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Management Competency Framework of Adopting Information System and Data Governance based on COBIT 2019

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Abstract

The present studies about the requirements for management ability state that technological developments have taken a significant impact on executives' control competence. Based on Control Objectives for Information and Related Technology (COBIT 2019) as a framework for enterprise governance of information and technology (IT), this paper proposes a management competency framework and analyses the constituent elements of management capabilities with a focus on the need for technological ability. The framework includes 30 competencies in 8 domains for executives when adopting the information system and data governance. IT-related strategies, innovation, operation management, financial skills, relationships, human resources, risk management, and cognitive and emotional skills are regarded as core capabilities for professional managers to equip. We also expect to further develop the metrics of each competency for empirical analysis and assessment system to rate the management competency adopting IT governance.

Keywords

Management Competency; Executives; IT; COBIT 2019; Governance.

1. Introduction

The most recent framework of COBIT 2019 is officially released by ISACA (Information Systems Audit and Control Association), the COBIT Core Model and its 40 management objectives provide effective implementation of "enterprise governance of information and technology (EGIT)" (Steven H. & Grembergen W., 2020) [1]. The performance management system is updated and allows the flexibility to use maturity measurements as well as capability measurements. According to COBIT Components of a Governance System, organizational structures, policies and procedures, information items, culture and behavior, skills and competencies, and services, infrastructure and applications are individually and collectively contributing to the good operations of the enterprise's governance system [2].

Technological contingency suggests that technology as an exogenous factor partly determines the initiatives of individuals and organizations, including management control (Azan & Bollecker, 2011). Therefore, they examined the adaptation process of ERP which managers need to undergo to tune their competencies from the management controller's standpoint [3]. Technology improvements also set the requirements of digital competency for almost everyone which extends from preliminary to higher education, including general education and vocational training [4] (Karsenti, Poellhuber & Parent, 2020). Researchers also developed a framework body that identified 81 managers' competencies divided across 11 dimensions: influencing, communication, emotional, contextual, management, cognitive skills, professionalism, knowledge and experience, project management knowledge, and personal skills and attributes [5] (Leandro & Paul, 2019).

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This research is neither a comprehensive management competence framework for executives' capabilities nor an enterprise governance framework for information technology, we focus on the IT management and governance competencies of executives. Regarding to the COBIT 2019 of information technology governance, we propose a management competency framework of managers accordingly. The objective of this article is to identify the dimensions and group the requirements of management competencies based on the information system and data governance.

2. Methods

This framework adopts the Search, Appraisal, Synthesis and Analysis (SALSA) framework to conduct the systematic review [6] (Booth et al., 2012). We searched 165 peer-reviewed documents relevant to the management competency framework, which a focus on the economy and management in the meantime except the medical health and education field. After glancing through the titles and abstracts, 3 frameworks are selected as main final references, Wilfrid Azan's Management Control Competencies, Bolzan and Leandro's Project management competency framework, and COBIT 2019. According to our research subject, we filter and organize the technological capabilities of executives and governance objectives of enterprises during the synthesis stage. At the final analysis stage, we define and analyze each constituent element.

"Complex know-how developed through the effective mobilization of a range of internal and external resources in a variety of related situations" was defined as "competency" by Tardif (Tardif, 2007, p.22) [7]. According to COBIT Core Model, it states 40 objectives and purposes of governance and management from the enterprise perspective, thus, we adopt a competency-based approach proposed by Azan and Bollecker to form the framework based on executives, which also includes the human abilities and social factors not only organizations.

3. Framework of Management and Governance Competency Adopting IT

Research on the management competency framework when adopting information system and data governance based on COBIT 2019, Table 1 illustrates the management and governance competencies using IT and also shows the connections between our framework on the left and 40 objectives of COBIT Core Model on the right side. Transforming the subject from the enterprises to executives, we group them in the 8 domains of 30 competencies for managers. We will explain each competency of the management competency framework when adopting information systems and data governance in the following paragraphs.

3.1. Strategic Capability

These are four competencies in the strategic domain, respectively strategy maintenance, digital transformation strategy, IT management framework and architecture optimization. Strategy maintenance is to ensure the IT-related decisions keeping in line with the enterprises' strategies. This strategic consistency can make IT procedures effective and efficient which can also realize the enterprises' governance through the transparent and contractual systems. Digital transformation strategy requires executives to support incremental changes that enable changes of update and promotion, from channels, processes to culture and incentives. IT management framework needs managers to implement a set of IT management systems with governance structures, processes requirements, and responsibilities. This approach will make members realize and clear about the technological applications in routine work and the skill requirements, which will also provide a standard procedure system with a Speed-up channel for organizational development. Architecture optimization needs the evolution of procedure designing, principles making, incentives upgrading and cost behavior controlling with

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appropriate periodical data analysis. Regular review, summary, analysis with data help with policy adjustments and forecast to improve the governance structure and the performance.

Table 1. Framework of Management and Governance Competency Adopting IT

Domains	Competencies	Reference		Objectives	Domains
Strategy	Strategy Maintenance	EDM01 EDM05 APO01 APO02 APO03	EDM01	Ensured governance framework setting & maintenance	Evaluate, Direct and Monitor
			EDM02	Ensured benefits delivery	
	Digital Transformation Strategy		EDM03	Ensured risk optimization	
			EDM04	Ensured resource optimization	
	IT Management Framework		EDM05	Ensured stakeholder engagement	
			APO01	Managed I&T management framework	Align, Plan and Organize
	Architecture Optimization		APO02	Managed strategy	
			APO03	Managed enterprise architecture	
Innovation	I&T Development	APO04	APO04	Managed innovation	
Operation Management	Service Quality	APO05 APO09 APO11 APO14 BAI01 BAI02 BAI03 BAI04 BAI10 BAI11 DSS01 DSS02 DSS03 DSS06 MEA01	APO05	Managed portfolio	
			APO06	Managed budget and costs	
	Process Control		APO07	Managed human resources	
			APO08	Managed relationships	
	Data Management		APO09	Managed service agreements	
			APO10	Managed vendors	
	Problem Solving		APO11	Managed quality	
			APO12	Managed risk	
	Evaluation		APO13	Managed security	
			APO14	Managed data	
	Portfolio Management		BAI01	Managed programs	Build, Acquire and Implement
			BAI02	Managed requirements definition	

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	Configuration Optimization		BAI03	Managed solutions identification and build	
Financial Skills	Budget & Cost	EDM02 EDM04 APO06 BAI09	BAI04	Managed availability and capacity	
	Resource Optimization		BAI05	Managed organizational change	
	Value Management		BAI06	Managed IT changes	
Relationship	Public Relationship	EDM05 APO08 APO10	BAI07	Managed IT change acceptance and transitioning	
	Stakeholder Engagement		BAI08	Managed knowledge	
	Business Relationship		BAI09	Managed assets	
	Vendors Management		BAI10	Managed configuration	
Human Resource	Recruitment System	APO07 BAI08	BAI11	Managed projects	
	Training Education		DSS01	Managed operations	Deliver, Service and Support
Risk Management	I&T-related Enterprise Risk	EDM03 APO12 APO13 BAI05 BAI06 BAI07 DSS04 DSS05 MEA02 MEA03 MEA04	DSS02	Managed service requests and incidents	
	Countermeasures		DSS03	Managed problems	
	Security Awareness		DSS04	Managed continuity	
	Change Acceptance		DSS05	Managed security services	
	Internal Control		DSS06	Managed business process controls	
Cognitive & Emotional Skills	Learning Initiative		MEA01	Managed performance and conformance monitoring	Monitor, Evaluate and Assess
	Critical Analysis		MEA02	Managed system of internal control	
	Inclusiveness		MEA03	Managed compliance with external requirements	
	Foreseeability		MEA04	Managed assurance	

3.2. Innovation Skill

Enterprises also need technological innovation to explore the information system development with emerging technology for operational effectiveness and efficiency and proceed to the next step of competitive advantage and business innovation. Executives should keep awareness and understanding of IT innovation possibilities. In the meantime, they stay positive to recognize, approve and award the innovative initiatives. Technology-based innovation is the root of facilitating business model optimization and getting access to scale advantages.

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3.3. Operation Management

ERP systems and cash payment systems have become normal in our social life. Most people admit the facility, standardization, compliance and even user-friendliness when applying the information systems in daily operations. Using information systems and IT management to achieve the enterprises' governance seems more essential for professional executives. We provide 7 competencies in operation management which are service quality, process control, data management, problem-solving, evaluation, configuration optimization and portfolio management. IT services of online consultation or automatic machines such as self-service make it important to think highly of guaranteeing quality control. Moreover, not only customers and suppliers, but employees are also service objects as information systems' users. Managers should pay attention to IT related services and observe the effects of system operation. Process control requires comprehensive monitoring and dynamic adjustments in case of incidents and problems. This capability of executives acts as guardian in operation management. Data management awareness requires the safety of information storage, the maintenance of data quality, and the integration of data from various resources. The appropriate effective utilization of data assets is also a way to achieve governance goals. Problem solving is the ability to take measures to deal with occasional IT incidents. Sensitive tact with a certain degree of adaptability is necessary to respond to emergencies and problems. Executives need this problem-solving competency to cope with incidents and ease them in a satisfactory manner. Then, managers should be able to evaluate the operation process and the usage of information systems, whether IT improve with the performance, deteriorate or of no avail. The relative higher economic cost, opportunity cost or leaning cost of an information system would worsen an enterprise performance. Executives need to assess the performance of IT. After evaluation, portfolio management is to prioritize and optimize appropriate distribution among different IT services and products. For the given IT budget and resources, it's possible that research and development relevant departments consume more whereas marketing use less, executives are aware of the allocation of IT resources to meet the benefits maximization and losses minimization. Configuration optimization requires sufficient latest information to reevaluate the impact, renew of portfolio and reallocate the resources to achieve better IT governance.

3.4. Financial Skills

Financial skills represent the capability that executives are equipped with clear planning and perception of financial and managerial accounting, which enable the fulfillment of cost efficiency and business value. Budget and cost demand the capability to forecast accurately and operate properly to enforce budget management and cost control of IT-related items. Resource optimization and value management keep managers aware of identifying value-added activities of IT instead of non-value-added, resources optimization measures need to take if non-value-added activities arise. Through value management to optimize resources distribution and get the cost leading advantages.

3.5. Relationship

Digital technology strengthens the relationship with business stakeholders and shareholders. Through online activities based on information systems, managers could transmit the organization's culture, corporate vision and social responsibility in a cost-effective way to staff and the public. For example, the Ant Forest of Ali Co. Ltd is the most influential online environmental protection project in China, this planting game not only benefits the enterprise performance but also bring the use and gratifications to users [8] (Mi Lingyun et al., 2021). This kind of information technology cultivates online green behavior and continuous use behavior, in which users desire public-spirited and enterprise could achieve sustainable development. Executives need to be conscious of public relationship cultivation through IT to expand personal and organizational social influence. IT-related decisions also need the agreement and

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support of stakeholders. It's significant for managers to ensure stakeholders' engagement and make IT satisfy the needs and create value for stakeholders. It's also possible to manage the business relationships to get partners involved in information systems and share partly data, which can help to accelerate processes and enhance the transparency of the transactions. This mechanism is similar to blockchain to build a trustworthiness and co-governance transaction system. With the transaction databases of information systems, executives can easily analyze the dependency and tendency of the vendors, then control the bargaining power and update the business structure accordingly.

3.6. Human Resource

Human resources are the energy of enterprises which are also the comrades-in-arms team of the executive side by side. Information systems and data screening can build an efficient recruitment system to select the expected employees according to IT strategic requirements and consistence to organizational culture and value. Professional executives could also set up IT training education programs to achieve IT customization for upgrading and development.

3.7. Risk Management

Risk management is normally the essential capability to equip executives. Considering IT risks usually have an extensive impact on organizations, risk identifying, countermeasures, security awareness, change acceptance and internal control are important competencies of executives' risk management. IT-related risk identification is the finding consciousness of a series of emergency incidents, such as IT investment risk, IT operational infrastructure incidents, unauthorized actions, noncompliance followed with the adoption, ownership and operation of IT. It's also the executives' responsibility to ensure the IT-related risk within the overall enterprise's risk tolerance. Once the IT risks are identified, managers need to analyze to bear, reduce, transfer, or avoid the risk. Furthermore, they take measures and enforce tactics to implement their plans. Security awareness refers to cyber security precautions and security-related services to prevent IT incidents. IT changes and develops fast which brings a negative impact on uncertainty and stability, with also positive on development expectations and potential outcomes. Executives should keep the acceptance of IT changes and control their risks at the same time. Information systems and data governance simplify the implementation and regulation of internal control, on the contrary, managers should develop the relevant internal control principles of IT to normalize the application of information systems and data governance.

3.8. Cognitive and Emotional Skills

In the cognitive and emotional domain, executives can pay attention to their competencies of learning initiative, critical analysis, inclusiveness and foreseeability of IT. Learning initiative is regarded as a core ability to absorb the frontier technology and make self-improvements to follow up the tendency. The critical analysis is mention as the basic capability to analyze IT-related changes and decisions in an objective and rational way. Another two competencies are inclusiveness and foreseeability, which can accept diverse and rapid IT changes, in the meantime, can be sensitive to future development and previously arrange.

4. Conclusion

The purpose of this article was to identify the management competencies for executives to equip with when information systems and data governance become essential in enterprise governance. Based on COBIT 2019 of enterprise governance of information and technology, we develop a competency framework with a focus on executives, therefore we also include the factors about human cognition, emotion and relationship considering their connection with IT.

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The framework consists of 30 capabilities in 8 domains of IT strategy, innovation, operation management, financial skills, relationship, human resource risk management, and cognitive and emotional skills. The governance competencies of professional executives are correlated with IT-related control and management, furthermore, they can achieve personal performance goals enterprise governance more efficiently through IT competency improvements. Without the empirical data analysis of this theoretical framework, further research is needed to set the metrics of each competency and develop a questionnaire survey and interviews to examine the degree of correlation with competencies, moreover, it would be interesting to propose the IT management competency assessment system according to the comprehensive metrics with rating levels.

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