Jurnal Ilmiah Teknik Elektro Komputer dan Informatika (JITEKI)
Vol. 8, No. 1, March 2022, pp. 128-135
ISSN: 2338-3070, DOI: 10.26555/jiteki.v8i1.23632

ITIL v3 Framework Application to Design Information Technology Incident Management Governance

Saleh Firdausi, Mukhammad Andri Setiawan
Universitas Islam Indonesia, Jl. Kaliurang KM. 14,5 Sleman, Yogyakarta 55584

ARTICLE INFO

Article history:

Received March 20, 2022
Revised April 24, 2022
Accepted April 29, 2022

Keywords:

IT Governance;
ITIL;
Incident Management;
Maturity Level;
Bank

ABSTRACT

Information technology (IT) is one of the strategic investments for Banks. IT can increase the efficiency and effectiveness of operational activities and strengthen their competitive position. Given that IT is an expensive investment, while its implementation contains various risks, Banks need to implement Information Technology Governance. Banks are required to implement some standards for IT governance in multiple aspects, one of which is the IT incident management aspect. IT services at the Bank are crucial because they must work optimally with zero downtime. They must ensure the management and prevention of any problems that may arise to support the sustainability of the company's business processes. One of the frameworks that can be used for good IT service incident management is Information Technology Infrastructure Library version 3 (ITIL v3). ITIL's incident management aims to restore disrupted IT services to their normal state and reduce the business impact. To measure the extent to which the Bank has implemented IT Incident Management Governance, the maturity level is calculated by comparing the current state (as is) and the desired shape (to be) to obtain the maturity level gap. The process of maturity level assessment is carried out using interviews and questionnaires addressed to all stakeholders involved in the entire IT incident management process. The research results show that 15 of the 42 IT incident management processes have not reached the desired state. Based on these gaps, an IT incident management governance document was designed based on the ITIL v3 framework, which is expected when implemented in the Bank's daily operations. It will increase the availability of IT services.

Corresponding Author:

Saleh Firdausi, Universitas Islam Indonesia, Mataram, Nusa Tenggara Barat, Indonesia.
Email: 18917223@students.uii.ac.id

1. INTRODUCTION

More and more government agencies, organizations, and companies worldwide consider information technology (IT) as the backbone to support every process to achieve their respective business goals [1][2]. IT can bring significant impacts on the competitive advantages of enterprises and has become the primary key to winning the competition [3]. IT is an essential weapon for an organization to accelerate communication and coordination across organizations, streamline its business processes, simplify the communication among customers and companies, and speed up information sharing to the whole organization [4]. IT needs to be effective and efficient in transforming resources into valuable services. This case shows that good IT governance is essential for a business's success. IT governance helps companies plan and control IT investments to achieve their business objectives [5]. The reality is that the investment spent on IT is pretty expensive, but it is not followed by a return that benefits the company [6][7]. In an organization where day-to-day operations rely heavily on IT, even a tiny problem can reduce productivity [8]. A framework is needed to ensure that IT investments can maximize the benefits, minimize the risks, be managed appropriately, and be used responsibly [9]. Business processes that run every day require that IT be available and provide the services

that customers need. IT services are recognized as crucial, strategic organizational assets that must be managed for business success [10][11]. A bank is one type of company that makes IT services the core of its operational activities.

The application of IT brings positive changes in the Bank's operational activities, especially in data management, to be carried out more efficiently and effectively and produce faster and more accurate information. IT-enabled service can increase customer convenience by enabling 24-hour transactions, thus improving customer satisfaction and delivering a competitive advantage [12]. Some studies have shown that companies with good IT governance models present superior returns on their IT investments than their competitors, mainly because they make better IT decisions [13]. Indonesian Financial Service Authority, known as *Otoritas Jasa Keuangan* (OJK), requires banks to develop an optimal business strategy to manage IT to improve operational activities' efficiency and service quality to its customers. The growing importance of banks to enhance the management of their services has led to the emergence of international standards and frameworks such as ISO/IEC 20000, Information Technology Infrastructure Library (ITIL), and CMMI-SVC, which provide process models and best practices for IT Service Management [14]. Banking services require quality and accurate management to minimize service disruptions [15]. Banks must ensure that the IT services can perform optimally and is also able to manage and prevent any incidents that may appear to support the sustainability of the company's business processes and achieve business objectives and value [16].

In a day-to-day process, there are always possibilities where unplanned interruptions to IT services occur; these are called IT incidents. According to the ITIL definition, an incident is an interruption or reduction in the quality of the IT services [17]. IT incidents affect business operations and may also have severe business impacts [18]. Failure to manage incidents can result in constant interruptions, poorly defined resolution priorities, and poor management information. Incident Management is a crucial element of IT service availability [19]. One of the leading indicators of an organization's success in managing incidents is the length of time to resolve an incident [20]. Incident management requires more attention from the company because it is directly related to operations and services provided to customers. This means that Incident Management can shape the customer's view of the entire organization. The main objective of the incident management process is to restore services as quickly as possible and minimize the impact. Incident management allows for minimizing delays between incident resolution and reduces services unavailability and costs due to the loss of service [21]. However, many organizations were mainly focused on technical issues and failed to focus on the value of implementing process improvement standards and frameworks [22]. Incident management requires a robust framework to prepare the company for all kinds of problems that will arise. Study shows that implementing a good incident management framework leads to (1) improved operational efficiency and reducing IT spending, (2) improved service orientation and focus on service delivery, (3) improved alignment, both externally with customers and internally, between IT functions, and (4) to improve service quality and thereby improve customer satisfaction [23]. One of the most popular frameworks that are used as an incident management standard for an organization's IT services is the Information Technology Infrastructure Library version 3 (ITIL v3) [24][25][26]. Previous studies by Marrone and Kolbe [27][28] show there are operational and strategic benefits that organizations gain with ITIL implementation.

ITIL is defined as a set of prescribed practices that an IT function may employ in order to achieve IT Service Management [23]. It is a set of best practices used to assist the implementation of a framework for IT Service Management, which includes the definition of integrated service management, process-based, and best practices applied within an organization [29]. The Central Computer and Telecommunication Agency (CCTA) developed this framework in England. The main objective of ITIL is to align IT management with the needs of the business, maintaining the focus on the quality of services and ensuring the established service levels. The advantages of ITIL bring a better quality of service, greater availability and stability of IT services, a clear view of the capacities of the areas related to IT service provision, and improved customer satisfaction [30]. The ITIL v3 framework is more suitable for this case due to practical recommendations than other frameworks, such as COBIT, which discusses strategic planning [31]. IT Service Management frameworks like ITIL focus on the operational excellence of IT-related services.

In contrast, on the other hand, IT Governance Framework such as COBIT focuses on enabling, controlling, and assisting with decision-making at the strategic level [5]. Incident management requires quick action to return IT services to their normal state, so ITIL is more suitable for technical matters like this. ITIL framework focuses on the interaction between technical workers and end-users [29].

Previous research has discussed measuring the maturity level of IT incident management governance in state banks [32]. The study results show that state banks have a reasonably good level of incident management maturity, but some processes can still be improved. This study aims to measure the maturity level of incident management in regional banks based on the ITIL v3 framework by comparing the current state (as is) and the desired shape (to be) to obtain the gap. This research aims to determine what factors cause the gap between

state banks and regional banks in terms of IT governance maturity level, especially regarding the availability of IT services to customers, to determine the correct ways to compete with the state banks. This research contribution is (1) lesson learned related to the implementation and improvement of incident management governance using the ITIL v3 framework in the banking sector so that it can be used as reference material for further research and (2) Improve the availability of IT services to increase bank competitiveness and maintain customer satisfaction.

2. METHOD

The method used in designing IT incident management governance based on the ITIL v3 framework for the case study of Bank XYZ is shown in Fig. 1, which explains the process of information gathering and initial analysis, maturity level assessment process, gap analysis, designing the IT Governance recommendation, to the conclusion of this study.

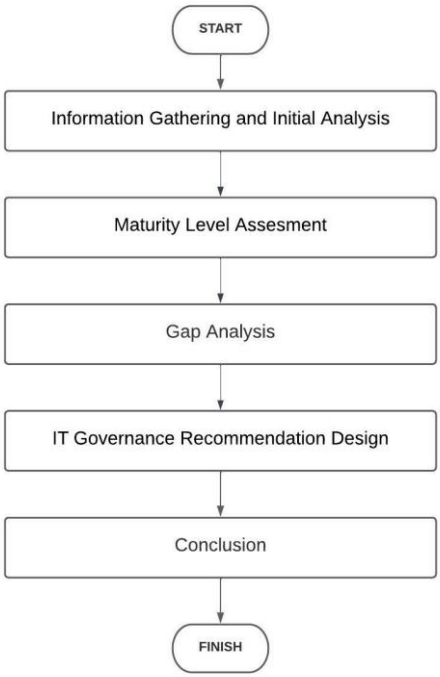

Fig. 1. Research methodology flow chart

2.1. Information Gathering and Initial Analysis

We carried out the initial information collection related to the IT incident management process at Bank XYZ. The analysis process involves studying all formal IT incident management guidelines, such as standard operating procedures, company annual reports, and financial services authority regulations (the central bank - Bank Indonesia, OJK, and BPK). Once the analysis was performed, we can get a clear picture of the current state (as is) of IT incident management at Bank XYZ. We have also conducted an interview process to obtain more detailed information from people directly involved with incident management at Bank XYZ. This interview aims to determine the current conditions of day-to-day IT incident management.

2.2. Maturity Level Assessment

Maturity models are focused on evaluating and analyzing all the essential elements to take them from an immature process to a disciplined, mature, and effective [33]. The method of assessing maturity level is carried out on IT incident management governance in the IT department of Bank XYZ. Division TSI is a department directly responsible to the president director of bank XYZ to manage all operations and information technology planning for the head office and all branch offices. This assessment process aims to measure the maturity level of the current IT incident management governance implementation (as is) and the ideal conditions of IT incident management governance expected in the future (to be).

We've selected 20 respondents directly involved in the IT incident management process to fill out two types of questionnaires. The first questionnaire assesses the current IT incident management maturity level, and the second questionnaire assesses the desired IT incident maturity level. The questionnaire will be based on USCISA's self-assessment tools for IT incident management [34]. USCISA's self-assessment tools for IT

incident management contain 42 processes divided into four categories or service areas such as: "The Incident Management Process," "Activities in Place Needed for the Success of Incident Management," and "Incident Management Metrics," and "Incident Management Process Interactions." The scale used is six answer choices based on the ITIL maturity model. The scale used ranges from: 0 – Absence (chaos), 1 – Initial (reactive), 2 – Repeatable (active), 3 – Defined (proactive), 4 – Managed (preemptive), 5 – Optimized [35].

2.3. Gap Analysis

After we know the maturity level of the current IT incident management and determine the target value needed to achieve the desired ideal state based on the ITIL v3 framework, a gap analysis is carried out. Gap analysis aims to improve IT incident management governance through maturity attributes. Thus, we can see which processes have gaps and need improvement. Maturity level assessment can show us to what extent the organization has met the standards in good IT governance. Furthermore, the results of this assessment can be used as the basis for increasing awareness of the IT incident management process and identifying which strategies are priorities for future improvement. Gap analysis is performed by comparing the current IT incident management maturity level (as is) with the expected IT incident management maturity level (to be). These comparisons will show which processes are not meeting the desired maturity level.

2.4. IT Governance Recommendation Design

A draft of the IT incident management governance document is designed. This draft was made based on the maturity level assessment of IT incident management at Bank XYZ. Based on the gap analysis, if we spot a process with a low score (a large gap), we will either propose a new set of procedures or give improvement suggestions to the existing IT incident management governance documents based on the best practices from ITIL v3 and will be adjusted to the current IT policies at Bank XYZ. This draft document contains several matters related to the IT Incident management process, such as the Purpose and Objectives, Scope, Concepts, Procedures, and Performance Measurement Matrix.

2.5. Conclusion

The research results on applying the ITIL v3 framework to design IT incident management governance at Bank XYZ are concluded and poured into a written report. Said reports will contain the current state of IT incident management at Bank XYZ, what is the ideal situation desired in the future, and the steps taken to achieve these goals.

3. RESULTS AND DISCUSSION

The result of the maturity level assessment of IT incident management governance based on the ITIL v3 framework for the case study of Bank XYZ is shown in Fig. 2.

Fig. 2. Maturity level assessment of IT incident management governance at Bank XYZ

The result shows that, in general, IT incident management at Bank XYZ is quite good. The situation can be seen from the ITIL maturity level assessment that has reached level 3 in all service areas. This means that management has a clear understanding and commitment to the IT incident management process at Bank XYZ,

which is fully outlined and documented in the form of Standard Operating Procedures. However, management feels that the current level still does not meet the ideal state. Management expects the superior maturity level to be 4 for each service area.

Management is planning proactive actions in preventing and responding to incidents related to IT, although in practice, both the head office and branch offices are still doing reactive action when incidents occur. This causes idle time when an IT incident occurs at the branch office, reported to the head office, then waiting for an answer on what action to take. Existing procedures have been standardized and communicated through training. However, often the training only involves Division TSI and the head office. If there is a representative from the branch office, it only consists of the branch manager or their representatives. The documentation has been done with versioning within a clear scope and in a change control mechanism. This means that every revision of the process/function is recorded from the initial version to the newest one. There is a performance measurement mechanism based on specific methods.

The research results show that 15 out of 42 IT incident management processes have not reached the desired state. Most procedures are already at maturity level 3 (defined), which means that at this level, the existing processes/functions are under control, standardized, documented, and provided through training by the Bank. Further analysis of the 15 processes that did not reach the desired state shows that a few incident management processes have already reached level 3 and above-average levels, but management considers it not good enough. Procedures and rules related to these processes need further analysis of why management feels this process has not reached the expected target. Then a strategic plan needs to be formulated to be able to achieve the expected maturity level. To confirm these findings, we conducted one more interview with management to understand and demonstrate why they want that process to meet higher expectations. The results of the analysis show that several factors encourage Bank XYZ to set higher standards for IT Services:

- Standardization:

Today, most banks are faced with a highly dynamic environment. Also, large and small banks focus on absorbing and retaining commercial customers due to the rapid changes in competitive positions and market situations [36]. According to the 2016'th Financial Services Authority regulation about "Application of Risk Management in the Use of Information Technology by Commercial Banks," banks must apply several reference standards for assessment related to information technology. Standardization for IT services is vital for an organization to ensure that the services offered can satisfy and meet customer needs. This standardization aims to align organizational business strategy, IT strategy, IT infrastructure, and processes [37]. Implementing best practices or frameworks for IT services, such as ITIL, has found that one of the key factors to guarantee success is having suitable processes, not only for the implementation but also for follow-up and maintenance [38].

- Company Characteristic:

Bank XYZ's corporate character, which is a commercial bank as well as a regional bank, demands comprehensive reporting to their related parties. Not only financial supervisory institutions in Indonesia, such as OJK, BI, BPK, and others, but Bank XYZ also needs to report the condition of their company to their stakeholders, namely regional heads and governors. These executives understand that they have to spend their budget on IT. However, they do not want to spend any more than the minimum necessary to deploy and run IT efficiently [13]. This is why managing service quality by implementing ITIL best practices is the least cost-effective way. Previous research shows that the ITIL framework is suitable to be applied to government agencies engaged in service delivery because ITIL focuses on improving the operational efficiency of information technology and improving service quality standards [39]. Incident management can bring significant improvement to the effectiveness and efficiency of IT resource management to support the organization's strategic goals [40].

- Competition:

Competition in the banking world has a significant influence on the efficiency and stability of the banking industry [41]. Previous research has shown that Islamic banks in Indonesia today have more market competition than before [42]. The rapid changes in technology increased the pressures and the competition between the banks to provide high-quality services to their demanding customers [43]. A bank can separate itself from players by giving the most effective quality service. Facility provision has a very important influence on trade execution, client fulfillment, trustworthiness, increased reference of clients, productivity, and company image [44]. To compete with other banks, especially state banks, management wants to implement good information technology governance, especially in terms of the availability of IT services. They set higher standards because previous research has shown that one of the state banks has been able to reach the maturity level of IT incident

management based on the ITIL framework at 1 level higher than theirs [32]. Management thinks that Bank XYZ is still far behind state banks both in terms of capital and technology. The main thing that needs to be maintained is service to our customers. Customer satisfaction is closely related to banking services that rely on IT, such as the availability of ATM networks, corporate banking systems, mobile banking, and customer service. Therefore, the availability of IT services must be maintained, and if the service is interrupted, it must be resolved immediately to maintain customer trust in Bank XYZ.

4. CONCLUSION

The Maturity Level Assessment process has been carried out based on the ITIL v3 framework, focusing on incident management services applied to one of the regional banks in Indonesia. The result shows a maturity level gap between the current incident management process (as is) and the desired ideal state (to be). Bank XYZ has fulfilled most incident management governance processes based on the ITIL v3 framework. Still, there are 15 out of 42 incident management processes that management feels have not met their expectations yet. Based on these gaps, an IT incident management governance document was designed based on the ITIL v3 framework best practice which is expected when it is implemented in the Bank's daily operations, and it will increase the availability of IT services.

Information technology, especially in IT services, is no longer discussing/questioning "if" IT services will be disrupted, but it is about "when" it will happen. Good IT governance, especially in terms of Incident Management, will help organizations assist in answering these questions: "what" happened; "where" is the affected area; "who" has duties and responsibilities towards it; "why" it happened; and "how" to minimize the impact and solve the problem.

Further research can explore the IT service management governance in other areas such as Event Management, Problem Management, and Request Fulfilment using ITIL v3 as a reference framework in its development, especially applied in case studies in Regional Banking.

REFERENCES

[1] M. Chi, J. Zhao, J. F. George, Y. Li, and S. Zhai, "The influence of inter-firm IT governance strategies on relational performance: The moderation effect of information technology ambidexterity," *Int. J. Inf. Manage.*, vol. 37, no. 2, pp. 43–53, 2017, https://doi.org/10.1016/j.ijinfomgt.2016.11.007.

[2] B. Tonn and D. Stiefel, "The future of governance and the use of advanced information technologies," *Futures*, vol. 44, no. 9, pp. 812–822, 2012, https://doi.org/10.1016/j.futures.2012.07.004.

[3] Z. Alreemy, V. Chang, R. Walters, and G. Wills, "Critical success factors (CSFs) for information technology governance (ITG)," *Int. J. Inf. Manage.*, vol. 36, no. 6, pp. 907–916, 2016, https://doi.org/10.1016/j.ijinfomgt.2016.05.017.

[4] F. Samopa, H. M. Astuti, and M. A. Lestari, "The Development of Work Instruction as a Solution to Handle IT Critical Incidents in Units within an Organization," *Procedia Comput. Sci.*, vol. 124, pp. 593–600, 2017, https://doi.org/10.1016/j.procs.2017.12.194.

[5] M. Gërvalla, N. Preniqi, and P. Kopacek, "IT infrastructure library (ITIL) framework approach to IT governance," *IFAC-PapersOnLine*, vol. 51, no. 30, pp. 181–185, 2018, https://doi.org/10.1016/j.ifacol.2018.11.283.

[6] H. M. Astuti, F. A. Muqtadiroh, E. W. T. Darmaningrat, and C. U. Putri, "Risks Assessment of Information Technology Processes Based on COBIT 5 Framework: A Case Study of ITS Service Desk," *Procedia Comput. Sci.*, vol. 124, pp. 569–576, 2017, https://doi.org/10.1016/j.procs.2017.12.191.

[7] S. A. Wulandari, A. P. Dewi, M. Rizki Pohan, D. I. Sensuse, M. Mishbah, and Syamsudin, "Risk assessment and recommendation strategy based on COBIT 5 for risk: Case study sikn Jikn helpdesk service," *Procedia Comput. Sci.*, vol. 161, pp. 168–177, 2019, https://doi.org/10.1016/j.procs.2019.11.112.

[8] M. Hsu and Janet Toland, "The challenges of implementing the ITIL Problem Management process in IT support organisations," *Sch. Inf. Manag.*, vol. Masters, no. February, p. 113, 2011, http://researcharchive.vuw.ac.nz/handle/10063/1554.

[9] H. Tanuwijaya and R. Sarno, "Comparation of CobiT Maturity Model and Structural Equation Model for Measuring the Alignment between University Academic Regulations and Information Technology Goals," *IJCSNS Int. J. Comput. Sci. Netw. Secur.*, vol. 10, no. 6, pp. 80–92, 2010, http://paper.ijcsns.org/07_book/201006/20100611.pdf.

[10] M. C. Valiente, E. Garcia-Barriocanal, and M. A. Sicilia, "Applying an ontology approach to IT service management for business-IT integration," *Knowledge-Based Syst.*, vol. 28, pp. 76–87, 2012, https://doi.org/10.1016/j.knosys.2011.12.003.

[11] N. Ahmad and Z. M. Shamsudin, "Systematic approach to successful implementation of ITIL," *Procedia Comput. Sci.*, vol. 17, pp. 237–244, 2013, https://doi.org/10.1016/j.procs.2013.05.032.

[12] P. Gangopadhyay and R. Nilakantan, "Peer effects and social learning in banks' investments in information technology," *Int. Rev. Econ. Financ.*, vol. 75, no. April, pp. 456–463, 2021, https://doi.org/10.1016/j.procs.2013.05.032.

[13] G. L. Lunardi, J. L. Becker, A. C. G. Maçada, and P. C. Dolci, "The impact of adopting IT governance on financial performance: An empirical analysis among Brazilian firms," *Int. J. Account. Inf. Syst.*, vol. 15, no. 1, pp. 66–81, 2014, https://doi.org/10.1016/j.accinf.2013.02.001.

[14] E. Orta, M. Ruiz, N. Hurtado, and D. Gawn, "Decision-making in IT service management: A simulation based approach," *Decis. Support Syst.*, vol. 66, pp. 36–51, 2014, https://doi.org/10.1016/j.dss.2014.06.002.
[15] V. R. Palilingan and J. R. Batmetan, "Incident Management in Academic Information System using ITIL Framework," *IOP Conf. Ser. Mater. Sci. Eng.*, vol. 306, no. 1, pp. 0–9, 2018, https://doi.org/10.1088/1757-899X/306/1/012110.
[16] C. L. Wilkin, P. K. Couchman, A. Sohal, and A. Zutshi, "Exploring differences between smaller and large organizations' corporate governance of information technology," *Int. J. Account. Inf. Syst.*, vol. 22, pp. 6–25, 2016, https://doi.org/10.1016/j.accinf.2016.07.002.
[17] UCISA, "ITIL – Introducing service operation," pp. 1–20, 2015, https://silo.tips/download/itil-introducing-service-operation.
[18] J. Järveläinen, "IT incidents and business impacts: Validating a framework for continuity management in information systems," *Int. J. Inf. Manage.*, vol. 33, no. 3, pp. 583–590, 2013, https://doi.org/10.1016/j.ijinfomgt.2013.03.001.
[19] J. J. Cusick and G. Ma, "Creating an ITIL inspired incident management approach: Roots, response, and results," *2010 IEEE/IFIP Netw. Oper. Manag. Symp. Work. NOMS 2010*, pp. 142–148, 2010, https://doi.org/10.1109/NOMSW.2010.5486589.
[20] J. Aguiar, R. Pereira, J. B. Vasconcelos, and I. Bianchi, "An overlapless incident management maturity model for multi-framework assessment (ITIL, COBIT, CMMI-SVC)," *Interdiscip. J. Information, Knowledge, Manag.*, vol. 13, pp. 137–163, 2018, https://doi.org/10.28945/4083.
[21] D. Tchoffa, L. Duta, and A. El Mhamedi, *Decision analysis in management of industrial incidents*, vol. 45, no. 6 PART 1. IFAC, 2012, https://doi.org/10.3182/20120523-3-RO-2023.00355.
[22] A. Abdul Latif, M. Md Din, and R. Ismail, "Challenges in adopting and integrating ITIL and CMMi in ICT division of a public utility company," *2010 2nd Int. Conf. Comput. Eng. Appl. ICCEA 2010*, vol. 1, no. January, pp. 81–86, 2010, https://doi.org/10.1109/ICCEA.2010.279.
[23] J. Iden and T. R. Eikebrokk, "Implementing IT Service Management: A systematic literature review," *Int. J. Inf. Manage.*, vol. 33, no. 3, pp. 512–523, 2013, doi: 10.1016/j.ijinfomgt.2013.01.004.
[24] M. Ruiz, J. Moreno, B. Dorronsoro, and D. Rodriguez, "Using simulation-based optimization in the context of IT service management change process," *Decis. Support Syst.*, vol. 112, no. June, pp. 35–47, 2018, https://doi.org/10.1016/j.dss.2018.06.004.
[25] A. Widianto and A. P. Subriadi, "IT service management evaluation method based on content, context, and process approach: A literature review," *Procedia Comput. Sci.*, vol. 197, no. 2021, pp. 410–419, 2021, https://doi.org/10.1016/j.procs.2021.12.157.
[26] S. Yamamoto, "A Continuous Approach to Improve IT Management," *Procedia Comput. Sci.*, vol. 121, pp. 27–35, 2017, https://doi.org/10.1016/j.procs.2017.11.005.
[27] M. Marrone and L. M. Kolbe, "Impact of IT Service Management Frameworks on the IT Organization," *Bus. Inf. Syst. Eng.*, vol. 3, no. 1, pp. 5–18, 2011, https://doi.org/10.1007/s12599-010-0141-5.
[28] M. Marrone and L. M. Kolbe, "Uncovering ITIL claims: IT executives' perception on benefits and Business-IT alignment," *Inf. Syst. E-bus. Manag.*, vol. 9, no. 3, pp. 363–380, 2011, https://doi.org/10.1007/s10257-010-0131-7.
[29] R. Yandri, Suharjito, D. N. Utama, and A. Zahra, "Evaluation model for the implementation of information technology service management using fuzzy ITIL," *Procedia Comput. Sci.*, vol. 157, pp. 290–297, 2019, https://doi.org/10.1016/j.procs.2019.08.169.
[30] M. D. De Barros, C. A. L. Salles, C. F. S. Gomes, R. A. Da Silva, and H. G. Costa, "Mapping of the scientific production on the ITIL application published in the national and international literature," *Procedia Comput. Sci.*, vol. 55, pp. 102–111, 2015, https://doi.org/10.1016/j.procs.2015.07.013.
[31] R. Esteves and P. Alves, "Implementation of an Information Technology Infrastructure Library Process – the Resistance to Change," *Procedia Technol.*, vol. 9, pp. 505–510, 2013, https://doi.org/10.1016/j.protcy.2013.12.056.
[32] R. Arisenta, Suharjito, and A. A. Sukmandhani, "Evaluation Model of Success Change Management in Banking Institution Based on ITIL V3 (Case Study)," *2020 Int. Conf. Inf. Manag. Technol.*, pp. 470–475, 2020, https://doi.org/10.1109/ICIMTech50083.2020.9211191.
[33] J. L. Verdegay and Z. Rodríguez, "A new decision support system for knowledge management in archaeological activities," *Knowledge-Based Syst.*, vol. 187, p. 104843, 2020, https://doi.org/10.1016/j.knosys.2019.07.014.
[34] O. Alshathry, "Maturity Status of ITIL Incident Management Process among Saudi Arabian Organizations," *Int. J. Appl. Sci. Technol.*, vol. 6, no. 1, pp. 40–46, 2016, http://www.ijastnet.com/journals/Vol_6_No_1_February_2016/7.pdf.
[35] AXELOS, "ITIL Maturity Model," 2013, https://www.axelos.com/for-organizations/itil-maturity-model.
[36] F. Li, H. Lu, M. Hou, K. Cui, and M. Darbandi, "Customer satisfaction with bank services: The role of cloud services, security, e-learning and service quality," *Technol. Soc.*, vol. 64, no. October 2020, p. 101487, 2021, https://doi.org/10.1016/j.techsoc.2020.101487.
[37] N. Rizun, A. Revina, and V. G. Meister, "Analyzing content of tasks in Business Process Management. Blending task execution and organization perspectives," *Comput. Ind.*, vol. 130, p. 103463, 2021, https://doi.org/10.1016/j.compind.2021.103463.
[38] T. Lucio-Nieto, R. Colomo-Palacios, P. Soto-Acosta, S. Popa, and A. Amescua-Seco, "Implementing an IT service information management framework: The case of COTEMAR," *Int. J. Inf. Manage.*, vol. 32, no. 6, pp. 589–594, 2012, https://doi.org/10.1016/j.ijinfomgt.2012.08.004.
[39] Office Government Commerce, *The Official Introduction to the ITIL Service Lifecycle*. The Stationery Office, 2007, https://books.google.co.id/books?id=9uLkMMqRKrYC.

[40] A. B. Naim, A. S. Wibawa, A. K. Yude, B. K. Akbar, V. S. Rahmadani, M. R. Shihab, and B. Ranti, "Changes in IT governance and its impact on organizational business process: Case study at Indonesia Supreme Audit Institution (BPK)," *Procedia Comput. Sci.*, vol. 197, no. 2021, pp. 734–742, 2021, https://doi.org/10.1016/j.procs.2021.12.195.
[41] C. Yildirim, A. Kasman, and F. S. Hamid, "Impact of foreign ownership on market power: Do regional banks behave differently in ASEAN countries?," *Econ. Model.*, vol. 105, no. September, p. 105654, 2021, https://doi.org/10.1016/j.econmod.2021.105654.
[42] I. Trinugroho, T. Risfandy, and M. D. Ariefianto, "Competition, diversification, and bank margins: Evidence from Indonesian Islamic rural banks," *Borsa Istanbul Rev.*, vol. 18, no. 4, pp. 349–358, 2018, https://doi.org/10.1016/j.bir.2018.07.006.
[43] Y. Alansari and A. M. A. Musleh Al-Sartawi, "IT governance and E-banking in GCC listed banks," *Procedia Comput. Sci.*, vol. 183, pp. 844–848, 2021, https://doi.org/10.1016/j.procs.2021.03.008.
[44] B. Tadesse and F. Bakala, "Effects of automated teller machine service on client satisfaction in Commercial Bank of Ethiopia," *Heliyon*, vol. 7, no. 3, p. e06405, 2021, https://doi.org/10.1016/j.heliyon.2021.e06405.

BIOGRAPHY OF AUTHORS

Saleh Firdausi is one of the postgraduate students at Universitas Islam Indonesia. He received his bachelor's degree from Universitas Mataram, Indonesia. Currently, he is working as an employee in Bank NTB Syariah, Indonesia. His research interest is IT governance, especially in IT services. Email: 18917223@students.uii.ac.id

Mukhammad Andri Setiawan is an assistant professor at Universitas Islam Indonesia. He received his Ph.D. from the University of Queensland, Australia. Currently, he is serving as Chief Information Officer at Universitas Islam Indonesia and also serving as head of training and human resources development at Indonesia Network Information Center, the National Internet Registry of the Republic of Indonesia. His main research interests are in the area of Information Systems, such as business process management and improvement, organizational change through the information system, IT governance, IT security, and research area in the development of the Internet of Things. Email: andri@uii.ac.id