	2.780	4
PO2	Definition of information architecture	2.425	4
PO3	Determination of IT directions	3.327	4
PO4	Definition of IT processes, organizations, and interrelationships	2.634	4
PO5	Management of IT investment	2.847	4
PO6	Communication of objectives and direction management	2.682	4
PO7	Management of IT resources	2.384	4
PO8	Management of quality	2.287	4
PO9	Estimation of IT risk management	2.337	4
PO10	Project governance	2.324	4

Currently, PO8 (management of quality) possesses the lowest maturity value (2.287). Based on observation, most digital business patterns of family companies exclude facets of clarity and conformity of the system standard of this kind of management. A similar problem happens to PO10 (project governance), PO9 (estimation of IT risk management), PO7 (management of IT resources), and PO2 (definition of information architecture) with these consecutive values: 2.324, 2.337, 2.384, and 2.425. All values obtained are less than 2.50. Here, the second level (repeatable but intuitive) is occupied. Meanwhile, other IT processes (PO4 (definition of IT processes, organizations, and interrelationships), PO6 (communication of objectives and direction management), PO1 (definition of strategic IT planning), PO5 (management of IT investment), and PO3 (determination of IT directions)) have reached the third level (defined process) with these consecutive values: 2.634, 2.682, 2.780, 2.847 and 3.327.

PO3 is a process with the highest maturity value and a gap value of 0.673. Overall, the average PO Domain is 2.603 (greater than 2.51), reflecting that the whole IT processes in it

are in the third level (defined process). Despite being fairly significant, the average reflects all IT processes possessing a clear, well-documented standard communicated in an amount of training. Possibilities of irregularities can, nevertheless, always occur and are complex to avoid. Moreover, incomplete, unstructured procedures and mechanisms exist. In practice, it turns out that some family companies have initially formalized the implementation. Based on the composition of the entire IT processes in PO Domain, only some of them are able to accelerate and optimize the use of application portfolios of IT services to be in managed and measurable status. The current and expected maturity levels of this domain are in the representation of a radar chart (see Figure 1).

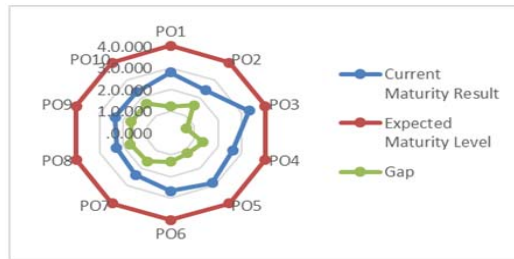


Fig. 1. Maturity Level Model of PO Domain

A slight difference is found in terms of the maturity values of the DS Domain. The average is 3.019. Complete findings can be noted in Table III.

TABLE III. GAPS IN MATURITY LEVELS OF DS PROCESSES

Domain	Process	Current Maturity Result	Maturity Level
DS1	Definition and management of service levels	2.385	4
DS2	Service management of the third parties	2.415	4
DS3	Management of performance and capacity	3.366	4
DS4	Continuous service assurance	3.285	4
DS5	System security assurance	2.285	4
DS6	Identification and allocation of costs	3.235	4
DS7	Education and training of users	2.238	4
DS8	Management of service desks and incidents	3.385	4
DS9	Configuration management	3.622	4
DS10	Problem management	2.670	4
DS11	Data management	3.863	4
DS12	Physical environment management	3.236	4
DS13	Operation management	3.268	4

The outcomes mean that with values that are greater than 2.51, more DS processes are at the third level (defined process) and exceed the average of the PO Domain. Two of them (DS11 (data management) and DS9 (configuration management)) successfully achieve the fourth level (managed and measurable). Their values are 3.863 and 3.622 in order. Nonetheless, a further arrangement is requisite to minimize the

gap in each IT process so that the use of application portfolios of IT services can be more optimal in managing the digital businesses. Another finding based on Table III is that maturity values of DS1 (definition and management of service levels), DS2 (service management of the third parties), DS5 (system security assurance), and DS7 (education and training of users) are consecutively 2.385, 2.415, 2.285, and 2.238 (less than 2.51). Comprehensibly, all these processes are still at the second level (repeatable but intuitive). Meanwhile, those of DS3 (management of performance and capacity), DS4 (continuous service assurance), DS6 (identification and allocation of costs), DS8 (management of service desks and incidents), DS10 (problem management), DS12 (physical environment management), and DS13 (operation management) are 3.366, 3.285, 3.235, 3.385, 2.670, 3.236 and 3.268 (at the third level (defined process)).

The highest maturity value that is nearly four is possessed by DS11. Its difference is only 0.137. It is clear that the process has been developed into stages with different parties working together. The reflection of the composition of all DS processes is that a high level of trust in the knowledge of each individual minimizes possibilities of errors in using application portfolios of IT services. A number of facets to be considered for remedies are informal training, incomplete mechanism, unstructured, individualized responsibilities, and partial job standardization. Nevertheless, it is positively discovered that it is faster to formalize the practice by adopting application portfolios of IT services in supporting the acceleration and optimization of digital business management. Current and expected maturity levels of DS Domain are in the representation of a radar chart (see Figure 2).

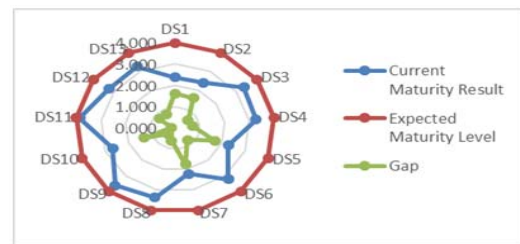


Fig. 2. Maturity Level Model of DS Domain

In detail, measured outcomes reveal that all IT process values differ in terms of the top priority, i.e., the requirement of immediate enhancement and others. To be specific, PO10, PO9, PO8, PO7, PO2, DS1, DS2, DS5, and DS7 are IT processes to be principally prioritized. Understandably, there are necessities to define their maturity levels. Better measurement results depicting greater maturity values guarantee the gap reduction. A certain impact on the management is that IT services get enhanced and reliable acceleration and optimization of application portfolios of IT services exist. Efforts to minimize the inequality must have immediate remedies through improved IT processes, especially those in PO and DS domains, which are still at the second level (repeatable but intuitive).

Gap values influence performance improvement of IT governance. The other analysis of maturity levels suggests that PO10 (project governance), PO9 (estimation of IT risk

management), PO8 (management of quality), PO7 (management of IT resources), and PO2 (definition of information architecture) need immediate, remedial actions considering their significant roles in realizing and assuring the capabilities of family businesses to accelerate and optimize digital business management through the utilization of application portfolios of IT services. One of the proposed recommendations covers patterns and standardization of implementation of programs and projects so that managerial aspects become obvious. It is also suggested that the management is active in overcoming the problems with commitment and passion, establishes clear procedures and frameworks of managing the use of project resources effectively and efficiently, ensures risk management of project complexity, controls the quality of every project change periodically, handles the risks of the values of IT investment, identifies and assesses the failure probabilities of IT services, and prepares, conducts, and monitors the risk management. Apart from these, the management should formulate manual procedures of quality management, establish standards and indicators of developing application portfolios of IT services, model job standardization procedures, develop standardized quality assessment by referring to customer needs, evaluate IT services regularly, formulate procedures of recruiting IT human resources through the principle that career outlook is in line with organizational needs, boost IT human resource quality through competence testing in the field of IT on a regular basis, and ensure the roles and functions of IT in accordance with the description of positions. Ultimately, there should be training and evaluation to enhance IT competence of managing digital businesses, definition, and description of information architecture, specification models of information to ease the ways to have IT services, information classification of criteria pertaining to stakeholder needs, and integrity among databases to ascertain accuracy and consistency through synchronization and interoperability of IT services.

Enhancing the performance of IT governance in the area of DS Domain, DS1 (definition and management of service levels), DS2 (service management of the third parties), DS5 (system security assurance), and DS7 (education and training of users) need to be seriously concerned. It is recommended that capabilities and levels of information services are determined, information service frameworks related to internal and external parties are established, and types of business information services are explained. Additionally, criteria and availability of information services, as well as agreements and readiness based on information service level, should be included. Monitoring the system quality and agreements between information service providers and recipients, identifying and determining the types of relationships with vendors, and communicating the agreements to provide information services with the third parties periodically is also helpful for the management. Besides, there should be the supervision of mutual agreements and commitments made by stakeholders and information service providers, controls of the third parties in providing various information services, and procedures and mechanisms to prevent negligence with information service providers. It is further suggested that the management notices the security levels of information services, creates strategic operation plans in relation to

information access security, determines and assigns access rights in accordance with respective duties and responsibilities, and conducts formulation and evaluation of policies and patterns in dealing with information service security risks. In the end, it is of great importance to monitor the smooth operation of information services continuously, provide training on information services to all users, and evaluate training models to earn feedback. The recommendations affirmed are generally useful for all IT processes of PO and DS domain vitally, realizing the synchronization and interoperability of managing the digital family businesses. The study results have become positive contributions to the management of family companies. It is particularly noted that digital business models are immensely dependent on the abilities to plan, organize, deliver, and support the acceleration and optimization of utilizing application portfolios of IT services to fulfill consumer needs.

V. CONCLUSION AND FUTURE RESEARCH

In summary, it is evident that IT governance maturity values of PO and DS Domains are 2.603 and 3.019 on average. In other words, they are at the third maturity level. More specifically, some PO and DS processes (PO10, PO9, PO8, PO7, PO2, DS1, DS2, DS5, and DS7) appear to be at the second level as their maturity values are in the range of 1.51-2.50. Here, PO8 and DS7 are those with the lowest maturity values (2.287 and 2.238). This circumstance reflects that the focus of family companies in managing the quality and reliability of resources in the field of IT is neglected. A future study can include Acquire and Implement (AI) and Monitor and Evaluate (ME) Domains to provide a clearer and more transparent description for the family management to realize the utilization of application portfolios of IT services in managing digital businesses. It facilitates the synchronization to guarantee the consistency of information mitigation in accelerating and optimizing the transaction and interaction between companies and customers and becomes the basis for estimating company reengineering through the combination and relationships among IT processes in each domain.

REFERENCES

- [1] S. A. Khan, M. A. Kaviani, B. J. Galli, and P. Ishtiaq, "Application of Continuous Improvement Techniques to Improve Organization Performance," *International Journal of Lean Six Sigma*, 10(2), 2019, pp. 542-565.
- [2] R. Morakanyane, A. A. Grace, and P. O'Reilly, "Conceptualizing Digital Transformation in Business Organizations: A Systematic Review of Literature," 30th Bled eConference Digital Transformation from Connecting Things to Transforming Our Lives, 2017, pp. 428-443.
- [3] G. C. Kane, D. Palmer, A. Nguyen-Phillips, D. Kiron, and N. Buckley, "Achieving Digital Maturity: Adapting Your Company to a Changing World," *MIT Sloan Management Review*, 59(1), 2017, pp. 1-29.
- [4] C. C. Snow, Ø. D. Fjeldstad, and A. M. Langer, "Designing the Digital Organization," *Journal of Organization Design*, Springer Open, 6(7), 2017, pp. 1-13.
- [5] N. K. Hanna, "Mastering Digital Transformation: Towards a Smarter Society, Economy, City, and Nation," Emerald Group Publishing, 2016, pp. 77-110.
- [6] S. Vejseli, and A. Rossmann, "The Impact of IT Governance on Firm Performance: A Literature Review," 21st Pacific Asia Conference on Information Systems, 2017.

- [7] Z. Alreemy, V. Chang, R. Walters, and G. Wills, "Critical Success Factors for Information Technology Governance (ITG)," *International Journal of Information Management*, 36(6), 2016, pp.907-916.
- [8] A. Joshi, L. Bollen, H. Hassink, S. De Haes, and W. Van Grembergen, "Explaining IT Governance Disclosure through the Constructs of IT Governance Maturity and IT Strategic Role," *Information & Management*, 55(3), 2018, pp.368-380.
- [9] J. Orozco, A. Tarhini, and T. Tarhini, "A Framework of IS/Business Alignment Management Practices to Improve the Design of IT Governance Architectures," *International Journal of Business and Management*, 10(4), 2015, pp.1-12.
- [10] L. P. Steier, J. J. Chrisman, and J. H. Chua, "Governance Challenges in Family Businesses and Business Families," *Entrepreneurship Theory and Practice*, 2015, pp.1265-1280.
- [11] R. Bhattacharyya, "Challenges of Digital Transformation in Small Family-owned Businesses in India," *Studies in Indian Place Names*, 40(36), 2020, pp. 28-34.
- [12] J. Sandlin, "Family Business Adaptation to Disruptive Technology: Case Studies on Family Businesses in Handling the Challenges of Disruptive Technology and Maintaining Competitive Advantage within a Swedish Market," 2017.
- [13] M. Blaschke, M. Cigaina, U. V. Riss, and I. Shoshan, "Designing Business Models for the Digital Economy," *Shaping the Digital Enterprise*, Springer, Cham, 2017, pp. 121-136.
- [14] B. Hinings, T. Gegenhuber, and R. Greenwood, "Digital Innovation and Transformation: An Institutional Perspective," *Inf Organ*, 28(1), 2018, pp. 52-61.
- [15] M. Rauch, M. Wenzel, and H.T. Wagner, "The Digital Disruption of Strategic Paths: An Experimental Study," *Thirty Seventh International Conference on Information Systems*, Dublin, 2016, pp. 1-19.
- [16] G. F. Templeton, S. Petter, A. M. French, K. R. Larsen, and B. Pace, "Information Technology Firms: Creating Value through Digital Disruption," *Communications of the Association for Information Systems*, 44(1), 35, 2019, pp. 748-763.
- [17] K. H. Rolland, I. Mathiassen, and A. Rai, "Managing Digital Platforms in User Organizations: The Interactions between Digital Options and Digital Debt," *Inf Syst Res*, 29(2), 2018, pp. 419-443.
- [18] M. Queiroz, P. Tallon, T. Colman, and R. Sharma, "Digital Infrastructure, Business Unit Competitiveness, and Firm Performance Growth: The Moderating Effects of Business Unit IT Autonomy," *The 53rd Hawaii International Conference on System Sciences*, 2020.
- [19] S. Kosasi, Vedyanto, and V. Wibowo, "Improving Information Service Performance of Family Businesses through IT Governance," *International Seminar on Application for Technology of Information and Communication*, 2018, pp. 11-16.
- [20] C. Riera, and J. Iijima, "The Role of IT and Organizational Capabilities on Digital Business Value," *Pacific Asia Journal of the Association for Information Systems*, 11(2), 2019, pp. 67-95.
- [21] M. Chergui, A. Chakir, A. Sayouti, and H. Medromi, "Strategic IT Governance Platform Based on Matchmaking Multi-Agent System and Loose Inter-Organizational Workflows," *International Journal of Computer Science and Information Security (IJCSIS)*, 14(5), 2016, pp. 297-301.
- [22] G. Salvietti, A. Gaur, and F. Pennarola, "Strategic Factors Enabling Digital Maturity: An Extended Survey," *The 13th Mediterranean Conference on Information Systems (MCIS)*, 2019, pp. 1-13.
- [23] M. Spremic, "Governing Digital Technology-How Mature IT Governance Can Help in Digital Transformation?," *International Journal of Economics and Management Systems*, 2(1), 2017, pp. 214-223.
- [24] K. Dery, I. M. Sebastian, & N. van der Meulen, "The Digital Workplace is Key to Digital Innovation," *MIS Quarterly Executive*, 16(2), 2017, pp. 135-152.
- [25] R. S. Debreceny, and G. L. Gray, "IT Governance and Process Maturity: A Multinational Field Study," *Journal of Information Systems*, 27(1), 2013, pp. 157-188.
- [26] K. Ryu, J. Park, and J. Park, "The Influence of IT Investment and IT Governance on Corporate Performance of Multibusiness Firms," *The Journal of Supercomputing*, 2017, pp. 1-27.
- [27] M. Chi, J. Zhao, and Y. Li, "Digital Business Strategy and Firm Performance: The Mediation Effects of E-collaboration Capability," *The Fifteenth Wuhan International Conference on E-Business*, Association for Information Systems, 2016, pp. 86-97.
- [28] S. Borja, K. Kim, H. Yoon, and J. Hwang, "IT Governance Effectiveness and Its Influence on Innovation Product and Process," *Portland International Conference on Management of Engineering and Technology (PICMET)*, 2018, pp. 1-8.
- [29] E. Meydani, "Role of Information and Communication Technologies in Government Effectiveness," *10th International Conference on Theory and Practice of Electronic Governance*, 2017, pp. 494-503.
- [30] B. Abdollahbeigi, and F. Salehi, "The Effect of External Environment Characteristics on Effective IT Governance through Organizational Performance," *The Journal of Technology Management and Technopreneurship (JTMT)*, 7(1), 2019, pp. 19-28.
- [31] A. Prayitno, T. K. Rahayu, L. Sumaryanti, and A. Efendi, "Assessment of Ripeness Analysis of Information Technology Supervision on DS and ME Domains Using COBIT 4.1 in the Information Engineering Department of Musamus Merauke," *IOP Conference Series: Earth and Environmental Science*, 343(1), 2019, pp. 1-6.
- [32] N. Prasetyawan, and S. M. S. Nugroho, "Maturity Level Analysis of Governance and Integration IT of Simkeuda in Pamekasan Regency Using COBIT 4.1," *International Seminar on Intelligent Technology and Its Applications (ISITIA)*, 2019, pp. 222-227.
- [33] F. M. Alkhalidi, S. M. Hammami, and M. Ahmar Uddin, "Understanding Value Characteristics toward a Robust IT Governance Application in Private Organizations Using COBIT Framework," *International Journal of Engineering Business Management*, 9, 2017, pp. 1-8.
- [34] Z. Alreemy, V. Chang, R. Walters et al., "Critical Success Factors (CSFs) for Information Technology Governance (ITG)," *Int J Info Manage*, 36(6), 2016, pp. 907-916.
- [35] IT Governance Institute, "COBIT 4.1: Framework, Objective Controls, Management Guidelines, Maturity Models", ITGI, 2007.
- [36] H. Suh, S. Chung, and J. Choi, "An Empirical Analysis of a Maturity Model to Assess Information System Success: A Firm-Level Perspective," *Behaviour & Information Technology*, 36(8), 2017, pp.792-808.
- [37] D. A. Saputra, I. Alif, R. A. Wijaya, Y. G. Sucahyo, and M. K. Hammi, "Role of IT in IT Governance Practices Maturity Perspective," *International Conference on Advanced Computer Science and Information Systems (ICACSIS)*, 2019, pp. 325-330.
- [38] S. Arezki, and Y. Elhissi, "Toward an IT Governance Maturity Self-Assessment Model Using EFQM and CobiT," *International Conference on Geoinformatics and Data Analysis*, 2018, pp. 198-202.
- [39] P. K. Senyo, K. Liu, and J. Effah, "Digital Business Ecosystem: Literature Review and a Framework for Future Research," *International Journal of Information Management*, 47, 2019, pp. 52-64.
- [40] R. Härting, C. Reichstein, P. Laemmle, and A. Sprengel, "Potentials of Digital Business Models in the Retail Industry-Empirical Results from European Experts," *Procedia Computer Science*, 159, 2019, pp. 1053-1062.
- [41] T. Ritter, and C. L. Pedersen, "Digitization Capability and the Digitalization of Business Models in Business-to-Business Firms: Past, Present, and Future," *Industrial Marketing Management*, 2019, pp. 1-11.
- [42] J. W. Creswell, "Research Design: Qualitative, Quantitative, and Mixed Methods Approaches," *Fourth Edition*, California: SAGE Publications, Inc., 2014.
- [43] A. Bandur, "Penelitian Kualitatif: Metodologi, Desain, dan Teknik Analisis Data dengan NVIVO 11 Plus," *Mitra Wacana Media*, 2016.
- [44] R. A. Khther, and M. Othman, "Cobit Framework as a Guideline of Effective IT Governance in Higher Education: A Review," *International Journal of Information Technology Convergence and Services* 3(1), 2013, pp.21-29.
- [45] N. Rezaei, "The Evaluation of Implementing IT Governance Controls", *Journal of Applied Business and Finance Researches*, 2(3), 2013, pp.82-89.