

***USING IT GOVERNANCE BALANCED SCORECARD AND
IMPORTANCE-PERFORMANCE ANALYSIS FOR DEVELOPING
IT GOVERNANCE IN HIGHER EDUCATION INSTITUTION
(AN EMPIRICAL STUDY IN EAST JAVA, INDONESIA)***

Wheny Khristianto
Universitas Brawijaya

email: wheny.fisip@unej.ac.id

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ABSTRACT

The purpose of this paper is to investigate the validity of the higher education academic staffs in IT governance studies and the future improvement for IT governance and controls. This research used a quantitative survey to identify the current state of IT governance for five higher education institutions in East Java, Indonesia. The questionnaires were distributed to post-graduate student as IT executives in their higher education institution. A total of 34 out of 40 post academic staffs completed the questionnaire, representing a response rate of 85 percent. This study found that attributes for deliver value (V2), attainment and retain people with key competencies (V6), capture knowledge to improve performance (V10), stakeholder satisfaction (V11), reach economies of scale (V17), deliver successful IT project (V19), understand business unit strategies (V20), and understand emerging technologies (V22) show no significant difference ($p < 0.05$) between mean interests and performance. In addition to these, other 15 attributes show significant differences in the t-test in the negative direction. This points to the fact that actual control of IT governance in colleges is monitored less than expected. Therefore, five higher education institutions in East Java should pay more attention to the identified attributes important to balance the gap between the importance and performance of these attributes.

Keywords: *IT governance, IT governance balanced scorecard, Importance-performance analysis, higher education institution*

INTRODUCTION

Good Information Technology (IT) governance will greatly support organizational activities in achieving goals that include the organization's vision and mission as it requires a consistency in organization or business strategy and information system (IS) / IT strategy (Guidlines for Secretary General of the Ministry of Communication and Information of the Republic of Indonesia No.1, 2018). IT / IT governance is also able to study the impact of technological developments on business performance and contribution to the organization in selecting strategic steps depicted in various analytical equipments, techniques and management frameworks to align SI / IT strategies with business strategy, new through the application of innovative technology (Waluyan & Manuputty, 2016).

Recently, the development of IT also masiv happening in the world of education, especially in college education. With increased pressure from globalization, changes in funding structures in higher education, and changes in supply and demand for higher education, many higher education institutions around the world seek to survive and seek competitive advantage through innovation (Brown, 2008; OECD, 2009; Gibbs and Barnett, 2014; Gaspar and Mabic, 2015). To gain competitive advantage and innovation power, higher education undertakes the adoption of information technology.

Stakeholders in colleges are seeking to advantage from developing IT governance. The higher education sector is haunted by a large number of challenges including technological developments and new demands in the education sector around the world, all of which make the field of higher education an exciting field for research (Mathew, 2010). Murtadho & Wahid (2016) identified several problems of IT implementation, such as internet access, network infrastructures, security systems, integration systems, computers devices and supports, system availability, and IT maintenance. Factors influencing innovation in higher education institutions thus always represent vital areas of concern in the field of organizational studies (Meek et al., 2009). Typically, the existing literature is a common position that successful innovative practices within an organization build relationships between individual and institutional factors (Hoidn and Kärkkäinen, 2014; Zhu, 2015). Both of them are also supported by IT for developing innovation and creativity.

In particular, the use of IT Balanced Scorecard in higher education institutions in Indonesia has not been widely implemented (Prabowo, 2007). Previous studies related to IT governance in Indonesia in higher education have highlighted the important role played by IT governance using BSC (Solechan, 2015; Misbah et al., 2017; Haerani, 2017). BSC IT can play an important role in the overall program in heigher education institutions, empowering the structural ranks (Haerani, 2017), but with regard to the effectiveness of this method, higher education institutions need to organize the ICT organization and simultaneously evaluate the success of system / application development. The purpose of this study is to investigate the validity of the higher education academic staffs in IT governance studies. Our study addresses a major issue in IT governance research in higher education contexts. Secondly, this study aims to clarify the actual practice of IT governance in higher education and to determine IT governance strategy for higher education institutions in Indonesia, especially in East Java.

LITERATURE REVIEW

Principles of IT Governance

This is supported by the definition of IT governance. Several definitions exist to define IT governance. Some of the more widely-used definitions are given here. According to IT Governance Institute/ITGI (2003), IT governance is defined as the responsibility of the board of directors and executive management. It is an essential element of enterprise governance and include the leadership and organizational structures and processes that guaranty that the organization's IT sustains and extends the organization's strategy and objectives. Based on Gartner (2006), IT governance is defined as the processes which ensure the effective and efficient use of IT in enabling an organisation to achieve its goals.

Wijsman et al. (2007) give definition about IT governance as the joint responsibility of the executive management level of an organization and its supervisor(s) for (1) strategic planning and (2) internal control of the organization's deployment of IT and for (3) external accountability and (4) external supervision of the organization's deployment of IT. In addition, Campbell et al. (2009) also suggested that definition of IT governance is the structure of relationships, processes and mechanisms used to develop, direct and control IT strategy and resource allocation so as to achieve the goals and objectives of an enterprise. It is a set of formal processes aimed at balancing the risk and return aspects of IT investment so as to consistently add value to the organization.

According to Lee and Lee (2009), there are three perspectives of IT governance. First, based on decision rights and accountabilities, IT governance is defined as the decision-making in the IT domain, focusing on the distribution of decision rights and accountabilities (or responsibilities) for the effective use of IT resources. Second, from business/IT alignment perspective, IT governance is defined as the activities to maximize business value through bringing about business/IT alignment. In achieving this goal, business/IT strategies should emphasize the effective control of resources, performance management, and risk management. Third, based on structures and processes, IT governance is defined as the responsibility of company executives and the board of directors, referring inclusively to the leadership, organizational structures and processes ensuring that enterprises' IT sustains organizations strategies and objectives.

Borousan et al. (2011) explained that IT governance considers two things: IT's delivery of value to the business and Mitigation of IT risks. They can be driven by strategic alignment of IT with the business and second is driven by embedding accountability into the organization. Both mentioned factors should be supported by adequate resources, and be measured for assurance of results.

IT governance-Balanced Scorecard

BSC can be referred to IT as initially described by Van Grembergen et al. (1997). The adaptations made by these authors generated a common scorecard for IT known in the literature as IT BSC. The success of the BSC in IT is due to its flexible design and comprehensive nature. By adding or altering individual measures and perspectives, the BSC can be tailored to suit the strategy of any organization (Erek, 2011). Moreover, a cascade of BSC can be used across multiple organizational levels supporting strategic alignment (Van Grembergen et al., 2003).

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Because of its easy adaptability, many issues have been addressed by using the IT BSC framework, such as, evaluating IT projects (Aubert et al., 2010), evaluate IT departments performance (Lee at al, 2008), evaluating IS performance (Rosemann, 2001), prevent sub-optimization of IT performance (Amado et al., 2012), ensuring strategic alignment between IT and the business (Van Grembergen & Saull, 2001), integration of business and IT governance (Borousan et al., 2011), and others. The range of each perspective in IT governance BSC can be explained as follows. First, the corporate contribution perspective measures the performance of IT governance processes for ensuring that business can achieve maximum profit from IT while reducing risk at a reasonable point. Second, the objectives of the stakeholder perspective are to measure stakeholder satisfaction, management of stakeholder needs, and legal/ethical compliance. Third, the operation excellence perspective identifies the maturity of IT governance structures and processes. Lastly, the future orientation perspective is designed to measure the foundations of skills, knowledge, and IT/business partnership for IT Governance delivery (Van Grembergen, 2005).

Importance Performance Analysis

Martilla and James (1977) introduced IPA, is a method which has been broadly used in marketing research, especially for developing and improving strategy. IPA, on the other hand, is a heavy evaluation instrument for practitioners and academics to find out attributes that are doing well and attributes that need to be improved, which require actions immediately (Liu & Picolli, 2007). In short, Konsynski & Tiwana (2004) argued that IPA evaluation equipment is used to prescribe the prioritisation of attributes for improvement and it can also provide guidance for strategic development. There are four quadrants in two dimensional IPA model with performance on the x-axis and importance on the y-axis. These four quadrants are namely *Concentrate Here*, *Keep up the Good Work*, *Low Priority*, and *Possible Overkill* are created. The quadrants can be used to generate suggestions for IT Governance managers by differentiating between them (Liu & Picolli, 2007).

The explanation of the original IPA is described by the scatter plot in the Figure 1 as follow:

- Quadrant I (High Importance/Low Performance) is labelled *Concentrate Here*. Attributes that fall into this quadrant represent key areas that need to be improved with top priority.
- Quadrant II (High Importance/High Performance) is labelled *Keep up the good work*. All attributes that fall into this quadrant are the strength and pillar of the organisations, and they should be the pride of the organisations.
- Quadrant III (Low Importance/Low Performance) is labelled *Low Priority*. Thus, any of the attributes that fall into this quadrant are not important and pose no threat to the organisations.
- Quadrant IV (Low Importance/High Performance) is labelled as *Possible Overkill*. It denotes attributes that are overly emphasized by the organisations; therefore, organisations should reflect on these attributes, instead of continuing to focus in this quadrant, they should allocate more resources to deal with attributes that reside in quadrant I.

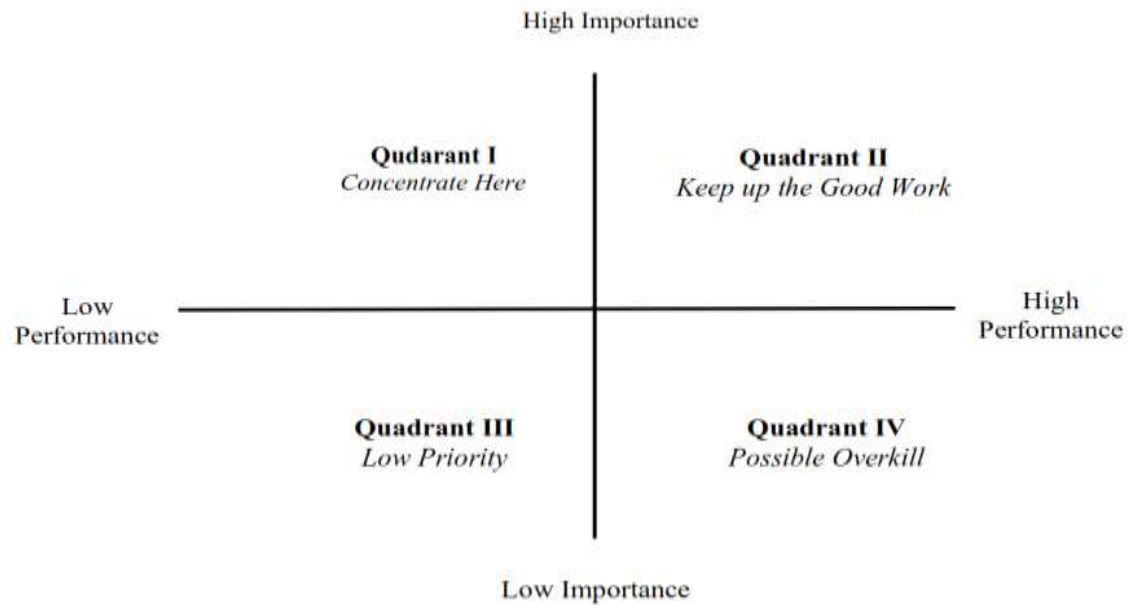


Figure 1. The original IPA Framework (Source: Martilla & James, 1977)

The IPA evaluation equipment can help to evaluate IT governance advantages and to provide guidance to formulate IT governance strategy to allocate resources accurately to maximise a high return on investment (ROI) (Liu & Picolli, 2007). The IPA model is used to evaluate the level of importance practioners and academics attach to each of the advantages and also to examine the level of satisfaction perceived by them in the delivery of those advantages.

RESEARCH METHOD

This research used a quantitative survey to identify the current state of IT governance for higher education organizations in East Java, Indonesia. A self-assessment was developed based on the metrics from IT governance BSC introduced by Abu-Musa (2007). The questionnaire consists of 23 items within four dimensions, as shown in Figure 3. According to these metrics (Abu-Musa, 2007), this study used three-point Likert scale to measure the importance (1 ¼ not important to 3 ¼ very important) and performance (1 ¼ not monitoring to 3 ¼ always monitoring). The questionnaires were distributed to post-graduate student as IT executives in their higher education institutions.

Sampel data were collected by administering the survey instrument to five higher education institutions on East Java. The survey instrument was handed out to the academic staffs who have experience in some strategic position in their institution as IT executive. They were asked to capture the perceived importance and performance for each attribute. A total of 34 out of 40 academic staffs completed the questionnaire, representing a response rate of 85

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percent. The reliability analysis was carried out by calculating the Cronbach's α coefficient. The result showed a high internal consistency as shown in Table 1.

After reliability testing was performed, a paired-sample *t*-test was run to evaluate the mean difference between performance and importance scores. IPA was then applied to capture graphical demonstration for identifying the current stage of IT governance and also providing the strategic actions for the higher education institutions.

Table 1. Cronbach's α and reliability of scale

Constructs (Grembergen & De Haes, 2005)	Items	Cronbach's α (importance)	Cronbach's α (performance)
Corporate contribution	Five items (V1, V2, V3, V4 and V5)	0.441	0.460
Future orientation	Five items (V6, V7, V8, V9 and V10)	0.415	0.515
Stakeholder orientation	Four items (V11, V12, V13 and V14)	0.333	0.377
Operational excellence	Nine items (V15, V16, V17, V18, V19, V20, V21, V22 and V23)	0.469	0.401
	All items	0.415	0.439

RESEARCH RESULT

This section presents key results related to academic staff' perceptions as IT executive' perceptions of the importance of IT governance performance measures performed at their higher education insitutions. The IPA results with IT governance of the BSC attributes are summarized in Table 2. The graphical parable of the IPA is also shown in Figure 3. In addition, the implications of the results obtained are also discussed in this section.

According to Table 2, a paired paired sample *t* test was conducted to identify significant gaps between importance and performance. Attributes for deliver value (V2), attainment and retain people with key competencies (V6), capture knowledge to improve performance (V10), stakeholder satisfaction (V11), reach economies of scale (V17) , deliver successul IT project (V19), understand business unit strategies (V20), and understand emerging technologies (V22) show no significant difference ($p < 0.05$) between mean important and performance. In addition to these, other 15 attributes show significant differences in the *t*-test in the negative direction. This points to the fact that actual control of IT governance in colleges is monitored less than expected. Therefore, five higher education institutions in East Java should pay more attention to the identified attributes important to balance the gap between the importance and performance of these attributes.

The important performance matrix of IT governance-BSC attribute is plotted in four quadrants, as shown in Figure 2. Important values are presented on the vertical axis, while performance values are presented on the horizontal axis. Quadrant I shows the attributes that

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need to be considered for improvement on the first priority. Quadrant II represents the attribute that the organization can perform well and needs to keep it working properly. Quadrant III shows the attribute that the organization must limit its resource allocation. Quadrant IV represents the attribute that the organization must reshape its policy to achieve optimal resource utilization. In addition, further details of the attributes in each quadrant can be described as follows.

The *concentrate here* quadrant

The IT executive identifies 19 attributes in the squares here, which can be considered as adequate controls for attributes that need to be noticed. This is due to the fact that the attributes for IT governance BSC can perform not only as performance measurements, but former attribute groups can also influence the next group / perspectives, as shown in Figure 2. The lack of auditing in source attributes can affect the control of destination attributes. Therefore, all attributes in the quadrant concentrate here must be reconsidered for results and consequences.

Table 2. IPA with IT governance BSC attributes

IT governance BSC attributes	Important mean	Performance mean	Gap (P-I)	t-value	Significance (two-tailed)
<i>Corporate contribution</i>					
V1.Align IT with business objectives	2.44	2.21	-0,23	-2.66	0.010
V2.Deliver value	2.26	2.20	-0.06	-2.94	0.000
V3.Manage costs	2.38	2.23	-0.15	-2.68	0.000
V4.Manage risks	2.53	2.30	-0.23	-2.35	0.022
V5.Achieve inter-organization synergies	2.24	2.18	-0.06	-2.92	0.005
<i>Future orientation</i>					
V6.Attract and retain people with key competencies	2.26	2.27	+0.01	-1.76	0.000
V7.Focus on professional learning and development	2.47	2.21	-0.26	-2.26	0.083
V8. Build a climate of empowerment and responsibility	2.12	2.29	+0.17	-2.91	0.002
V9. Measure/reward individual and team performance	2.44	2.29	-0.15	-2.45	0.005
V10.Capture knowledge to improve performance	2.24	2.18	-0.06	-2.48	0.017
<i>Stakeholder orientation</i>					
V11.Stakeholder	2.35	2.30	-0.05	-2.21	0.000

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IT governance BSC attributes	Important mean	Performance mean	Gap (P-I)	t-value	Significance (two-tailed)
satisfaction					
V12.Demonstrate competitive costs	2.56	2.35	-0.21	-2.11	0.000
V13.Delivery good service	2.41	2.21	-0.20	-2.76	0.008
V14.Develop good service	2.62	2.30	-0.32	2.23	0.029
<i>Operational excellence</i>					
V15.Mature internal IT processes	2.48	2.32	-0.16	-1.59	0.015
V16.Manage operational service performance	2.47	2.30	-0.18	-1.35	0.117
V17.Achieve economies of scale	2.38	2.30	-0.08	-2.32	0.180
V18.Build standard, reliable technology platforms	2.53	2.30	-0.23	-2.13	0.000
V19.Deliver successful IT projects	2.23	2.18	-0.05	-5.06	0.000
V20.Understand business unit strategies	2.38	2.32	-0.06	-4.48	0.005
V21. Propose and validate enabling solutions	2.35	2.53	+0.18	-3.80	0.026
V22.Understand emerging technologies	2.29	2.38	+0.09	-5.71	0.001
V23.Develop organization architecture	2.32	2.44	+0.12	-4.68	0.010

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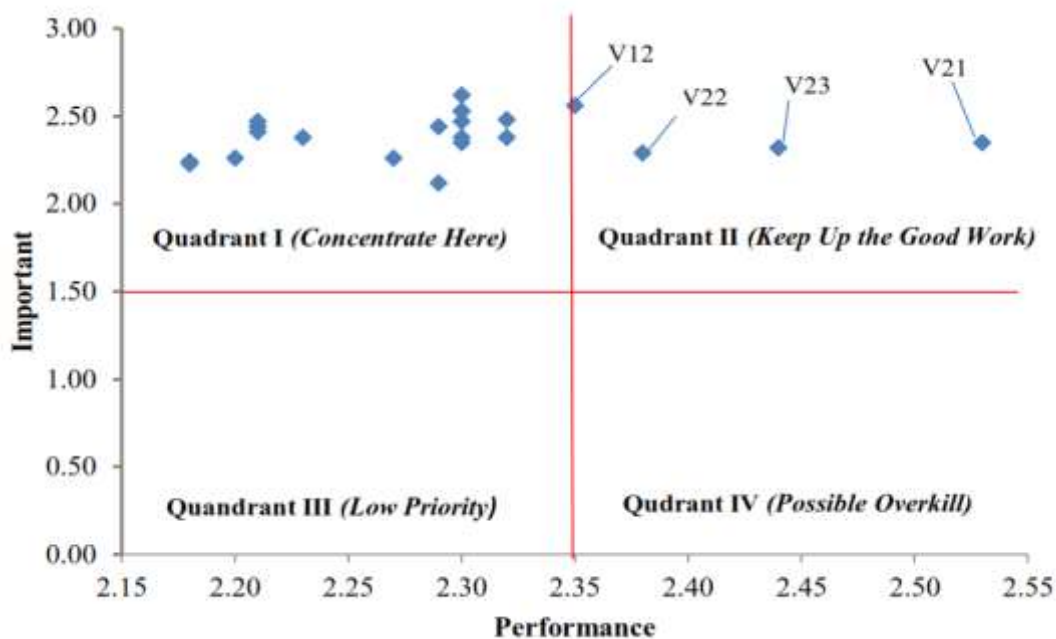


Figure 2. Plotting of importance-performance matrix for IT governance BSC attributes

The keep up the good work quadrant

According to the IT executive perception, 4 attributes (V12, V21, V22, and V23) have been identified in the keep up the good work quadrant. The important attributes that fall into quadrant II can be measured in a consistent way. These attributes are expected to be the pillar of strength for leading IT governance in the higher education institutions. Therefore, all attributes in the keep up the good work quadrant can be used as the baseline indicators for driving IT governance in five higher education institutions in East Java.

The low priority quadrant

In quadrant III, there is no attribute that fall into the low priority quadrant. This means that all IT executives perceived the performance measurement of IT governance in their higher education institutions can be conducted well. There are no important attributes that perform a low-level monitoring. Even if we found evidence for lower expected control with 14 attributes in Table 2, it would not be considered as a critical point when comparing with the result reflected in this quadrant.

The possible overkill quadrant

There is no attribute falls into the possibility of an excessive quadrant. If there are attributes that reside in this quadrant, those attributes are considered to be doing a lot of control. Therefore, if the attribute is the IT executive must reconsider the importance of this attribute. If the last discussion identifies the same utterance, then it can reduce the effort for this attribute.

DISCUSSION

This study applies IPA analysis with IT governance BSC to capture the perceptions of IT executives represented by academic staffs regarding the importance of IT governance performance measures performed at their higher education institutions. When applying IPA to strategic equipments such as IT governance BSC, the results obtained must be interpreted with caution in order not to provide false information. Because the metrics of IT governance BSC are shown in the form of cause and effect, the results obtained must be reshaped from the original IPA analysis.

From the results of IPA analysis obtained data that there are many attributes in quadrant I and some attributes are in quadrant II. This can be a consideration for IT executives to pay attention to both quadrants. If there are attributes fall into quadrants III and IV it does not mean these attributes are unnecessary, but this can be information for IT executives to consider more thoroughly and give priority to attributes that have more impact and have consequences on higher education institutions performance. If they confirm that an existing metric is not important, unnecessary metrics must be rejected. After recovering unnecessary Indicators, IT executives can follow up on three strategic actions to elevate their ability to set IT at their higher education, as shown in Figure 3.

There are three strategies that can be used as guidance in the analysis using IPA. Strategy 1 (S1) is intended to support the attributes that fall into unimportant region to rise up to important region. Strategy 2 (S2) aims to rise up the attributes that fall into low performance region to high performance region. Strategy 3 (S3) is intended to rise up both attributes that fall into low performance and unimportant region to high performance and important region.

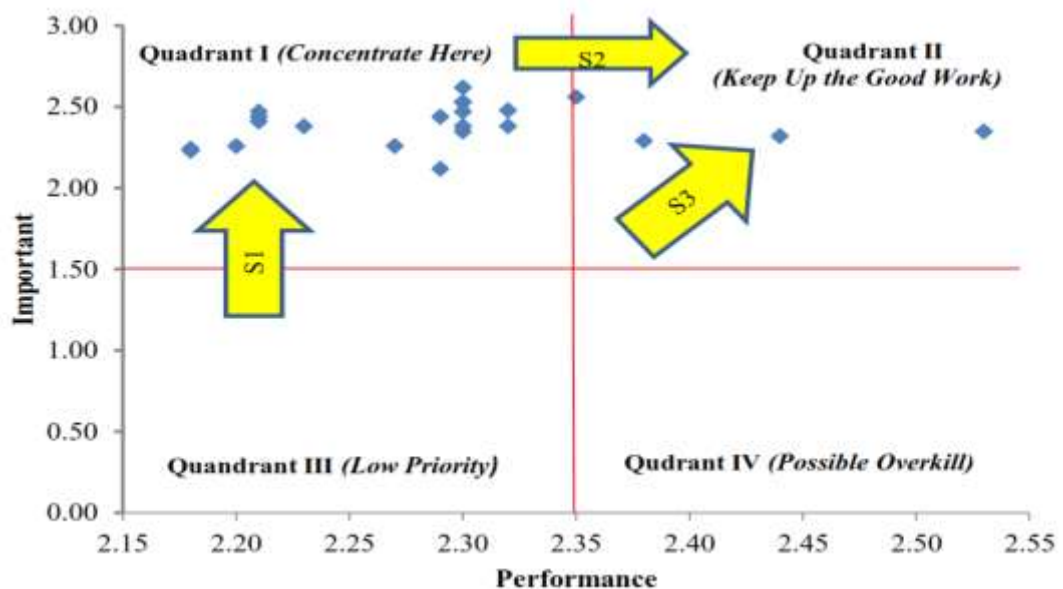


Figure 3. IT governance strategic guidance for higher education institution in East Java based on IPA

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Based on the results of the analysis, the recommended strategy to use is Strategy 2 which aims to increase attributes that fall into low performing regions to high performing regions. According to Strategy 2, IT executives should focus on identifying indicators that should be consistent with their internal IT processes. All attributes in the quadrant concentrate here must be reconsidered for results and consequences. Furthermore, all stakeholders should be involved in the development of these indicators to gain wider acceptance.

CONCLUSION

There are two conclusions from this study to answer the research objectives. First, IT executives can implement BSC IT governance metrics with IPA to clarify the current situation of IT governance performance at their heigher education. Consequently, the strategic actions of IT governance for five higher education institutions in East Java could take place. In addition, the control framework currently used in higher education institutions may be tailored to the implications of the IPA.

Second, based on the IPA results, five higher education institutions in East Java can apply 4 attributes that are included in keep up the good work as an early indicator to drive IT governance at their higher education institutions. In the long run, IT executives can apply the IT governance strategic recommendations provided by this study using S2 as a guide to focus on attributes included in the concentrate here to be pushed toward keep up the good work. In further study, an insight review of articles based on a global IT governance perspective and practical guidance from a regional survey can be combined to draw a flexible IT governance framework for five higher education instiutions in East Java.

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