

A Conceptual Model for Creating Effective Public Value Through Key Practices in Information Technology Governance Mechanisms

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Abstract— Information Technology (IT) convergence and transformation in the public sector continue to increase that encourage governmental organizations to make IT Governance (ITG) doing well. For public sector, ITG implementation is difficult because it is complex than ITG in the private sector. It is therefore necessary to have ITG mechanisms that align public sector needs especially in creating public value. The literature in ITG implementation in the public sector still does not discuss the ITG mechanisms implementation that align with IT strategy to create public value. Using Systematic Literature Review (SLR), we find key practices in ITG mechanisms that align with IT strategy in the public sector. These key practices are the basis of the conceptual model of the relationship between ITG mechanisms, strategic IT alignment, and effective public value.

Keywords—IT Governance Mechanisms; Strategic IT Alignment; Public Value

I. INTRODUCTION

Information Technology (IT) convergence and transformation, as marked by service digitalization through various smart and connected products that are sensor-embedded or commonly known as Social, Mobile, Analytics, Cloud and Internet of Things (SMACIT) [1] encourage organizations, including the public sector, to improve their

effective IT Governance (ITG). According to Weill & Ross [2], ITG is a series of decisions and accountability framework to encourage the behaviour and the use of IT. ITG will be more effective if the combination of ITG mechanisms that consist of decision-making structure, process, and relational mechanisms fit and align IT strategy and business strategy (strategic alignment) that generate IT value [3][4].

The process of determining the appropriate ITG mechanisms combination is complex because ITG mechanisms of a certain organization cannot be automatically implemented into other organizations [4]. It is not always the case in the private sector can be implemented well in the public sector. Although ITG aims to generate IT value of increasing IT investment regardless of the organization [5], the public sector inherently serves broader objectives than the private sector IT utilization in public sector supports the internal performance of these organizations and improves public service that eventually creates public value through IT [6][7]. Public sector aims to provide high-quality public service, to promote economic development, to achieve justice, and to enforce laws and regulations as public values [8].

Existing facts indicate that the ITG implementation in the public sector still faces various problems, such as interest differences among stakeholders, difficulties to measure IT

performance and public value, misalignment between organizational strategy and IT, and the absence of IT architecture that supports ITG implementation [2][5]. The literature on ITG mechanisms in the public sector finds key practices and activities that are the combination of decision-making structure, process, and relational mechanisms [9][10][11][12]. These key practices are developed from ITG mechanisms in the private sector [13][14][15][16]. There have been numerous studies on strategic IT alignment as an objective of ITG in the private sector [17][18][19]. However, the literatures that combines the relational pattern between key practices on ITG mechanisms that can generate strategic IT alignment to create effective public value is still lacking. Besides, DeHaes and Grembergen propose that scholars investigate ITG mechanisms in other sectors, such as the public sector [13].

The main motivation of this paper is to encourage the ITG implementation in the public sector in order to anticipate rapid IT investment in the digital era. It is expected that this study scientifically contributes to the development of ITG mechanisms as a governance implementation framework while also investigating its relationship with strategic IT alignment to generate public value. From the practical point of view, it is expected that this study contributes to the ITG implementation for public sector, especially in achieving optimal public value.

Accordingly, the research question of this research is “*how to create effective public value through key practices in ITG mechanisms and strategic IT alignment*”. This paper is structured as follows: introduction, theoretical foundations, research methodology, results and discussions, implications and conclusions, and limitation and future research.

II. THEORETICAL FOUNDATIONS

A. Public Value

The public value terminology was firstly coined by Moore that refers to values given by a particular organization to the public [20]. The public value was developed from the concept of New Public Management (NPM) which includes the public value dimension to be used together as a result of public service reform [8]. The implication of the IT in public organizations such as government agency, health institutions, and education that created a socio-political impact on IT adoption are categorized as public values [5].

It is expected that integration and digitalization in various sectors, especially in the public sector, significantly contribute to economic growth and public welfare improvement [21]. Public value is effective when public benefit from the impact of service digitalization provided by their governments. It is therefore expected that IT investment contributes significantly to public interests. Cresswell et al [22] introduce public value framework (Fig. 1) that analyses public value through IT not only for governmental agencies but especially for the public. Public value greatly affects society in various sectors, namely economy, sociopolitics, strategy, ideology, and even nationalism. However, the effective public value must be clearly identified so that IT investment and initiative match organizational strategy with IT strategy.

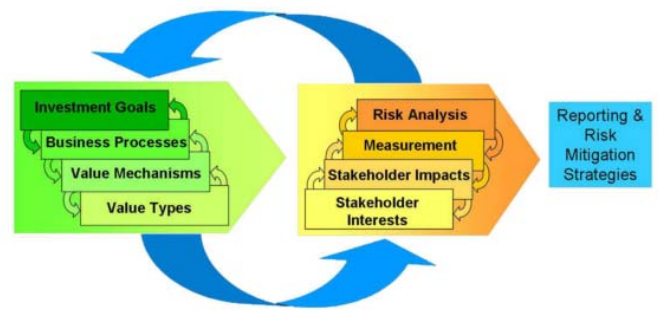


Fig. 1. Public Value Framework

B. ITG Mechanisms

Peterson [3] was one of the first authors to define a set of mechanisms for ITG. According to that author, the mechanisms act in order to meet the objectives of organizations regarding IT, while respecting the principles of corporate governance. ITG mechanisms are the combinations of IT practices that consist of relational mechanisms, decision-making structures, and processes [4] that can align IT and organizational strategies (strategic IT alignment) to achieve organizational objectives [2].

The following explains the relational patterns of ITG mechanisms: decision-making structures are the results of responsibility and role sharing in the appropriate IT decision making the framework in the IT organization. Process explains implementation procedures that fit IT policies and strategies. Finally, relational mechanisms ensure that designs and processes provide create IT value for organizations [13]. Fig. 2 explains further the ITG mechanisms.

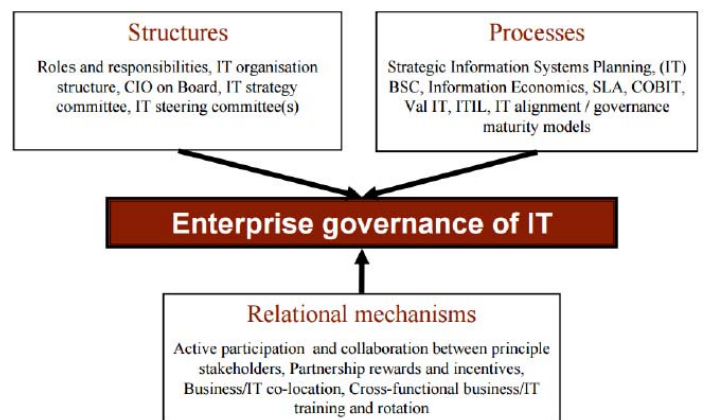


Fig. 2. ITG Mechanisms

C. Strategic IT Alignment

As discussed previously, the main objective of ITG is to align business and IT strategies. It then follows that the main question is are process implementation, structure, and relational mechanisms able to encourage strategic IT alignment? Although not a new concept, strategic IT alignment studies [17] are still relevant, especially in relation to the combination of ITG mechanisms to create public value. Integrating the ITG mechanisms and public value is even novel in the literature on strategic IT alignment in the public sector.

Although difficult to implement due to its complexity, it is expected that the holistic approach that combines structure, process, and relational mechanisms could enhance the ITG implementation [18]. It is, therefore, necessary to investigate key practices in each ITG mechanism within the strategic IT alignment framework [23] in various sector, especially in the public sector.

III. RESEARCH METHODOLOGY

This study uses the Systematic Literature Review or SLR method that was proposed by Kitchenham [24]. Considering the limited space, and purpose of this paper that develops a conceptual model of ITG mechanisms in public sector and strategic IT alignment, therefore the following are our research steps:

1. Finding the key practices in ITG mechanisms for public sector using SLR. The processes include: determining research sources, accomplishing the finding process by using selected keywords, extracting data, and display the results that related to key practices in ITG mechanisms for public value creation.
2. Develop the conceptual model and hypotheses to answer the research question.

IV. RESULTS AND DISCUSSIONS

A. Finding the Key Practices in ITG Mechanisms for Public Value

The first step in this SLR is to search and identify the key practices from previous literature that discuss the ITG mechanisms in public sector. We choose the following literature databases as literature sources: AIS Electronic Library, IEEE Xplore Digital Library, Springer Link, ScienceDirect, ACM Digital Library, IGI Global, Tandfonline, Palgrave, Google Scholar. We use various keywords to collect papers to review, namely “information technology governance”, “information technology governance mechanisms”, “public sector”, “public value”, “information technology governance practices”, and “strategic information technology alignment”. Table 1 describes the results of this searching process.

TABLE I. NUMBER OF STUDIES IN SELECTED SOURCES

Source	Studies Found	Candidate studies	Selected studies
AIS Electronic Library	85	13	7
IEEEExplore	25	11	6
Springer	191	15	7
Science Direct	97	12	4
ACM Digital Library	153	3	2
IGI	26	3	2
Tandfonline	22	3	2
Palgrave	21	1	1
Others (Google Scholar)	110	13	10
Total	730	74	41

Our next step is mapping and analysing the key practices in ITG mechanisms based on the combination of relational mechanisms, structures of decision-making, and processes that

have been proposed by Peterson [3], Weill & Ross [2] and DeHaes & Grembergen [16].

TABLE II. SELECTED ITG MECHANISMS FOR PUBLIC VALUE

Key Practices
<p>Decision-Making Structure :</p> <ol style="list-style-type: none"> 1. IT steering committees 2. Committe for IT investment and capital improvement 3. The role and responsibilities of governance are formally defined 4. Steering Committee for IT Project and IT Project Feasibility
<p>Process or Procedural :</p> <ol style="list-style-type: none"> 1. IT investment and portfolio management (Business Case, Information Economics, etc) 2. ITG frameworks (COBIT, ITIL, TOGAF, etc) 3. Control and reporting of the IT budget 4. IT performance measurement (IT Balanced Scorecard) 5. IT project governance management methodologies 6. Strategic information system planning
<p>Relational Mechanisms :</p> <ol style="list-style-type: none"> 1. IT leadership and top management support for IT 2. Organization communication system (internal and regular regular basis) 3. Business/IT job rotation and training as a cross-functional 4. Business/IT objectives shared understanding

Based on 41 papers reviewed, we find 44 key practices of ITG Mechanisms which consist of 17 key practices related to decision-making structure, 13 key practices related to processes or procedural and 14 key practices related to relational mechanisms. To answer the research problem, the key practices shown in Table 2 are only related to the purpose of the research that is to see the relationship of key practices in ITG mechanisms and strategic IT alignment to create effective public value. We using in-depth interview with 3 IT representatives from three government institutions in Indonesia and 2 IT experts in the public sector to choose the key practices.

B. Conceptual Model and Hypotheses

According to an assumption that public value through IT is important to organizational outcomes, the proposed model (Fig.3) will describe relations between among key practices of relational mechanisms, decision-making structures, processes, and strategic IT alignment. ITG mechanisms are a practical manifestation of ITG high-level definitions and contain day-by-day activities as a way to execute ITG in practice. We choose one key practice in every ITG mechanisms that have a strong relationship with the creation of public value. We proposed that the strategic IT alignment as a construct to explain how to create public value through IT and has relationship with other constructs. These are the theoretical construct based on research questions:

1. **IT leadership and top management support for IT** as a key practice of relational mechanism. Top management support and the commitment of top management regarding initiatives related to ITG enhances IT success and helps to integrate and align it with strategies, business processes,

stakeholders' expectations, and institutional mechanisms that ensure the permanence of IT investments over time [23][2]. Our assumption is that IT leadership is good to ensure that IT activities are sustainable and expanded to achieve the goal of creating a public value. IT leadership and management support can make a critical decision in IT investment and deployment in public sector initiatives

This leads us to propose the following hypothesis :

H_{1a} = IT leadership and top management support for IT has a positive relationship with the performance of the IT investment and portfolio management.

H_{1b} = IT leadership and top management support have a positive relationship with IT steering committee when making an IT investment decision.

2. **IT Steering Committee** as a key practice of decision-making structure. Several studies in performance of the IT committee argue that the performance of the structural mechanism of "IT committee" in planning and aligning responsibilities to the business is fundamental for the support of governance structures, planning and management of processes and information systems; hence, it is an important governance mechanism used by organization that show better performance [25][2][11]. The committee is composed of a team of executives from different areas of the organization with the main function of connecting business and IT strategies, as well as making decisions regarding projects selection and prioritization [26][7][27]. Hence, by determining methods, forms of management and investment priorities in IT initiatives, this mechanism has the mission of managing resources coming from the stakeholders that take part in the control and provision of institutional resources [27].

This leads us to propose the following hypothesis :

H₂ = The performance of the IT Steering Committee has a positive relationship with the performance of the IT investment and portfolio management.

3. **IT investment and portfolio management** as key practices of process or procedural mechanisms. The objective of the processing mechanism of IT investments and portfolio management is to improve the use of institutional resources in order to select a set of projects and programs that can bring the highest possible return to the organization [16] or public value [22]. This mechanism includes prioritization processes [2], IT projects and investments in which business and IT are involved as a strategic IT alignment, and its development and existence are linked to the mechanism of IT committee [28]. The portfolio management and the IT steering committee are interconnected, because the committee operates especially in the phases of prioritization, authorization and review of investments to be made [29]. Optimizing IT investment in the public sector through alignment with strategic priorities is important.

This leads us to propose the following hypothesis:

H₃ = The performance of the IT investment and portfolio management has a positive relationship with strategic IT alignment.

4. **Strategic IT Alignment for public value.** Strategic IT alignment is another term for business/IT alignment can be explained as alignment between business strategy/organization with IT strategy. This condition is important in ITG because of the lack of organizational / IT strategy is often the cause of IT failures [19]. Since Henderson and Venkatraman [17] published Strategic Alignment Model (SAM), the various research has been done in strategic IT alignment to develops several mutually constructions such as organizational and IT strategy. Strategic IT alignment in the public sector in line with the strategic goals of a public organization in delivering services. We assume that strategic IT alignment influences the creation of public value through IT. This construct contains various public values from Cresswell [22].

This leads us to propose the following hypothesis:

H₄ = The strategic IT alignment has a positive relationship with effective public value.

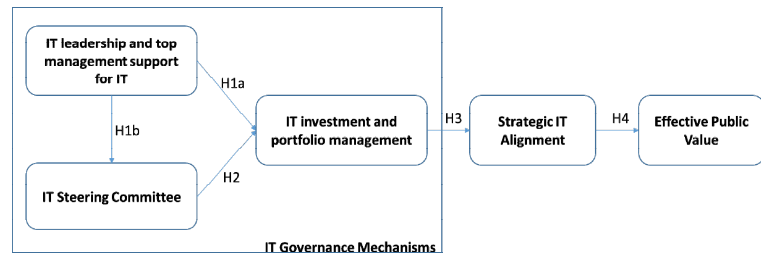


Fig. 3. Conceptual Model

V. IMPLICATION AND CONCLUSION

The main motivation of this paper is driven by the fact that the literature on the ITG implementation in the public sector seldom discusses public value as the benefit of IT investment in the public sector. Therefore, this research proposes a conceptual model that combines key practices in ITG mechanisms in the public sector that align with strategic IT alignment. Our thorough literature review finds key practices in ITG mechanisms in public sector. These underlie the construction of the conceptual model of ITG mechanisms for the public value that is in line with similar studies in the private sector [31][16].

We find interrelated constructs, especially on key practices in ITG mechanisms, namely IT leadership and top management support for IT, IT Steering Committee, and IT investment and portfolio management. The support of IT leadership as indicated by the creation of IT steering committee will improve IT investment process and performance that can be prioritized to generate public value. The novelty of this research is in the description of the relation between ITG mechanisms with strategic IT alignment in the context of public value creation. This paper scientifically contributes to the development of ITG mechanisms theory as the governance implementation framework and the

investigation of its relationship with strategic IT alignment to create public value.

From the practical point of view, it is expected that this study contributes to the ITG implementation in the public sector, especially in generating optimal public value. This is important because one of public sector characteristics is creating IT value internally especially for their citizens.

VI. LIMITATION AND FUTURE RESEARCH

This study has not yet validated the proposed model. We, therefore, suggest that subsequent studies validate our model. Also, our validation of key practices in the ITG mechanisms does not involve numerous actors although we have made in-depth interviews to experts. It is expected that follow-up studies discuss key practices in ITG mechanisms in more details while also validate the proposed conceptual model. The combination of quantitative and qualitative approaches are likely to validate better this model in order to generate effective public value in the public sector.

REFERENCES

- [1] J. W. Ross, I. M. Sebastian, C. Beath, S. Scantlebury, M. Mocker, and N. Fonstad, "Designing Digital Organizations," 2016.
- [2] P. Weil and J. W. Ross, *IT Governance : How Top Performers Manage IT Decision Rights for Superior Results*. 2004.
- [3] R. Peterson, "Crafting Information Technology Governance," *Inf. Syst. Manag. Fall 2004*, vol. 32, no. 6, pp. 1–24, 2004.
- [4] S. De Haes and W. Van Grembergen, "IT Governance and Its Mechanisms," *Inf. Syst. Control J.*, vol. 1, pp. 27–33, 2004.
- [5] J. Campbell, C. McDonald, and T. Sethibe, "Public and Private Sector IT Governance: Identifying Contextual Differences," *J. Inf. Syst.*, vol. 16, no. 2, pp. 5–18, 2009.
- [6] A. M. Cresswell, D. S. Sayogo, and L. Madrid, "Assessing the value of investments in government interoperability," in *Enterprise Architecture for Connected EGovernment: Practices and Innovations*, 2012, pp. 442–466.
- [7] J. Zdravkovic and I. Rychkova, "A Capability-Oriented Approach to IT Governance: The Case of Public Service Organizations," in *Lecture Notes in Business Information Processing*, vol. LNBIP 286, 2017, pp. 39–49.
- [8] A. Cordella and C. M. Bonina, "A public value perspective for ICT enabled public sector reforms: A theoretical reflection," *Gov. Inf. Q.*, vol. 29, no. 4, pp. 512–520, 2012.
- [9] A. O. Tonelli, P. H. de Souza Bermejo, P. Aparecida Dos Santos, L. Zuppo, and A. L. Zambalde, "IT Governance in the Public Sector: a Conceptual Model," in *Information Systems Frontiers*, vol. 19, no. 3, 2017, pp. 593–610.
- [10] T. J. Winkler, "IT Governance Mechanisms and Administration/IT Alignment in the Public Sector: A Conceptual Model and Case Validation," in *Wirtschaftsinformatik Proceedings 2013*, 2013, pp. 831–845.
- [11] M. A. H. Altemimi and M. S. Zakaria, "An Approach Towards Assessing Effective IT Governance Setting: Malaysia Public Sector Case Study," in *Leadership, Innovation and Entrepreneurship as Driving Forces of the Global Economy*, 2017, pp. 111–129.
- [12] G. C. Wiedenhof, E. M. Luciano, and O. A. Magnagnagno, "Information Technology Governance in Public Organizations: Identifying Mechanisms That Meet Its Goals While Respecting Principles," *J. Inf. Syst. Technol. Manag.*, vol. 14, no. 1, pp. 69–87, 2017.
- [13] S. De Haes and W. Van Grembergen, "Analysing the relationship between IT governance and business/IT alignment maturity," *Proc. Annu. Hawaii Int. Conf. Syst. Sci.*, no. February 2008, 2008.
- [14] R. Almeida, R. Pereira, and M. Mira, "IT Governance Mechanisms : A Literature Review," in *Proceedings, 4th International Conference, Exploring Services Science (IESS 2013)*, 2013, pp. 186–199.
- [15] R. Pereira, R. Almeida, and M. M. Da Silva, "IT governance patterns in the portuguese financial industry," *Proc. Annu. Hawaii Int. Conf. Syst. Sci.*, pp. 4386–4395, 2014.
- [16] S. De Haes and W. Van Grembergen, "An Exploratory Study into IT Governance Implementations and its Impact on Business/IT Alignment," *Inf. Syst. Manag.*, vol. 26, no. 2, pp. 123–137, 2009.
- [17] J. C. Henderson and H. Venkatraman, "Strategic alignment: Leveraging information technology for transforming organizations," *IBM Syst. J.*, vol. 32, no. 1, pp. 472–484, 1993.
- [18] S. P. Wu, D. W. Straub, and T.-P. Liang, "How Information Technology Governance Mechanisms and Strategic Alignment Influence Organizational Performance: Insights From A Matched Survey ff Business And IT Managers," *MIS Q.*, vol. 39, no. 2, pp. 497–518, 2015.
- [19] M. Queiroz, "Mixed results in strategic IT alignment research: a synthesis and empirical study," *Eur. J. Inf. Syst.*, vol. 26, no. 1, pp. 21–36, 2017.
- [20] M. H. Moore and S. Khagram, "Creating public value: strategic management in government," 2004.
- [21] R. D. Atkinson, "Digital Prosperity: Understanding the Economic Benefits of the Information Technology Revolution," *The Information Technology & Innovation Foundation*, vol. 1, no. March. p. 78, 2007.
- [22] A. M. Cresswell, G. B. Burke, and T. Pardo, "Advancing return on investment, analysis for government IT: a public value framework," 2006.
- [23] V. Sambamurthy and R. W. Zmud, "Arrangements for information technology governance: A theory of multiple contingencies," *MIS Q.*, vol. 23, no. 2, pp. 261–290, 1999.
- [24] B. Kitchenham, "Procedures for performing systematic reviews," 2004.
- [25] E. M. Luciano, G. C. Wiedenhöft, M. A. Macadar, and G. V. Pereira, "Discussing and Conceiving an Information and Technology Governance Model in Public Organizations," in *Information Technology Governance in Public Organizations*, 2017, pp. 3–26.
- [26] J. S. Denford, G. S. Dawson, and K. C. Desouza, "Exploring IT-Enabled Public Sector Innovation in U . S . States," in *Hawaii International Conference on System Sciences (HICSS) 2017*, 2017, pp. 5174–5183.
- [27] L. C. Santos and C. D. dos Santos, "A study on the impact of non-operational mechanisms on the effectiveness of public IT governance," *Rev. Adm.*, pp. 1–12, 2017.
- [28] B. Ranti and J. Tambotih, "Implementasi Kajian Kelayakan Finansial Untuk Meningkatkan Tingkat Kematangan Manajemen Investasi Teknologi Informasi," *J. Sist. Inf.*, vol. 6, no. 2, pp. 126–133, 2010.
- [29] M. Pang, "IT governance and business value in the public sector organizations — The role of elected representatives in IT governance and its impact on IT value in U . S . state governments," *Decis. Support Syst.*, vol. 59, pp. 274–285, 2014.
- [30] B. H. Reich and I. Benbasat, "Factors That Influence the Social Dimension of Alignment Between Business and Information Technology Objectives," *MIS Q.*, vol. 24, no. 1, pp. 81–113, 2000.
- [31] P. H. de S. Bermejo, A. O. Tonelli, A. L. Zambalde, P. A. dos Santos, and L. Zuppo, "Evaluating IT Governance Practices and Business and IT Outcomes: A quantitative Exploratory Study in Brazilian Companies," *Procedia Technol.*, vol. 16, pp. 849–857, 2014.