Case Studies in IT Governance Systems at Japanese National Universities: The Current Status and Challenges

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Fatema Ebrahim Mohamed Abdulrasool

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Graduate School of Systems and Information Engineering

University of Tsukuba

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ABSTRACT

Japanese National Universities (NUCs) are central players in several broad initiatives of the Japanese government to strengthen Japan's economy and global influence. Unfortunately, reports show that NUCs are struggling to enhance their performance to fulfill their expected role. This is not due to a lack of resources: Japan owns one of the most developed IT infrastructures in the world. It is a failure of leadership, of governance.

IT Governance is the senior executive (strategic) process that focuses on improving the day-to-day processes used by senior managers to evaluate, direct, and monitor IT functions and projects. An important function of governance is to align IT goals with the overall goals and direction of the business. This study aims to sheds the light on the importance of IT Governance in improving NUCs performance. It introduces an initial understanding about the current status of IT Governance at NUCs. Further, it paves the way for empirical studies by a providing a survey instrument that can be utilized to collect primary data.

IT Governance is the starting point to ensure addressing stakeholders' technical needs and implant controls to mitigate undesired side effects. Due to the increasing demand for a process to oversee IT function, several IT Governance frameworks have emerged such as Information Technology Infrastructure Library (ITIL), Control Objectives for Information and Related Technology (COBIT), and Value from IT Investments (Val IT). In this study I adopt the COBIT framework because it is the most holistic approach that address all facets of IT Governance framework.

These frameworks including the COBIT framework provide general guidance which needs to be adjusted to the organization specific needs and profile. A couple of prior research discussed the benefits of implementing the COBIT framework manifested in improving compliance with quality requirement and overall efficiency of IT function. In the study, I construct IT Governance framework based on the COBIT framework that consider the current environmental challenges facing universities.

I investigate the IT Governance function at NUCs, which has not been studied before. From the NUCs IT Governance framework I derive a structured interview format and perform case study research by email to grasp the current consciousness of the university wide IT Governance in NUCs. The targeted respondents

are IT leaders at the vice president level. My developed research instrument focuses on finding the right balance between the benefits of implementing IT projects, the risk associated with the use of IT, and the optimal utilization of the available technical, human, and intellectual resources. To that end, respondents are asked questions about matters like the current structure of the accountability framework for making decision related to IT, governance of IT resources, data management, and IT risk management.

I find that the IT function is receiving an adequate buy-in and support from top management which can be noticed from granting the IT leader a position of vice president and giving him a permanent seat in the highest strategic committee in the university. The structure of IT Governance at NUCs is a federal form of structure where there is a centralized IT department responsible for setting the overall strategy and managing IT infrastructure and resources. The other IT departments may occasionally not refer to the central department in certain matters which may cause resource utilization, compliance, and also security issues. Another finding is that NUCs may not always consider addressing the needs of all stakeholders where in some cases the requirements of the students, who are the main beneficiary of university services, are neglected. With regards to risk management, I find that NUCs focus mainly on personal information privacy and security while other aspects of risk management such as risk assessment do not receive adequate attention. I conclude that the IT Governance function at NUCs is still not comprehensive enough to cover all areas. Further, there is a lack of understanding about the interrelation between IT Governance components.

There is an intensified need for more IT resources to cover alumni needs and to control security threats since alumni have access to university resources. This is highlighting further the need for IT Governance processes. I conduct case study research to discuss IT Governance of alumni engagement programs at NUCs. Alumni are the biggest group of university stakeholders who are affected by technologies during their study and will continue using university facilities including IT resources after their graduation. Further, other special services will be provided to alumni via technical means. Further, the decentralized structure of alumni associations at NUCs where every single association have its own resources and technologies required a real effort to enhance collaboration and communication among these associations to better utilize university resources. Okawa et al., (2015) series studies are the only studies discussed the alumni engagement programs

at NUCs, and the IT Governance aspects were beyond the scope of these studies. My study expands Okawa et al., (2015) and incorporates IT Governance aspects to fill the research gap.

I found that there were great differences in levels of understanding and implementation of central governance concepts and functions across universities in managing their IT infrastructure. Furthermore, in the associated alumni organizations I even found regression in the implementation of IT services due to an increasingly hostile internet environment despite the desire to provide better services through IT. In this contemporary digitalized world, NUCs alumni association technology utilization is still limited to using conventional technical tools to disseminate information, and store alumni information. Surprisingly, some alumni leaders at NUCs rate their level of IT utilization as sufficient to cope with the new environmental challenges even though some of their services were suspended due to environmental and security threats. This is clear evidence that the IT Governance processes have not extended to cover all university practices nor engaging the entire university stakeholders. Implementing a comprehensive IT Governance framework will help in not only address technical issues but also other issues related to the management of resources and strategies. I conclude that an improvement in governance is needed to efficiently focus resources on needed services.

KEYWORDS

IT Governance, Japanese National Universities, NUCs, COBIT, Alumni Engagement

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TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

CHAPTER 1: INTRODUCTION

Throughout its history, Japan has recognized the importance of education in developing the society due to their role as innovation centers, developers of future technologies, knowledge repositories, human resources developers, and incubators for experts. The Japanese modern education system began in 1887 during the Meiji Restoration era (1868-1912), when the University of Tokyo was founded followed by the other six imperial universities. These universities were organized on the German model which may be described as a bureaucratic system with quasi-autonomous academic units (Itoh, 2002).

Japanese higher education went through a tremendous number of educational reform proposals. These proposals were formed in accordance with the national wide strategies and directions that recognized the domestic and global challenges, and aims to enhance Japan global competitiveness, presence, and influence. These goals highlight the need for improved university governance processes, especially IT Governance in the light of the increased IT and data utilization demands in these knowledge organizations. The major four reforms proposals were the Meiji Restoration era reform in the 1870s, post-World War II Occupation era reform, and 1960s reforms, and incorporation of national universities reform (NUCs) which was enacted in 2004 (Doyon, 2001; Itoh, 2002; Yamamoto, 2004; Tabata, 2005; Oba, 2005; Oba, 2013) .

University governance is “the set of policies, roles, processes, customs, and departments which affect the way a university is directed, administered, or controlled” (Rosca, Nastase, & Mihai, 2010). University governance includes the relationships among the stakeholders and the business goals through which the university is governed. The group of university stakeholders includes shareholders, management, the board of directors, employees, customers, creditors, suppliers, students, professors, regulators, and members of the community. The business goal of a university is to achieve the returns to its stakeholders (Rosca, Nastase, & Mihai, 2010).

Corporate governance concepts and methods are applicable to IT Governance since it is part of university overall governance. We can construct a definition for university IT Governance derived from the Rosca, et al. (2010) definition of university governance. In this sense, university IT Governance is “the set of IT

policies, laws, processes, customs, and departments which affect the way university IT functions are directed, administered, or controlled".

IT Governance is a relatively new term which emerge in the late nineties. Research in the field of IT Governance at Higher Education Institutions (HEIs) has not received enough attention and it has not matured enough yet to conduct empirical studies in this field. A limited number of exploratory studies, case studies, and survey studies have been conducted in the field of IT Governance at HEIs, none of which discussed Japanese universities' IT Governance function. The design of IT Governance functions vary depending on a number of factors that include matters like the size of the university, sector (public or private), and the country. This research aims to discuss the IT Governance function at NUCs.

'Good' university governance does not simply happen. It is the product of continuous efforts to find the most appropriate governance structures, protocols and processes. It is also about timing and judgement: it requires boards of governors to recognize when a governance model is not working, why and how to repair it. Ultimately, governance models are created by people to govern people. They are only as good as they who devise and apply them, as well as those who live by them" (Trakman, 2008).

Computing capacities and the level of technology utilization define the future of HEIs (Popenici & Kerr, 2017). Universities produce, process, transmit, store, and collect streams of information about not only students teaching and learning activities and research, but also about university management operations including university staff data, university facilities, partner, and supporters. The focus is on organizing, standardizing, and safeguarding data and then applied it to advance their mission (Grajek, 2019; Pelletier, 2019). As a result, information protection and IT governance have been intensified (Grajek, 2019; Norris, 2018).

The extensive use of IT in all university operations (teaching and learning, research, and business functions) and the increasing funding challenges necessitate the integration of IT in the overall institutional strategy and business model (Grajek, 2019; Pelletier, 2019). Functions of academic institutions such as: student learning, research outcomes and institutional functioning can be improved through the using of information technology. Academic programs and courses have been supported by the Internet with tools such as groupware, communication software, and end-user tools. Research has been improved through providing

electronic access to the scientific community internationally and to databases and online publications as well. Technology has also altered the way universities are managed. Major universities' functions like enrollment processes, accounting, reporting, international relations, and decision support can be automated (Sporn, 2007). Information management and governance directly aid the accomplishment of university mission (Blaschke, Frost, & Hattke, 2014).

The Japan Association of National Universities (JANU) report entitled "For Reinforced Governance Reform at the National Universities of Japan (Proposals)" pointed that the university leaders in Japan are aware of the importance of the information resources to the decision making which reflect itself in the creation of Information Resources section for the centralized management and utilization of in-house information (JANU, 2017).

Organizations either for profit or not-for-profit exist to create value for their stakeholders and universities are no exception to this fact. Universities "are driven by a complex set of cultural and motivational factors, arising from their status as non-profit organizations, which directly affect their management and governance" (Fernández & Llorens, 2009). University stakeholders include students, students' parents, academic and administrative staff, community groups, industry and professions, and governments. Creating value means different things for different stakeholders since they may have different or conflicting goals. University Governance is essential to oversee university operations in order to create value for their stakeholders and achieve goals. Universities have unique business models, and their business objectives are specific and affect different stakeholders. The whole method of operation, structure, and culture of a university business is very much different from any other organization. Universities are marked by fuzzy goals and unclear understandings of the root and influencing factors to an arising problem. Further, the socio-organizational factors in universities are very strong and academic freedom which is the spirit of the academic culture gives a huge amount of power to the academic staff and department till a limit that they may resist the central authority and governance practices (Maassen, 2017).

Due to the fact that the universities governance is decentralized (which is seems to be the case at NUCs as will be shown later in my study in chapter 4 and 5) the interaction between different units though it does exist, results are often weak, slow in response or not permanent. This fact weakened the university

governance performance (Blaschke, Frost, & Hattke, 2014; Wilmore, 2014). University needs to create a structure for data management and distribution, this system organize and analyze information relating to the study, organization and management of the universities, and this information should be utilized by the universities (Higher Education Policy Planning Division , 2011).

Universities reform is a must to improve universities performance and governance style (Top Global University Project, 2021).The NUC reform is a major reform that has been introduced to improve university governance structure and hence fulfill its role in encounter the changing environmental challenges facing the Japanese society as stated in the national revitalization plan which was initially known as Science and Technology Basic Plan. The first plan was enacted in 1996. While the focus of each consecutive plan has changed based on environmental changes and challenges, the aim of all Basic Plans is always to restructure Japan's science and technology scheme to make it more innovative and cost efficient. Thus, the title of the plan has been updated in the 4th Basic Plan to "Science, Technology, and Innovation Basic Plan" to reflect innovation aspects (The 5th Science and Technology Basic Plan, 2016).

The NUC law was built on the National Public Management (NPM) concept. NPM is a new concept embedded in the classical form of public administration. NPM has changed the managerial style of public institutions through a series of techniques adopted from business management. Customer focus and outcome-oriented approaches have been integrated in policy making and implementation processes. (Kudo, 2010; Carnegie & Tuck, 2010; Trakman, 2008). Applying NPM to the governance of higher education at institutional level identified five unique components which are: 1- state regulation including funding; 2- stakeholder involvement and guidance; 3- academic self-government; 4- managerial competences; 5- competition. The belief is that some of these elements will become more influential while others will become less influential (Scott, 2018).

Japanese National Universities (NUCs) are a main entity of STI plan, and they still have major challenges related to governance including IT Governance. NUCs "need to strengthen their management capability through the appropriate allocation ("portfolio management") of resources and enhancing their education research capabilities. This can be accomplished by improving risk management; actively publishing information, including data on the state of their finances; diversifying funding sources; and implementing a

selection process aimed at appointing presidents in accordance with each university's mission, and then securing and training personnel to be presidents" (The 5th Science and Technology Basic Plan, 2016). Here the Basic Plan is describing university governance, specifically IT governance, and giving it a promising role in elevating the Japanese economy.This year (2021) witnessed the commencement of the 6th Basic Plan. When the 5th Basic Plan was formulated, the identified major issues were the changes in the global industrial structure due to the rapid evolution of Information and Communications Technologies (ICT), and networking which raised security threats; global constraints on energy, resources, and food; environmental issues; declining birthrates, aging population, and risk of natural disasters. While all of these issues remain important today, a notable new environmental challenge has emerged which is the spread of the Coronavirus that force communications that had been face-to-face to move to online platforms to control the spread of the virus which requires new model for IT Governance at NUCs (Science, Technology, and Innovation Basic Plan, 2021)

Digitalization provides a mean to face these challenges which its important was recognized and promoted in all fields since the 5th basic plan. Even so, Japan has not been able to implement it fully at the national level due to the lack of proper IT Governance function that ensure the fulfillment of the national strategic direction. Now the coronavirus has ignited an intensified need for digitalization (as well as enhanced telecommunication). Digitalization aims to improve the efficiency of existing operations, and to create new business models through data collaboration and utilization. Note that this ambition is often not realized. It has been noted that "automation just speeds up the mess". The digitalization of universities administration processes and academic operations has varied depending on universities resources and infrastructure. MEXT stablished ICT centers in universities on a hierarchical basis where the core national research universities receive the lion share of the budget (Science, Technology, and Innovation Basic Plan, 2021).

As revealed by the coronavirus pandemic, IT infrastructure has operational problems and psychological concerns regarding its stability and security. Thus, there was a lack of sense of speed and sense of crisis in infrastructure development for realizing the new "human-centered society in which economic development and the resolution of social issues are compatible with each other through a highly integrated system of cyber space and physical space" known as Society 5.0 (Science, Technology, and Innovation Basic Plan, 2021). This is a clear evidence of weak IT Governance function at NUCs.

Internationalization of NUCs was also a major drive for universities reform to enhance their governance aspects. To improve NUCs ability to compete in the global world, they must diversify their financial resources and expand their supporters' networks. Further, enhancing university governance and resources utilization is a must for universities seeking a world-class status (Yonezawa & Shimmi, 2015). The NUC law helped universities in enhancing their competitiveness and improved their diversity and differentiation since universities are obliged to create a distinctive profile, mission and strategy to attract resources and students (Christensen T. , 2010).

Although the globalization power to enhance university status and ranking, it comes with its own cost and challenges such as data management and security concerns. Universities must think strategically about reducing the risks of globalization. These technology concerns require a holistic approach to govern IT function. Poorly constructed and implemented globalization strategies that neglect IT aspects may just impose an impact opposite to what the university desire. The starting point is to have clear goals and direction which will leads to a creation of effective policies, strategies, and plans. The system should foster collaboration and communication among all universities stakeholders in order to get their buy-in and support. Sufficient human resources with clear roles and responsibilities and clear reporting line should be dedicated to support the system. Several communication channels should be utilized to attract international scholars, partners, and supporters. The system should be monitored and evaluated regularly to ensure its effectiveness. These measures and processes are at the heart of IT Governance Function. Furthermore, Covid 19 introduced a new challenge to Japanese universities, as social distancing and lockdown hinder students' mobility. Since Japan has one of the best IT infrastructures, the backbone for online learning and teaching, will Japanese HE be able to overcome these challenges? (Top Global University Project, 2021; McKinley & Thompson, 2011; Mohsin & Zaman, 2014)

One of the university strategic areas that is receiving an increasing attention is the university relation with their alumni. Alumni engagement programs has been created to tie alumni with their alma mater. These programs include a mix of strategies that utilize different technologies, communication channels, social activities, and services such as social activities and events, social media, trips, magazines, and newsletters to expand their access to all alumni (Smith, Gearhart, & Miller, 2019; Teixeira & Maccari, 2014). Constructing a life-long relationship between alumni and their alma matter has been considered to be a

challenging task because of the volatile nature of the alumni network and the university short-sighted vision that focused mainly on university gains (Jepps, Gregory, & Cresswell, 2019).

Japanese universities, like universities all over the world, have recognized the strategic role of alumni to overcome the environmental challenges and improve its status. Unfortunately, technology aspects have not been strategically planned and implemented to strengthen this relation at NUCs. Data from other parts of the world shows that technologies are essential tool to connect alumni with their alma mater, yet a comprehensive IT Governance function that includes alumni engagement function under its umbrella does not exist.

Thus, leading universities now aim to put in place a comprehensive system that enables them to forge a lifelong relation with their alumni. This system includes strategies, resources, and technologies. Unfortunately, the role of technology in enhancing the efficiency and effectiveness of alumni engagement at Japanese universities seems to be limited to the series of studies by Okawa et al., (2015).

The novel coronavirus affects all aspects of higher education, and it is of special concern in alumni relations. The shift to the online platform affects the university's ability to foster a personal connection between the university and its students. The quality of the technologies used can positively or negatively impact the student experience. Student success plays a role in how alumni view their university experience. Thoughtful strategies must be developed to consider the complete sudden shift to online teaching and learning.

Currently, there is a great emphasis from national level on IT resources governance and utilization to achieve digitalization goals as stated in the Basic Plan. The operations of colleges and universities were affected by new technologies. Functions of academic institutions such as: student learning, research outcomes and institutional functioning can be improved through the using of information technology. Academic programs and courses have been supported by the Internet with tools such as groupware, communication software, and end-user tools. Research has been improved through providing electronic access to the scientific community internationally and to databases and online publications as well. Technology has also altered the way universities are managed. Major universities' functions like enrollment processes, accounting, reporting, international relations, and decision support can be automated (Sporn, 2007).

Despite the huge amount of money that the universities invest in IT, it never seems to achieve its full potential. Nowadays, universities recognized the importance of IT Governance in supporting their mission in attaining the full potential of their IT spending. (Hicks, Pervan, & Perrin, 2012). The concept of IT Governance focuses on the sustainability in controlling, managing, and monitoring IT activities through five driven mechanisms which are strategic IT/business alignment, value delivery, IT resource management, IT risk management, and performance measurement. (Subsermsri, Jairak, & Praneetpolgrang, 2015) IT Governance is often the weakest link in a corporation's overall governance structure. It represents one of the fundamental functional governance models receiving a significant increase in attention by business management. (Brown & Grant, 2005). The difference in corporation governance between private and national universities requires a unique IT Governance scheme for each sector. Research shows that the private sector is more efficient in the development, implementation, and governance of IT while the public sector is lagging behind. Usually, the IT is viewed as a service not as a value creator in public institutions (Campbell , McDonald, & Sethibe, 2009).

Although research on IT Governance has been continually conducted for a couple of decades, there has been no consensus over its design and implementation. Further, there is no agreed scientific standard to apply. There are commercial or popular standards which give guidance and a methodology to apply IS auditing in general and shows IT Governance as part of the overall governance practice, such as the ISACA standard. However, research has yet to explore more effective IT Governance methodologies that are able to cope with the evolving market changes, uncertainties, and advancements.

In order to understand the situation and the effect of IT Governance in the NUCs, we need a framework that outlines the functions, roles, and value addressed specifically to the universities. This research starts by adapting an existing framework to NUCs context. ITIL, COBIT, ITCG & COSO, COBIT and ITIL IT Governance frameworks are the most prominent and commonly used frameworks for IT Governance implementations (Nicho & Khan, 2017). COBIT is the framework we adopted in our study. It is a comprehensive generic internationally accepted framework that aims to assists enterprises in understanding, designing and implementing IT Governance and Management. COBIT builds on and integrates more than 25 years of development in this field. It incorporates new insights from science and operationalize these insights as practices (COBIT® 2019 Framework: Introduction & Methodology, 2018).

In summary, IT Governance is a powerful tool to enhance university teaching and learning, research, and management operations and also improve university competitiveness in the global market. It can also help universities is building stronger ties with their stakeholders especially their alumni. In the previous few pages, we gave an introduction about the higher education systems in Japan and the national direction towards enhancing NUCs performance and we highlight the need for effective IT Governance process at NUCs. This research aims to discuss the current status and the challenges of IT Governance at the NUCs. Special attention has been paid to the role of IT Governance in enhancing Alumni Engagement programs at NUCs. The following sections introduce the main motivation, objective, methodology and design of our research.

1.1 Research Motivation

University governance in general plays a very important role in the running of any university. It directs the university towards the achievement of its objectives. University governance means the set of guidelines, legislations, policies, procedures, management styles and reporting hierarchy, to name but a few. University objectives can only be achieved through the tools, techniques and the resources (human and non-human). It is generally agreed that IT nowadays plays a very important role in the running of organizations and universities are no exception.

IT Governance is a subset of the university corporate governance, and it is it implemented to govern and manage IT effectively. People, information, technology service, infrastructure, applications, culture ethics, processes, principles, policies, frameworks and organizational structure are the tools for IT Governance.

Despite the acknowledgement of the role of IT Governance in improving the outcomes of IT resources, no research has been conducted to evaluate the stature of IT Governance systems at Japanese universities including NUCs. This research aims to investigate the level of IT Governance implementation at NUCs.

NUCs are under huge pressure from the society since they are the major player in revitalizing Japan Economy. Despite the efforts and huge investment in IT, IT in Japanese universities fell far short of achieving the intended benefits. The environmental challenges are threatening the existence of many universities and requiring a prompt attention. IT Governance may be the key for the universities to reposition itself and

overcome the problems that threaten their existence. NUCs now are competing globally, and they are virtually crossing their borders. Literature shows that universities are not fully utilizing their IT capabilities, and this is clear evidence that they are having serious issues with their IT Governance practices. The researcher believes that the results of this research will be beneficial to NUCs and MEXT.

1.2 Research Objectives

1. Develop IT Governance framework for NUCs based on COBIT framework.
2. Identify and analyze the existing component of IT Governance in NUCs.
3. Identify the challenges facing CIOs in NUCs in implementing IT Governance system.

1.3 Research Design

Detailed descriptions about research methodologies used in each component of our research will be presented in the section dedicated to each research component.

Due to the fact that the research on the field of IT Governance at NUCs has not been conducted previously by any means, this research will follow an exploratory approach to collect data about IT Governance systems at NUCs. A thorough literature review pertaining University Governance, IT Governance, Japanese higher education, and NUCs will be carried out. A structured interviews by email will be conducted to collect research primary data. The population of the research are the senior IT staff and senior alumni associations staff at NUCs.

My study is divided into seven main chapters. Chapter 1 is the introduction. Chapter 2 presents the literature review in the field of IT Governance and also will provides detailed literature review pertaining to Japanese higher education with more focus on NUCs.

The implementation of effective IT solutions will surely enhance university operations. One of the areas that is receiving an increasing attention is the university relation with their alumni. Later in chapter 2, I present the literature review related to alumni engagement status, rationale, and information technology utilization and struggles. I also present a model for effective governance of alumni engagement programs which is based on the work of Abdulrasool & Turnbull (2021). In addition, I show the amount of donations to NUCs received from their alumni. The last part of the chapter gives detailed background about the alumni services

at American universities to provide a base to compare NUCs performance with other universities in the world.

Chapters 3 is based on the work by Abdulrasool and Turnbull (2020) and it is directed to fulfill the first objective of our research as stated in the previous section (section 1.2). Furthermore, it provides the basis to develop the research instruments required to address the other two research objectives. The chapter discuss the applied research that we will carry out based on the COBIT framework aiming to develop security, risk, and compliance driven normative IT Governance model for universities. Chapter 4 and 5 discuss the case studies research that I conduct to understand the existing structure of IT Governance at NUCs by gathering structured data using a questionnaire, targeting the CIO and the leaders of a more loosely governed university organs i.e., alumni associations. The aspects of research pertaining to alumni association at NUCs is built upon the Okawa et al., (2015) studies. Chapter 6 summarizes my study and present my future research directions.

CHAPTER 2: IT GOVERNANCE LITERATURE REVIEW

My research is focusing on investigating the IT Governance processes at Japanese National Universities. Therefore, I conducted a thorough literature review that covers our main concepts which I am going to present in this chapter. The first section of this chapter will discuss IT Governance literature review with special consideration to studies discussing IT Governance at universities. The following section will discuss Japanese higher education history, direction, and governance. The last section of this chapter is dedicated to the literature review related to Alumni services governance, a special area of IT Governance that is receiving an increasing attention.

2.1 IT Governance Literature Review

NUCs are struggling to compete in the global market due to the short-sighted policy that focuses mainly on English as a Medium of Instruction (EMI) and the number of international stakeholders. A comprehensive strategy should be adopted to improve the implementation and governance of the globalization process. The rampant epidemic of the corona virus though it jeopardized mobility, it may open the way for traditional bricks and mortar universities to provide online programs which can break the physical limitation and lower costs. To do so, digitalization should be strategically planned and governed, which highlights the need for effective IT Governance.

The Japanese government provide tremendous support to universities to improve their attractiveness and presence in global market. The Japanese government support was not limited to financial support only, it also included other measures related to improve Japan readiness to accommodate the needs of international students. This includes Visa legislations, global communities' facilities, and work permits. Furthermore, the enactment of the NUC law increased university autonomy and their uniqueness and differentiation. On the other hand, due to the nature of these competitive projects which obliged universities to specific numeric targets, universities' differentiation diminished.

IT has been considered as the most powerful enabler of globalization. IT has created a virtual world where ideas, people, and information can cross borders beyond physical limitations and boundaries. Researchers argues that IT empowered English to become the main language of communication in the academic world.

IT increased the gap between universities competition power. Universities with sufficient IT resources such as IT human resources and IT infrastructure are better equipped to conduct and produce quality research, provide better teaching, enhance IT usage and utilization, create better networks for communicating with partners, supporters, and stakeholders, and hence improve their ranking and status in the global market. Further, IT can help universities in reducing its expenses by providing online teaching content such as MOOC (Massive Open Online Course) instead of in-class courses. DeGioia (2011) and Altbach (2013) emphasized the importance role of IT for globalization. Further, DeGioia (2011) also stressed the need to implement more advanced infrastructure and technologies. He believed that the currently used IT tools are outdated and insufficient to equip graduate with the expertise needed to enhance the economy (Altbach, 2013; Pieterse, 2002; DeGioia, 2011; Popenici & Kerr, 2017; Hrynyshyn, 2002; Dahlman, 2007).

Universities' mission is focused on teaching and learning, research, and knowledge transfer. While information processing and communication are crucial to achieve the university mission, codifying, processing, storing, and communicating the information using Information Systems can enhance the ability of the university to achieve its goals (Wilmore, 2014). The strategic use of IT has been increased in the core academic activities. Online course delivery, high-performance computing tools for research, and large data sets analysis tools are examples to name a few. This increase is a result of mounting globalization, and the rising competition to attract and retain quality students and researchers (Wilmore, 2014; Bianchi, Sousa, & Pereira, 2017).

Managements of universities realized the importance of utilizing intelligent systems to improve the overall performance of the university including improving student retention and graduation rates. These systems can help in creating student's admission policies, predict the number of students to be enrolled in the forthcoming semester, attract prospective students, manage resources, update course offering, estimate hiring needs, or make financial decisions (bin Mat, 2013; Dennis, 2018; Zeide, 2019).

The real strength of traditional universities is their ability to blend online and on class learning experiences which has proven more effective than adopting one method. Hybrid instruction has the potential to take traditional universities to new levels by allowing them not only to respond to competition but also to serve more students with their existing resources. Universities that fail to employ online learning technology will

loss the opportunity to grow and may also lose students as the cost disparity between the traditional model and the technology-enabled model increases (Christensen & Eyring, 2011).

The University of South Florida (USF) implemented a variety of programs, processes, and policies that integrate Artificial Intelligence and human intelligence to promote student persistence and retention. As a result, the university achieved tremendous benefits. The retention rate has been improved from 86% in 2008 to 91% in 2017. The four years graduation rate has been improved from 38% in 2011-2012 (2008 cohort), to 61% in 2016-2017 (2014 cohort) (Miller & Irvin, 2019).

Research shows that one-to-one teaching levels up student success rates. Although it is irrational to adopt it in traditional classrooms, it is attainable with the advancement of AI and e-learning techniques. The adaptive educational systems are Learning Management System (LMS) capable of designing personalized educational model for each and every individual student. These systems integrate students learning needs with the pedagogical expertise to improve learning outcomes. The first step in constructing these models is to design an accurate student profile by analyzing the information stored in the student's information system such as gender, sex, educational background and also personality traits and skills; and then link these variables using AI algorithms with the students' performance in the LMS. The success of these systems relies on the accuracy of data as well as the efficiency of the applied AI algorithms. Educators are provided with tools to monitor and evaluate students online performance which will help them in identifying students who need extra attention. Furthermore, it will give them an insight about the most challenging study area so they can focus more on them (Almohammadi, Hagras, Alghazzawi, & Aldabbagh, 2017; Norris, 2018; King, 2017; Humble & Mozelius, 2019).

While access to LMS is restricted to the university enrolled students, Massive Online Open Courses (MOOC) systems are open to public with no cost. Stanford and Harvard universities are examples of universities offering this service to support lifelong learning. The challenge for MOOC lies in its capability to analyze the enormous data generated by the massive number of users. The completion rates for the students registered in these courses is really low (less than 13%). Robust Artificial Intelligence techniques are needed to enhance the performance of these systems to the level of LMS, hence improve the retention and completion rates (Almohammadi, Hagras, Alghazzawi, & Aldabbagh, 2017).

Although e-learning systems are implemented to improve efficiency, effectiveness, satisfaction, and motivation of students, many systems failed to achieve the intended objectives. The spotted problems are poor management, neglecting important phases of system development lifecycle, inappropriate allocation of recourses, poor data quality, and compliance issues with rules and legislations (Urh, Vukovic, Jereb, & Pintar, 2015). These issues can be controlled with the existence of an effective IT Governance process.

Student engagement has been defined as "the time and effort students devote to activities that are empirically linked to desired outcomes of college and what institutions do to induce students to participate in these activities". Many studies have been conducted to understand the impact of deploying intelligent technologies on student engagement, Beeland (2002) study is an example. The aforementioned study aims to evaluate whether the use of interactive whiteboard will affect student engagement. The results show a positive relationship between the use of an interactive whiteboard in classrooms and student engagement (Beeland, 2002).

University research plays an important role in product development, regional innovation and industrial patents. The collaboration between universities and industry will positively improve the faculty research performance. However, inadequate IT capabilities may hinder universities' ability to partner with industry and hence affect research. Universities with successful entrepreneurial investment in technology and knowledge transfer, and businesses were able to earn money through patents and joint ventures (Sporn, 2007). Inadequate IT capabilities may hinder the university's ability to partner with industry and hence affect research (Woolgar, 2007).

Chary (2007) discussed the positive direct effect of the innovation in IT on globalization. He argues that building strong IT resources is no longer optional because of its ability to improve the overall performance if it implemented effectively. Benefits include improve decision making due to the improvement of flow of information in terms of time, quality, and volume. Another benefit is improved centralization of power at the top level of university. Furthermore, IT improves process governance through formal policies, procedures, and plans. IT also facilitate monitoring and follow up (Chary, 2007).

After surveying the literature thoroughly, we saw many opportunities and failures in the use of IT in Universities which reflects a lack of governance.

2.1.1 IT Governance

IT Governance concept is defined as "a set of relationships and processes designed to ensure that the organization's IT sustains and extends the organization's strategies and objectives, delivering benefits and maintaining risks at an acceptable level" (lliescu, 2010; Gunawan, Kalensun, Fajar, & Sfenrianto, 2018).

IT Governance can be generally applied to any organization, e.g., banks, schools, universities, industrial companies, etc. However, I believe that each domain or type of business may necessitate its own style of IT Governance which makes the IT Governance model or methodology more applicable and able to yield better outcomes.

Organizations have witnessed an increased attempt in the adoption of IT Governance frameworks due to growing demand for accountability and objectivity in the measurement of IT performance as well as increasing demand for compliance in the information domain (Nicho & Khan, 2017).

The IT Governance concept emerged late nineties, however, many of the underlying elements of the strategic alignment debates commenced many years before (De Haes & Van Grembergen, 2005). According to Kalensun, Fajar, & Sfenrianto (2018), IT Governance is a notion that started to be developed when ITGI (IT Governance Institute) was founded in 1998 (Gunawan, Kalensun, Fajar, & Sfenrianto, 2018). However, the topic has been increasingly discussed since the mid-nineties when Brown (1997) and Sambamurthy & Zmud (2000) started to refer to a notion of "Information System (IS) governance frameworks" and later to "IT Governance frameworks" in Brown & Grant (2005) paper. (Rubino & Vitolla , 2014; De Haes & Van Grembergen, 2005). In 2003, "Improving IT Governance" idea has been introduced for the first time as a third Top-ten CIO Management Priorities. (De Haes & Van Grembergen, 2005).

Sambamurthy & Zmud (2000) shed the lights on the gap between scholarly research and practice in the field of IT Governance. The researchers aimed to induce a new way of thinking about the organization of IT activities in today digital economy, and to stimulate the interested scholars to widen their horizons about the new challenges and discoveries of the modern IT management. They recommend thinking about the organization of IT activities as the establishment of a platform that provides a rich ensemble of current and future IT-enabled functionalities. After the establishment of this platform the increasingly dynamic and tightly bounded decisions of how and where to distribute decision authority for specific IT-enabled

functionalities are addressed. The scheme consists of three core blocks which are: IT capabilities, relational architectures, and integration architectures (Sambamurthy & Zmud, 2000).

IT professionals devoted high attention during 1980's to the organization-wide activities connected to the acquisition, deployment, and management of information technology primarily discussing the virtues of modes of governance (centralized, decentralized, and federal) (Sambamurthy & Zmud, 2000). The term Federal governance is used interchangeably with the following terms: distributed governance, hybrid governance, equilibrium model of governance, and "centrally-decentralized" governance. A recentralized governance model is a similar concept that deals with organizations that previously decentralized and then moved back some strategic and core functions to a centralized IS group (Brown & Grant, 2005).

Senior IT executives overturned the traditional governance logic by utilizing other mechanisms, such as strategic alliances, sourcing arrangements, roles, teams, processes, and informal relationships, as the primary method through which their IT organizational architectures were organized. These contemporary complex structures are designed around important IT capabilities rather than managing IT tasks, and network architectures (Sambamurthy & Zmud, 2000).

IT Governance can be deployed using a mixture of structures, processes, and relational mechanisms (Nicho & Khan, 2017; Brown & Grant, 2005). Structures involve the existence of responsible functions within the organizational structure with clear roles and responsibilities such as IT executives (CxOs) and a diversity of IT committees (IT strategy committee, IT steering committee). Processes refer to strategic decision making and monitoring using tools such as: Strategic Information Systems Planning, Balanced (IT) scorecards, Information Economics, Service Level Agreements, COBIT and ITIL, IT alignment / governance maturity models. The relational mechanisms rely on active participation and collaboration between principal stakeholders that include business/IT participation and correlations, strategic dialogue and cross-functional business/IT training and rotation (De Haes & Van Grembergen, 2005).

There are three angles of organizational structure that can have an impact on organizational governance. The first angle is vertical specialization; how roles and responsibilities are distributed within organizational levels. The second is horizontal specialization; how tasks are divided between organizational departments and based on what principle of specialization. The third angle is the clarity of the role expectations attached

to organizational positions. A rational actor perspective on governance will identify how associates and leaders of an organization will respond strategically to competition and incentives by considering it as opportunities for attracting resources (Maassen, 2017).

The increasing adoption of enterprise management systems such as ERP, data warehousing, supply chain management systems, and customer relationship management has expanded the definition of IT infrastructure. As a result, organizations transformed their fundamental mission from applications development towards platform building and solutions delivery. The traditional style of managing IT infrastructures, which is a function of IT Governance, for cost-effectiveness and efficiency has been extended to incorporate issues related to global reach and range, flexibility, scalability, and openness to emerging technologies (Sambamurthy & Zmud, 2000).

The Weill & Ross (2004) study, which comes after a temporary lull in publishing IT Governance, research has resuscitated interest in the field. Inspired by the aforementioned study, Brown & Grant (2005) conducted a comprehensive and thorough review of the existing literature in connection with IT Governance frameworks. In their study, they introduced a conceptual framework of IT Governance that split the research in the IT Governance field into two parallel streams: IT Governance forms, and IT Governance contingency analysis. From within the constructed framework, the researchers concluded that the Weill and Ross' contemporary framework signals the beginning of an amalgamation of the two streams of preceding IT Governance research (Figure 1). In order to improve the understanding of IT Governance, researchers now are left with the choice of deciding whether to continue with Weill and Ross' aggregated research approach or expanding on individual streams (Brown & Grant, 2005).

For successful implementation of IT Governance, organization should consider all the following factors Strategic alignment between business and IT; Value delivery from an investment in IT which is driven by the needs of the investing entity; Resource management that ensures that IT has sufficient, competent, and efficient resources to meet the organization's demands; Risk management which ensures that the strategic objectives of the business are not jeopardized by IT failures; and performance measurement that helps the board and senior management in evaluating IT performance towards achieving the organization objectives (Ramlaoui, Semma, & Dachry, 2015).

Iliescu (2010) makes a brief presentation of IT Governance practices, the Val IT Framework and the IS Auditor Process in order to explain the approach and the purpose of the Audit Work Program. The Audit Work Program helps the IS Auditor to conduct his engagements, but each organization and project has its own characteristics and the work program which should be tuned accordingly. Iliescu (2010) stated that nowadays Val IT Framework is on top of the best practices for IT Governance (lliescu, 2010).

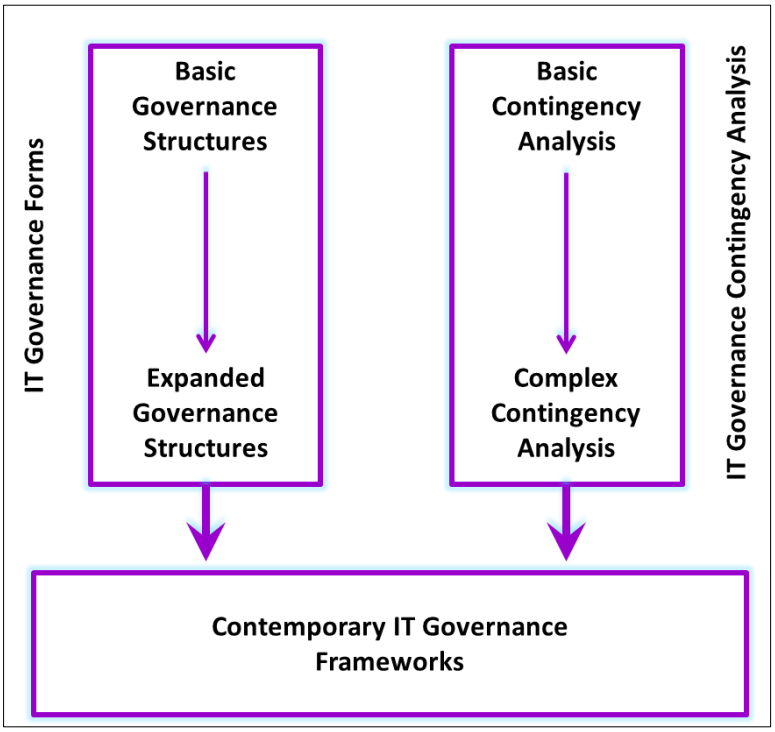

Figure 2.1: Brown & Grant (2005) Conceptual Framework for IT Governance Research

The IT strategy articulates the enterprise's intention to use IT, based on business requirements (lliescu, 2010; Gunawan, Kalensun, Fajar, & Sfenrianto, 2018). The following must be considered by organizations while formulating the IT strategy: business objectives and the competitive environment; current and forthcoming technologies; expenses; risks; IT capabilities; cost of existing IT applications and IT services; and past failures and achievements (lliescu, 2010).

IT Governance has been considered as a crucial strategic element for organizations to achieve ultimate corporate governance (Aliyu, 2010). Information Systems are cluster of IT tools such as computer hardware, software, databases, and networks which are used to collect, process, store, and distribute information needed

to support the decision-making process in a corporation. Data governance is part of the overall IT Governance, and it cannot be separated from it (Yaokumah, Brown, & Adjei, 2015).

Data Management International (DAMA) defines Data Governance as "the exercise of authority, control and shared decision-making (planning, monitoring and enforcement) over the management of data assets. Data Governance is high-level planning and control over data management" (Mosley, 2008). Data Governance can't be separated from IT Governance, and it needs a holistic approach. The university top management including the president and the board must be deeply involved in the Data Governance endeavors since it can be used as a strategic tool to enhance the organization ability to compete in the highly diverse marketplace (Grajek, 2019).

2.1.2 University IT Governance

The personal computer, which appeared in the early 1980s, was reshaping HEIs by 1990. The higher management of universities (presidents, provosts, and trustees) are leveraging information technology to achieve the institutions' strategic visions (Grajek, 2014; Hicks, Pervan, & Perrin, 2012). Universities are suffering from multiple issues resulting from the decentralized nature of HEIs organization structure. The identified issues are lack of control and accountability in IT, executive pressure to reduce or justify expenditure on IT, insufficient IT risk management, duplication of IT resources, and inconsistent IT architecture (Hicks, Pervan, & Perrin, 2012).

Universities recognized the importance of IT Governance to address the previously mentioned issues and attaining the full potential of their IT spending. (Hicks, Pervan, & Perrin, 2012). The concept of IT Governance focuses on the sustainability in controlling, managing, and monitoring IT activities through five driven mechanisms which are strategic IT-business alignment, value delivery, IT resource management, IT risk management, and performance measurement (Subsermsri, Jairak, & Praneetpolgrang, 2015). IT Governance is often the weakest link in a corporation's overall governance structure. It represents one of the fundamental functional governance models receiving a significant increase in attention by business management (Brown & Grant, 2005).

IT Governance is the difference between success and failure for universities in today's high-tech world and it plays a vital important part of university governance. Regulators, students and professors are increasingly

concerned about the proper use of data, information, IS, processes. Many universities are identifying Information as an area of their operation which needs to be protected through university IT Governance plans (Rosca, Nastase, & Mihai, 2010).

Universities adopt IT Governance to achieve beneficial outcomes in three main areas: resource utilization, alignment, and risk management. The utilization of IT resources aims to reduce cost of IT and promoting user relationships were seen to be valuable in this context. IT/business alignment was commonly enhanced by initiatives like an IT Steering Committee, use of an IT strategic plan, stakeholder's engagement in decision making, synchronization of IT and business planning cycles, and effective support from all stakeholders. IT risk management was found to be enhanced through clear roles and responsibilities, specifying accountability, and the existence of CIO or equivalent role responsible for IT across the institution (Hicks, Pervan, & Perrin, 2012).

Implementing an effective IT Governance structure in universities is a powerful tool to improve decision-making while pursuing strategy (Bianchia, Sousab, Pereirac, & Luciano, 2017; Gunawan, Kalensun, Fajar, & Sfenrianto, 2018; Yaokumah, Brown, & Adjei, 2015; Hotzel, Wimmer, Heyde, & Lang, 2015). However, the literature is scarce on the advantages and disadvantages of different IT Governance structures. IT-Function organization and IT decision-making authority location within the organization determine the effectiveness of IT Governance. Appendix D includes a table that summarizes the research conducted in the field of Universities IT Governance.

Some universities have established a board of executives in it to make key decisions to the university. In the light of work to date these objectives can be include review staffing, resources and processes for provision of IT services and aim to move to a situation where: Policy, standards and common operational processes are established once and implemented by all support services, faculties and departments. Resources for policy implementation are drawn from staff with appropriate skills, irrespective of their current location (i.e., establish matrix management to allow departmental it support staff to participate in organization-wide, strategic projects) (Rosca, Nastase, & Mihai, 2010). Since the application acquisition is becoming more and more a departmental decision rather than centralized function; senior leadership in universities must be involved in the Digital Integrations to reduce the risk and utilize funds. Data integration requires different

measures to addresses contractual and security issues across different, disparate vendors and repositories (Grajek, 2019).

University adopts one of the following IT Governance structures: first, a single centralized IT Governance structure with specific functions delegated to specialized subcommittees such as academic IT, administrative IT, infrastructure, networks, and information security subcommittees. Second, several, parallel IT Governance councils. The most prevailing example uses one structure for administrative IT functions and another structure for academic IT functions. These councils then work hand in hand to make IT Governance decisions. University size, organization, culture, and control (private vs. public) are some of contingency factors that must be considered when designing an IT Governance framework for any university (Grama, 2015).

With a view to analyze the best-fit IT Governance structure for universities; Bianchia, Sousab, Pereirac, & Luciano (2017) conducted an exploratory study that adopts an inductive strategy where they performed semi-structured interviews in six universities located in three different countries (Brazil, the Netherlands and Portugal) proceeding a comprehensive literature review. The research shows a consensus that a totally decentralized IT Governance model which is characterized by higher risks, duplication and waste of resources, as well as control and communication difficulties; has been perceived as inappropriate for Higher Education Institutions. Moreover, the size of HEIs will drive the selection between totally centralized and federal IT Governance structures. Large and extra-large universities tend to adopt the federal IT Governance structure where the strategy, infrastructure, roles and procedures are centralized to avoid resource wasting and the execution and operations are decentralized. In order to increase the efficiency, the decentralized IT units should have a strong interaction with central IT, and they must communicate and work as partners. As for medium size university with only one campus, centralized governance structure is the best since it allows economizing on skills and applications which lead to cost reduction and standardization. The researchers confirmed that the IT Governance structure tends to be centralized rather than decentralized or federal.

The drastic change in the role of IT in an organization challenged the position of the CIO. Traditionally, the skills of IT managers to the greatest extent were technology oriented while now the C-level positions are responsible for the entire IT strategy creation, alignment, and communication. This strategy focuses on

supporting core business processes to ensure business continuity in the highly competitive marketplace. (Hotzel, Wimmer, Heyde, & Lang, 2015). In universities, a respected and engaged CIO can make all the difference in helping functional areas use technology effectively and foster collaboration. The collaboration between CIOs and CBOs in the area of IT funding models that can accommodate continuing shifts to the cloud, adopting increasingly mature IT financial management, invest in IT innovation, outsourced IT options, and shared services is evolving. (Grajek, 2019) .

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The Joint Information Systems Committee (JISC) for universities in the United Kingdom took the lead and designed the first IT Governance model which provides a reference for the whole university system. Along with the IT Governance reference model, the committee developed a toolkit for the self-evaluation of IT Governance maturity, which aims to help universities in the process of identifying and defining the IT role within the planning and governance of the university corporate governance. This framework was designed to be highly flexible, and it considered different contingency factors like the size of the university, governing style (public/private) and the university culture (Fernández & Llorens, 2009).

Performance measure is important to justify the use of IT, however, it did not receive the required attention because of the lack of consensus about different perspectives within the organizations. The success of the assessing or measurement IT Governance function in universities relies on firstly the gathering of performance measures and secondly the assessment of those measures by someone with the authority to act on the results or to forward results to an authorized body that can action them. These measures include intangible and qualitative factors such as feedback from faculties and other constituents, exception reporting when governance issues arise, internal and external audit reports, and IT strategic progression compared to plan (Hicks, Pervan, & Perrin, 2012; Ko & Fink, 2010).

Research shows that successful implementation of IT Governance relies not only on the design of the IT Governance framework, but also on how well-communicated the IT strategy and IT policy from the board

is. In the context of universities, for the sake of minimizing capital risk and failure of trial and error; universities have to analyze their current status of IT Governance performance before taking any further steps (Jairak & Praneetpolgrang, 2013).

Participatory leadership and shared governance that involves employees in decision-making might be the key to foster compliance in HEIs. Information Security Policy enforcement which is achieved using coercive force does not blend well with higher education culture (Kam, Katerattanakul, & Hong, 2016).

The top management involvement headed by the university president is important to enhance communication between different university units and foster collaboration. Their role is extended to make decisions on major matters related to IT construction and orienting the IT development (Zhen & Xin-yu, 2007). Stakeholders' involvement, employee's integration, business process improvement, and flexibility of the IT infrastructure are critical success factors for the implementation of IT Governance framework. The effect of active commitment from the top management in driving the capabilities to manage IT resources and improving internal process-level performance cannot be neglected (Jairak & Praneetpolgrang, 2013)

Universities all over the world adopted different approaches to select and implement IT Governance frameworks that suit their objectives, management, and governance. Some have used COBIT to implement it; others have designed their own IT Governance models based on literature; and the last group has designed a more practical and less academic model (Fernández & Llorens, 2009). Most of the IT Governance guidelines are tailored to corporate settings that exercise top-down management. These guidelines do not fit the unique setting of higher education, which is identified as complex, highly decentralized, heavy-bottom structure (Kam, Katerattanakul, & Hong, 2016; Hicks, Pervan, & Perrin, 2012). This structure empowers the academic freedom which awards the scholars the rights to discover, discuss, and share ideas. Furthermore, it guarantees the profession autonomy. This unique structure brings opportunities and challenges to the security of information and the governance of IT resources and services. It opens the doors for innovation, quick decision making, and collaboration, yet it gives scholars the power to resist security practices. Another challenge of implementing security is the large dispersed system across different departments which brings difficulties in standardizing the implementation of security practices (Kam, Katerattanakul, & Hong, 2016).

In Spain, a group of IT Directors and CIOs of all Spanish Universities and other researchers collaborated to develop a survey built of three layers: IT Description, IT Management, and IT Governance. The first layer was distributed on 6 axes which are: Teaching and Learning, Research, Management, Information Management, IT Training and Culture, and IT Resources. It aims to obtain a detailed list of IT resources while the second layer (IT Management) analyzes the level of IT management best practices implementation. This layer is divided on 7 axes: IT Resources, IT Projects, IT Services, IT Direction, IT Quality, Regulations and Standards, IT Collaborations, and IT Trends. The IT Governance layer analyzes the level of IT Governance best practices implementation, and it is based on the seven principles of ISO 38500 which are: Responsibility, Strategy, Acquisition, Performance, Conformance and Human Behavior(Fernández Martínez, Llorens-Largo, & Hontoria Hernández, 2015).

In light of addressing the problem of inaccurate date that encountered beginning of 2017 in one popular IT school in Indonesia, STMIK MBM, a change in the management has occurred. The school also suffers from frequent IT interruptions which negatively impact the school operations and reputation. The new management implemented COBIT IT Governance framework to promote IT good governance. COBIT has emerged as an important reference to IT Governance in higher education institution and it provides seemingly integration of good governance system of education, business and Information systems. Gunawan, Kalensun, Fajar, & Sfenrianto (2018) conducted a study in STMIK MBM with the aim of measuring the effectiveness of the recently implemented IT Governance framework. They relied on data collected through observations and interviews with 12 major stakeholders in managerial levels and above. The study provides an analysis of COBIT 5 implementation with the aim to provide a guidance for major school stakeholders to understand and develop effective business and IT policy. The outcome is expected to provide insight of good IT Governance for higher education institution. The researchers found that the implementation of COBIT 5 in the school has a positive impact in addressing the problems and it also helps in identifying and mitigating risks by helping the leaders of the school to develop an effective risk management policy applicable to all stakeholders (Gunawan, Kalensun, Fajar, & Sfenrianto, 2018).

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Governance maturity, which aims to help universities in the process of identifying and defining the IT role within the planning and governance of the university corporate governance. This framework was designed to be highly flexible, and it considered different contingency factors like the size of the university, governing style (public/private) and the university culture (Fernández & Llorens, 2009).

The integration of IT Governance review process into the strategic IT Governance as well as IT management levels that translate the strategic IT plans into operational realities has been advocated. Research founds that the maturity level of IT Governance practices in universities is low. (Hicks, Pervan, & Perrin, 2012; Ko & Fink, 2010). Previous study shows that the average maturity of universities IT Governance on a global level is 2.30. Llorens & Fernández (2008) state that the average maturity level of Spanish universities is 1.44.

IT Governance performance is generally not being measured properly. Organizations need to find a good balance between technical and business IT Governance performance measures. Technical measures evaluate technical-related issues such as IT downtime and access failure while business measures evaluate business-related issues such as customer satisfaction (Ko & Fink, 2010).

Universities are facing many issues with regards to the control, management, and governance of IT. These issues result from the decentralized organization of university which makes it very difficult to trace, evaluate, and monitor the interwind systems with business processes scattered throughout the different departments. The new technologies that are proliferating brings new challenges and possibilities for teaching, learning and research, as well as university administration processes; hence, models to justify additional investment and long-term sustainability plans are needed. The increasing legislation intended to protect and secure the information assets are increasing drastically and universities must develop plans and policies to assure compliance which is the core to its sustainability and existence. The level of information technologies awareness increased among the university stakeholders specially the students; this leads to growing demand for more advance technologies acquisition. As the reliance on IT increased, the risk of system failure increased. The clash between the need to centralize IT and the resistance from scholars is increasing (Coen & Kelly, 2007; Zhen & Xin-yu, 2007).

Hicks, Pervan, & Perrin (2012) identified several common, overarching processes that improve the outcomes of IT Governance structure. These were: a formal strategic planning process, an IT Steering Committee,

appointment of a CIO or equivalent position, a comprehensive system for IT risk identification and management, and clear roles and responsibilities, specifying accountability for IT functions and decisions, transparency of IT decision making, stakeholders involvement in IT decision making, and central control or coordination of IT (Hicks, Pervan, & Perrin, 2012).

Bianchi, Sousa, & Pereira (2017) research suggested to enhance the university IT Governance through managing innovation, Dashboards, International standard knowledge sharing, and partnership among universities and the software industry.

IT benchmarking is a powerful tool for universities to enhance quality and productivity of universities which are competing locally and internationally to be viewed as prestigious institutions. This will open avenues for universities and will increase their chances with regards to funds, collaboration with other institution, as well as getting research grants (Fernández Martínez, Llorens-Largo, & Hontoria Hernández, 2015).

2.1.3 IT Governance and Agility

While the implementation of IT Governance has been viewed by many researchers as a crucial aspect to enhance business performance and achieve organizational objectives, several studies argue that agility plays an equally vital role in this regard. Agility has been defined as the process whereby an organization and its executive boards is able to answer the market emerging opportunities and demands both effectively and efficiently.

Based on Couto, E., et al. the IT Governance practices involving the organizations procedures, supervision, monitoring and control are proven to have positive impact on the organizational performance. The main challenge, however, arises from the ability of the presumed rigidness and relatively static IT Governance approach in coping with a rapidly changing industry needs and requirements. This issue of IT Governance and agility has been deemed as a stress between adaptation and anticipation.

The significance of enterprise agility has been emphasized by Tallon and Pinsonneaulet (2011) where they were able to find through an enquiry to 241 organizations that there is a positive correlation between alignment and agility and between agility and organizational performance. The study was able to particularly confirm the substantial effect of agility in volatile business environments.

Adapting IT to a rapidly changing environment has been perceived as a challenging task in key aspects of development, design, testing and implementation. The agility concept has been misunderstood and confused with other terminologies leading to more difficulties in scope understanding and implementation. Unlike flexibility that deals with known changing factors, agility is more viewed as the ability to adhere with a yet unknown context. Ultimately, these challenging variables raise further questions on whether the current well-established IT Governance structures are responsive to unknown regulatory and economic changes in any presumed business setting including the educational sector and universities. Figure 2.2 illustrates the differences between IT Governance and agility.

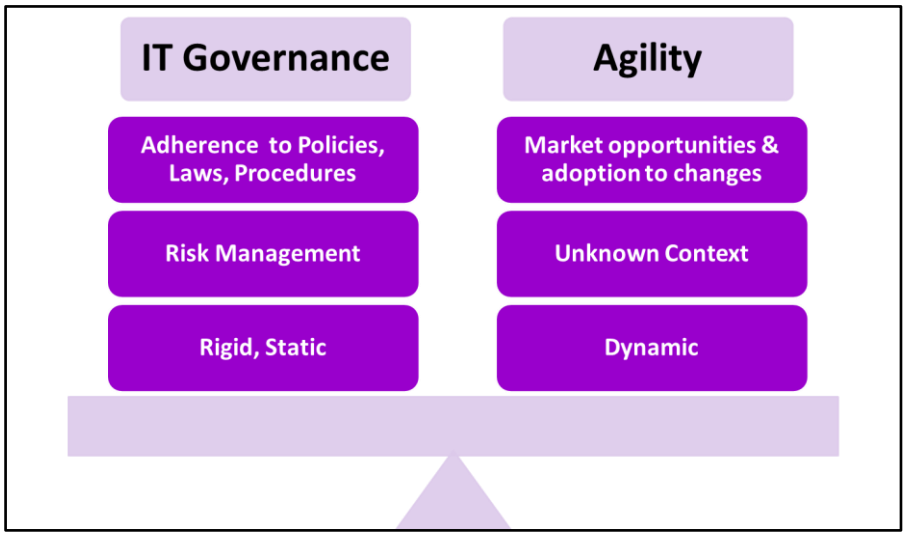

Figure 2.2: IT Governance vs. Agility

Effective IT Governance is dynamic and flexible in nature, requiring to be reviewed to reflect any change in technology or the business environment. IT Governance is not a static concept, it is an ongoing process deeply embedded in the organizational structure that includes evaluation, monitoring, and guidance to ensure that IT Governance function is effective and working as intended. IT Governance is a collaborative network structure that support organizations to prosper in a turbulent environment. It enables organizations to sustain realizing value from IT instead of restraining its contribution by imposing control. (Ko & Fink, 2010; Hicks, Pervan, & Perrin, 2012).

2.1.4 IT Security in Higher Education

Information is considered to be one of the most valuable assets for any institution. Cyber-related security threats are increasing in number and magnitude; therefore, organizations place a major focus on maintaining the security and accuracy of information systems (Bélanger, Collignon, Enget, & Negangard, 2017).

Information IT security is strongly related to the concept of risk. Information security defined as "the concepts, techniques, technical measures, and administrative measures used to protect information assets from deliberate or inadvertent unauthorized acquisition, damage, disclosure, manipulation, modification, loss, or use". Managers and employees tend to think of IT security as a second priority because it is hard to measure its impact on performance and work outcomes (Rezgui & Marks, 2008).

Universities reliance and investment IT have increased which necessitate the implementation of reliable structures and measures to grantee positive return on investment and minimize failure. IT Governance, security, risk, and compliance issues increasingly pervade HE information technology and are considered the main drivers for deploying an IT Governance scheme in HEIs.

Ensuring business service continuity and availability can be achieved through safeguarding and securing universities' information assets and it has become an extremely complex and challenging activity. It is a major concern for knowledge-intensive organizations like universities since the effective conduct of their core teaching and research activities is becoming more reliant on the availability, integrity, and accuracy of information resources (Doherty, Anastasakis, & Fulford, 2009).

The ultimate computer security program takes in consideration the following components: domains, functions, and concepts. "Domains can be categorized into physical security, operational security, personnel security, systems security, and network security. Functional areas can be categorized into risk avoidance, deterrence, prevention, detection, and recovery while concepts are categorized into confidentiality, integrity, authentication, access control, non-repudiation, availability, and privacy." Security attitude of internal and external stakeholders are essential to ensure effective IS security (Rezgui & Marks, 2008)

An informal poll was conducted to identify the highest information security risks on HEIs. The top four risks revealed by the poll are: 1. Phishing and social engineering; All university stakeholders are vulnerable to

social engineering attacks including the university president and board members. Over the past two decades, phishing scams have become more sophisticated and harder to detect. Campuses implemented various training programs to enhance the awareness about the different type of phishing attacks and hence protect institutional resources. 2. End-user awareness; With limited resources, campuses must be creative and collaborative in fulfilling information security awareness needs. 3. Inadequate resources for information

security program. 4. Addressing regulatory requirements; due to the complexity and diversity of regulatory requirements surrounding the HEIs (Grama & Vogel, 2017).

Despite the efforts of universities to protect stakeholder's information, statistics shows no improvement in the percentage of data breaches incidents that strike universities. Table 2.1 shows the percentage of different data breaches incidents that struck American universities from 2014 to 2018. The data were extracted from Privacy Rights Clearinghouse which is a non-for-profit organization founded in 1992. The organization aims to protect IT privacy through empowering individuals throughout the United States and advocating for positive change (Data Breaches, 2019).

Measuring the effectiveness of information security awareness training programs is difficult, and it is hard to measure its return on investment. Formal security awareness training may improve the user perception of the ethical use of IT. Research show that students are able to identify most unethical situations correctly. However, they cannot identify misuse of university IT assets even with the existence of proper polices in place (Cox, 2012).

Table 2.1: Data Breaches Incidents That Struck American Universities

Year	Unintended Disclosure	Hacking or Malware	Insider	Physical Loss	Portable Device	Unknown
2014	16.7	53.3	6.7	6.7	13.3	3.3
2015	15.8	57.9	0.0	5.3	21.1	0.0
2016	28.6	52.4	0.0	4.8	9.5	4.8
2017	40.0	30.0	3.3	13.3	3.3	10.0
2018	21.1	42.1	0.0	21.1	0.0	15.8
Total	25.2	46.2	2.5	10.1	9.2	6.7

Universities tended to have an information security policy, accompanied by several related policies, and then also supplemented by several specific guidelines and/or practice-related documents. The common combination of policies in universities was an Information Security Policy (ISP), accompanied by an acceptable use policy and an electronic mail policy (Doherty, Anastasakis, & Fulford, 2009).

Information security controls are implemented to ensure confidentiality, integrity and availability of the organization's information, which may be essential to sustaining a competitive edge, cash flow, profitability or legal compliance (Da Veiga, Martins, & Eloff, 2007).

ISP is considered as one of the top priorities of organizations which helps in managing information and minimizing risks. The policy provides a direction and intent of management for safeguarding the information. It outlines the framework for setting control objectives and controls to mitigate risk to information. ISP plays a vital role in building a strong information security culture in an organization. Employees' awareness and perception of ISP rules and procedures affect information security behavior and hence the information security culture (Da Veiga A. , 2016).

Various information security policies and procedures were implemented in order to minimize and prevent intended or unintended behavior of employees that could either weaken or destroy the effectiveness of the hardware or software defense systems (Hu, Dinev, Hart, & Cooke, 2012).

Building an organization culture that considers information security awareness will minimize information assets risks by reducing employee's misconduct risks and harmful interactions with information assets. Measures and reports on the state of information security culture in the organization are needed. "An information security culture can be defined as the way things are done in the organization to protect information assets" (Da Veiga, Martins, & Eloff, 2007).

Research shows that two to three percent of an organization's annual profit may potentially be lost due to information security incidents (Da Veiga & Eloff, 2010). A study in data breach indicates that organizations' employees could be behind most breaches and pose a threat to the protection of information, whether intentionally or unintentionally. Therefore, organizations must pay a serious attention to the risk that employees pose (Da Veiga & Eloff, 2010; Chang & Lin, 2007; Cox, 2012; Cheng, Li, Li, Holm, & Zhai,

2013). In fact, internal employees of an organization could be more dangerous than those external to the organization because of their intimate knowledge of the organizational information systems and access to data in their routine work activities (Hu, Dinev, Hart, & Cooke, 2012). Insider's error can be costly to an institution in many ways. It can interrupt business processes till the information systems are restored, cause financial loss directly or indirectly, exfiltrated personal or sensitive corporate information, and destroy the organization's reputation (Cox, 2012).

Setting the direction for information security is the responsibility of the top management through the ensuring the existence of guiding policies, defining ethnical expectations, and emphasizing on proper procedures. The users' attitudes towards compliance with established policies and procedures are influenced by knowledge, personal ethics, and acceptable behavior. Users tend to behave in a way that is consistent with their perceptions of the group's normal behavior (Cox, 2012).

Culture is a critical factor for business continuity since it drives the organization and its activities. Employing policy-based security plan is considered extremely challenging because new security policies often conflict with the way employees work for years. Understanding organizational culture traits can facilitating businesses in carrying out ISM, and building shared values, beliefs and norms for ISM based on the concept of organizational culture (Chang & Lin, 2007).

Engaging staff in information security initiatives and programs will influence relevant organizational culture values such as the goal and rule orientations, particularly perception of these values at the individual level (Hu, Dinev, Hart, & Cooke, 2012).

Top management involvement, in the development and implementation of information security policies, will have a big impact on employees' perception about the legitimacy of these policies and the organizational commitment to the goal of a high standard information security (Hu, Dinev, Hart, & Cooke, 2012). The Chief Security Officer (CSO) plays the key role in leading information security programs and initiatives, however, CSO role in the HE Sector has been very difficult to characterize (Petersen, 2006).

Hu, Dinev, Hart, & Cooke (2012) attempt to study the influence of top management on security compliance behavior of employees. An individual behavioral model that integrates the role of top management and

organizational culture into the theory of planned behavior was developed. The study found that top management participation in information security initiatives influences directly and indirectly employees' compliance with information security policies. Furthermore, the top management involvement strongly influences organizational culture which in turn influences employees' attitudes towards compliance with information security policies.

The environment of HE is highly regulated and extremely complex. HEIs obligations usually extend beyond IT systems to the operation of the institution itself. HEIs ought to comply with variety of external laws and regulations such as: accreditation, athletics participation, campus safety, donation, financial aid, healthcare and insurance, record management, research, and taxation. Furthermore, it must comply with institutional internal policies that cover areas like intellectual property, privacy, and staff conduct. Similarly, institutions have abundant of contracts, including their contractual commitments to their students (Grama, 2015).

Academic freedom is the spirit of the academic culture. HEIs determine the legitimacy of rules and regulations based on "their consistency with the goals of academic ideology". Academics would strive to comply with regulations only if the regulations are in an accordance with the goals of academic ideologies (Kam, Katerattanakul, Gogolin, & Hong, 2013).

In 2013, compliance issues struck all facets of HE and it is becoming more complex because of technology advances. Specialized professionals are required to manage data in a legal and compliant manner. The complexity of privacy, information security, data governance, and IT policy as compliance and risk areas can impact every department within HEIs. Managing risk is an integral part of compliance. The ability of HE to take appropriate decisions with regards to everyday operational activities and strategic transformative new technologies is only possible through collaborative compliance and risk activities (Feehan, 2013).

Compliance activities are an ongoing process which require coordination between IT units, business and academic units, institutional compliance offices, legal counsel, and other stakeholders to properly address university-wide compliance requirements. Regulatory requirements often change, which then require a review of institutional compliance. Compliance requirements for IT systems are often linked to the type of data used, processed, stored, or transmitted; this means that one IT system may be subject to multiple compliance requirements. Compliance concerns often bring to notice only after a serious noncompliance

incident occurs. The likelihood of a high-profile incident may minimize by proactively addressing compliance issues (Grama, 2015).

Information security compliance requirements must be effectively addressed and maintained through continually reviewing compliance methods, systems, and processes to ensure that the compliance approaches are effective. Several universities are considering the implementation of Governance, Risk, and Compliance (GRC) solutions to automate compliance reviews and reporting and also to help in implementing corrective actions. Many universities perform technical compliance reviews such as vulnerability, data loss prevention assessments, and penetration testing. information security teams may use technical solutions to help in conducting effective reviews of IT infrastructure and the information lifecycle. Some universities hire expert third parties for these purposes since the untrained individuals may jeopardize business continuity and disrupt university-wide operations, not only IT operations (Compliance Management, 2019).

2.1.5 Japanese Universities IT Status

In Japan, there is a gap between government discourse and policy implementation due to the conflict between stakeholders needs. The NUCs entrepreneurial activities are confined to the areas of technological transferring and licensing. Though these activities were advocated as a method to increasing NUCs contribution to the national economy; the ministerial control and the financial mechanism which limits financial incentive prevent the universities capabilities in participating in entrepreneurial activities (Yokoyama, 2006).

As a result of e-Japan initiatives which commenced in 2000, Japan has one of the most cost-effective and high-speed ICT systems in the world. Infrastructure, network environment, e-commerce and e-government targets were set, and all classrooms were connected to the internet, e-learning heavily encouraged. Despite the fact that Japan has highly developed information and communications technology infrastructures and encouraged e-transformation, Japanese universities failed to attract many foreign students due to the low level of e-learning activity. MEXT has articulated the vision for e-learning, revised some policies and set some targets however, it did not develop the action plan required to implement its vision neither provided the necessary follow up or funding. MEXT stablished ICT centers in universities on a purely hierarchical

basis. The elite universities received the lion share in the number of personnel and facilities while other universities got a few technical resources (Latchem, Jung, Aoki, & Ozkul, 2008).

In Japanese universities, e-learning has not been strategically planned or implemented. It is still at the experimental stage, and it did not receive the necessary managerial attention and technical support. Internet use is largely confined to administrative emails and bulletin boards, the internal distribution of printable material, library databases, marketing and posting syllabi on the Web. Few Japanese academics are involved in e-learning research and development, hence the pedagogical aspects of e-learning are either ignored or dealt with superficially (Latchem, Jung, Aoki, & Ozkul, 2008).

A concentrated effort is a must to reach a full e-transformation stage in Japanese universities. Management of resources, faculty training and support, organizational cultures and structures changes, funding, and recognition and reward systems are some of the factors that could help universities in improving their e-learning status (Latchem, Jung, Aoki, & Ozkul, 2008).

Formal IT Governance structure based on the best internationally accepted governance frameworks that fits the unique characteristics of NUCs is needed especially in this era of accelerated need for more advanced technologies and applications, a need that is encountered with even more accelerated speed in developing the required technologies and applications and creating new needs. Universities should be able to make a major alignment to available IT Governance framework to make them more relatable to their needs. This is the first objective of my research, to develop an IT Governance framework to fit the unique structure of NUCs, which I am going to discuss in detail in chapter 3.

2.2 Japanese Higher Education History, Direction, and Governance

Our research focuses on IT Governance at NUCs. In the previous section I presented comprehensive literature review about the field of IT Governance especially the research related to HE IT Governance. In this section will provide detailed literature review about Japanese Higher Education history, reforms, and national direction.

Since the 1990s, Japanese higher education policy has been more economic-centered and neo-liberal in nature than previous policy. It is characterized by governmentalism and managerialism which represent a

shift in university plan towards business and market values. The emphasis for the reform in Japan reflects the recent government concerns regarding Japan's ability to compete in the global market in while concurrently coping with a rapidly aging society and a declining birth rate (Yamada, 2018; Yonezawa, 2014; Nomura & Abe, 2010). Converging logics of 'bureaucracy' and 'managerialism' have brought about leadership challenges (Howells, Karataş-Özkan, Yavuz, & Atiq , 2014).

The higher education system in Japan consists of private and public universities, junior colleges and colleges of technology (Goldfinch, 2006; Yamamoto, 2004). Upper secondary schooling is essential for the admission to Universities and Junior colleges while lower secondary schooling is sufficient for the enrollment in colleges of technology. Universities offer courses of at least four years leading to a bachelor's degree whereas Junior colleges offer two to three years programs that lead to associate bachelor certificate. Colleges of technology offer five-year programs leading to the title of associate (Yamamoto, 2004).

In Japan, universities are ranked in pyramidal fashion. National universities are generally regarded as the most prestigious with Tokyo and Kyoto Universities sitting at the pinnacle. Local public universities are in the second place after the elite National universities while the majority of private universities are counted as marginal to poor quality institutions with few exceptions of highly esteemed ones such as Waseda, Keio, Ritsumeikan, Sophia, and Doshisha (Doyon, 2001).

The higher education system in Japan consists of private and public universities, junior colleges and colleges of technology (Goldfinch, 2006; Yamamoto, 2004). As of 2015, there were a total of 779 universities, 77.54 % (604) of which are private. Approximately three quarters of students are enrolled in the private universities. The number of national universities did not change since 2010 while there is a slight difference in the number of local and private universities (see table 2.2) (Yamada, 2018; Goldfinch, 2006; About MEXT, 2018). As of 2018, management expenses grant for national university corporations appeared in the second rank of MEXT spending occupying 20.7 % of the total budget while the Science and technology promotion came in the third rank with a percentage of 18.1. MEXT spent about 0.7% of its budget on National university corporation facility (About MEXT, 2018).

Table 2.2: Statics of Japanese Universities and Students

University Type	# Of Institutions	# Of Students	Institutions %	Students % in each institution
National	86	610,802	11.04	21.36%
Local	89	148,766	11.42	5.20%
Private	604	2,100,642	77.54	73.44%
Total	779	2,860,210	-	-

Approximately 40% of MEXT budget is allocated for the NUC and the promotion of science and technology activities which the NUC plays the central role in this mission. (About MEXT, 2018) Despite the collaborated national efforts to enhance the efficiency of NUC, it is still suffered from inappropriate management and inefficient allocation of resources (Oba, 2013).

The 18-year-old population reached its peak of 2.05 million in 1992 and since then it has been steadily decreasing. Despite the drop in the 18-year-old population, the percentage of students pursuing higher education degrees has been steadily increasing. Regardless of this fact, it seems unlikely that the rising percentage of 18-year-old population entering higher education will compensate the decline of 18-year-old population eligible to enter university. There is a huge pressure to compensate for the shortage in the local demand for the higher education. MEXT should develop a plan to expand their markets and expand their global competitiveness, through the promotion of foreign exchange programs and lifelong learning (Doyon, 2001).

Internationalization of Japanese higher education efforts started after Japan independence post World War II in 1952. Prior to its independence, since Japan was an American colony, America imposed their education system on Japan. After independence, Japan succussed to revitalize its economy and hence improve its influential power in the global world. Its strong economy elevated its competitiveness in the global marketplace in all aspects including research and development (Mohsin & Zaman, 2014).

The modern concept to Internationalize Japanese is rooted in the time of the establishment of the Nakasone cabinet in 1982. Since 2002 MEXT has introduced a series of competitive funds to empower Japanese

university to compete in the global world such as “Global 30 (G30)”, the Inter-University Exchange Project, and “Top Global Universities (TGU)” projects. Not all universities are lucky enough to receive MEXT support. As Japanese government focused on empowering large-scale universities who are already have a long experience, the other universities that may have the potential to be left out the race. The world universities ranking shows that a number of Japanese universities are capable of competing regardless of governmental subsidies support. Several universities are taking internal efforts to promote globalization. Sadly, globalization of Japanese universities projects was short in fully achieving its stated goals and potentials. Further, it heightened the inward-facing internationalization and widen the differences in terms of resources and received support from MEXT and other partners and supporters among domestic universities (Aleles, 2015; Ota, 2014; Shimauchi, 2017).

The revised School Education Law in November 2002 subjects all institutions of higher education to a compulsory evaluation by third-party accreditation agencies. These agencies must be certified by the Minister of Education, Culture, Sports, Science and Technology (MEXT). The amended law is criticized for obstructing the autonomy of institutions of higher education. This view, however, contrast with Paragraph 2 of Article 7, which states: “The autonomy, independence, and nature of education and research of universities should be respected” (Yamada, 2018).

National policies have been emphasizing the important role of universities and tertiary institutions in enhancing the country standing in the international competition. Despite the financial constraints that the universities currently undergo, universities have been asked “to do more with less,” enhance market position, and graduate quality alumni as well as research results (Sporn, Governance and Administration: Organizational and Structural Trends, 2007; Yonezawa & Shimmi, 2015).

The continuous changes in globalization trends and computerization in the “knowledge society” force the universities to be positioned under the limelight due to its vital role in facing the current opportunities and challenges. In 2011, the Higher Education Policy Planning Division Office for Higher Education Policy in Japan published the interim report that presents the deliberation process and issues that require further consideration in the higher education in Japan. The report highlighted the need to improve the organizational and managerial practices of universities which will boost the educational and research functions. The report

recommended “Improvement in professional quality levels of university administrative staff, with the intention of strengthening organizational bases. Training through university education that incorporates groups that support universities, support for joint research from university partnerships, graduate courses, and course validation programs”. It also emphasized the need for university to create a structure for “information provision promoting autonomous decision-making by universities”. “The government supports autonomous and independent measures within universities to organize structures for the distribution of information relating to trends in approvals for the establishment of universities by region and sector, and the number of students per head of the population (by sector, degree level and region)” (Higher Education Policy Planning Division , 2011).

2.2.1 The History of Japanese Education Reforms

During the Edo feudal régime Japan had around ten thousand schools called Terakoya, open to children of commoners and samurai. The estimated literacy rate was 40% (Itoh, 2002). The Japanese modern education system began in 1887 during the Meiji Restoration era (1868-1912), when the University of Tokyo was founded through the merger of two existing higher education institutions. Other imperial universities were subsequently established resulting in a total of 7 imperial universities (Tokyo, Kyoto, Tohoku, Kyushu, Hokkaido, Osaka and Nagoya). All these were comprehensive universities and were organized on the German model, which led to a stratified bureaucratic system with quasi-autonomous academic units (Itoh, 2002).

The Ministry of Education of Japan was stablished in 1871 under the Cabinet. In 2001 the Ministry of Education, Science Sports and Culture and the Science and Technology Agency have been merged under the name of Ministry of Education, Culture, Sports, Science and Technology (MEXT) (About MEXT, 2018).

“MEXT examines the basic direction of education policy by planning and drafting basic educational policies, works to promote education in which schools, families and communities collaborate, enhances specialized training colleges, libraries and museums, etc. addresses child poverty, facilitates education and learning for gender equality, advances the use of Information and Communication Technology (ICT) in school education, and promotes sound development of youth.” (Ministry of Education, Culture, Sports, Science and Technology (MEXT), 2016).

There has been tremendous amount of reforms proposals of which some articles where partially implemented. The major four movements of educational reform in Japan were: (a) the Meiji Restoration era reform in the 1870s, (b) post World War II Occupation era, and (c) 1960s reforms, and (d) incorporation of national universities reform (Doyon, 2001) . Most of the reform issues are deep-rooted and have arisen frequently over years. The 1960s reforms proposals though were considered too progressive for the Japanese society during that time, most of its suggestions were implemented years later (Doyon, 2001; Itoh, 2002; Yamamoto, 2004; Tabata, 2005; Oba, 2005). A comprehensive "higher education policy" in Japan did not exist until the beginning of the 1970s because of the believe that the university's academic freedom and autonomy must be untouched (Kitamura, 1997). The post war reforms tried to implement the American system, but somehow it didn't succeed in eliminating the previous stratified German system, so the universities worked in a hybrid way, a mix of both systems. The post-war reforms were a step back to pre-war system to remove the dissatisfaction and return control to the ministry of education which they lost since they were not consulted or involved in the policy making during the Occupation era. The response to this ambitious reform that followed the Occupation era was generally negative. Some of these reforms could certainly have undermined the traditional autonomy and neglected the socio-political climate of the time (Itoh, 2002).(Refer to appendix C for more information about Japanese educational reforms) (Doyon, 2001; Itoh, 2002; Yamamoto, 2004; Tabata, 2005; Oba, 2005; Christensen T. , 2011; Ehara, 1998).

2.2.2 Science and Technology Basic Plan

Considering dramatic challenges facing Japan society which are: global competition, aging society, decline birthrates, demise of traditional industries, as well as global environmental and resource issues, Japan made many efforts to return to its position and strength as one of the leading countries. Japan created the national wide revitalization strategy plan to boost science and technology, Japan's Science and Technology (S&T) Basic Plan which was enacted in 1996 (JANU, 2017). The S&T Basic Plan is aimed to restructure Japan's science and technology scheme to make it more innovative and cost efficient. It integrates and systemize previously suggested reforms and deregulation measures into one coherent plan. The Basic Plan was drafted by a team of bureaucrats from the Science and Technology Agency under the Ministry of Education, Culture, Sports, Science and Technology (MEXT). The previously mentioned plan is a 5 year plan from 1996 to 2000 that recommends spending ¥ 17 trillion in implementing public research and development in fields neglected

by the private sector. The Plan is designed to restructure Japan's Science and Technology system by: Improve researchers mobility between different sectors, shift from lifetime employment system to tenure system in the personnel structure of national universities, increase the competitiveness in research funding, introduction of objective and systematic evaluation procedures, attracting foreign researchers, upgrade information technology infrastructure in universities and national laboratories, and enhance and encourage the cooperation between private and public sector (Science and Technology Funding: Plan Calls for Japan to Spend $155 Billion over Five Years, 1996).

Japan improved its status through the implementation of Science and Technology Plans in terms of research quality and quantity, human resources development and management, patents, cross sectoral research collaborations, problem solving, Research and Development facilities, addressing global issues, and improve lifestyle. Starting from the Forth Basic Plan, a shift was introduced from S&T to Science, Technology & Innovation (STI) to cover a wider spectrum (The 5th Science and Technology Basic Plan, 2016).

The 5th Science, Technology and Innovation (STI) Basic Plan enacted to be in action from 2016 to 2020. It was developed by the Council for Science and Technology Policy CSTP chaired by the Prime Minister and aimed to promote S&T in coordination with related ministries. The 5th Basic Plan is supposed to answer the question whether science, technology, and innovation (STI) can contribute to sustainable and inclusive development in Japan and the globe. Out of the vital role of information infrastructure as a backbone in the creation of STI, Japan is intensifying its efforts to improve the performance and the facilities of information infrastructure. This includes improving the ICT security functionality, cloud computing and enhancing research information networks. Technologies and information are essential to Japan’s industrial competitiveness. The security of information required to be managed appropriately by all organizations. Many laws, regulations, and/or guidelines were enacted to protect information. The Unfair Competition Prevention Law and the Foreign Exchange and Foreign Trade Control Law are examples (The 5th Science and Technology Basic Plan, 2016).

Despite these achievements, Japanese Science Technology and Innovation has regrettably deteriorated in recent years. Japan is currently facing several issues for instance: decline in research standing in international ranking, retards in construction international research networks, shrinking number of young researchers as

well as immaturity in the industry–academia collaboration. In the interest of overcome these drawbacks and extract the most out of the R&D investments of the past 20 years, it is extremely important to reform the systems related to the development and training of human resources in STI, and to recognize, reorganize and enhance the role of universities and National R&D Institute (The 5th Science and Technology Basic Plan, 2016).

Universities are the main entity in STI plan and unfortunately, they fail to keep pace with in terms of management of resources including human resources and management systems. In this regards, universities must be restructured putting in mind their important role in transforming the society through education and research which will maximize the return on investment in S&T. Universities "need to strengthen their management capability through the appropriate allocation ("portfolio management") of resources across their organizations; enhance their institutional research and planning, survey, and analysis systems; boldly restructure and metabolize their education and research systems; reform their payroll systems to promote optimal deployment of human resources; radically reform university and graduate school education; and upgrade systems for industry–academia–government collaborations. This can be accomplished by improving risk management; actively publishing information, including data on the state of their finances; diversifying funding sources; and implementing a selection process aimed at appointing presidents in accordance with each university's mission, and then securing and training personnel to be presidents" (The 5th Science and Technology Basic Plan, 2016).

2.2.3 National University Corporations (NUC) Reform

The period prior to NUC reform was characterized by tensions between higher education institutions perspective of deregulation and autonomy on one hand; and the Ministry of Education re-regulation, scrutiny, and evaluation measures on the other hand. There was a general feeling that HEIs are partly responsible for the trend towards stagnation in Japan, combined with a decrease in the number of students seeking higher education. This paved the way for the Ministry of Education and the leaders of higher education institutions to push for change and efficiency. The introduction of Independent Administrative Institutions (IAIs) in 2001 has also influenced the change (Christensen T. , 2010).

NPM was introduced to solve efficiency, participation, and legitimacy issues in the public sector. The notion combined mix of element taken from institutional economic theory and management theory. NPM focus on markets, competitive tendering and privatization and service provision and consumer-orientation. It reorganized the corporate structure of the public sector vertically (devolution) and horizontally (role purification) (Christensen T. , 2011). Research shows that NPM has enhanced the public services efficiency. Further it made role relationships clearer which in turns enhance transparency and accountability (Christensen T. , 2010).

Higher education went through drastic transformations since the establishment of the national university corporation system law in April 2004 (Goldfinch, 2006). Despite the fact that this law accords autonomous personality and give more freedom to universities in term of management, it causes a reduction of the operating grants provided by MEXT for national universities. In 2014, National University Corporation Law in Japan were amended, and it was officially enacted in 2015. The revisions of laws that clarifies the role and responsibilities of university presidents, vice presidents, and faculty meetings were considered as a major change. The amended law reinforced the leadership of university presidents which brings more flexibility to the management structure (Yamada, 2018; Oba, 2013; Oba, 2006).

The recurrent university reform in Japan guarantees the autonomy of university to govern and manage their processes and activities under the leadership of university president. However, MEXT will direct and approve the university direction as the budget is directly allocated to the universities by them, and NUCs are responsible to the minister for its use. National University performance is evaluated on yearly basis based on their "medium-term plan". The "medium-term plan" is a plan which specifies the university organizational structure, research and education measures as well as financial indicators. Some NUCs comprise quantitative performance indicators in their plans. The plan is originated by NUC then discussed with the Minister of MEXT. The university will modify their mid-terms plan to reflect the changes instructed by the Minister and eventually submit the final modified version for approval (Goldfinch, 2006).

The NUCs law was considered as a controversial law which was backed up by different proponents and confronted by many rivals. The first group to support the 2004 reform were politicians from the ruling Liberal Democratic Party and the Management and Coordination Agency, and neoclassical economists educated in

the US. The second group consists of The Ministry of Finance, officials from the Ministry of International Trade and Industry and the business community. This group advocated private and public investment in R&D activities of universities to improve the country's international competitiveness. The last group incorporate two councils belonging to the Cabinet Office, supported by Prime Minister Koizumi, which perceive corporatization as a first step towards privatization (Christensen T. , 2010).

The reform opponents were primarily the Japanese Association of National Universities and the National Union of Higher Education Staff. They feared that the reform may jeopardize their autonomy since the universities' goals will be formed by the Ministry of Education, Culture, Sports and Technology (MEXT), and it will also evaluate their performance by ministry's evaluation committee. Furthermore, the reform may lead to down-sizing through corporatization, increased tuition fees and increased social inequality in student admissions. With the status of NUCs, universities have more autonomy since they are now legally separated from the government, but they are also subject to substantial ministerial control and scrutiny. The NUC increased diversity and differentiation, because their corporate status involves developing a distinctive profile, mission, and strategy to attract resources and students and to increase their competitiveness (Christensen T. , 2010).

Nowadays Japanese universities are experiencing a rapid development in quality assessment and assurance activities. Incorporation of National Universities subjected the universities to several assessments and evaluation by different bodies. The results of these evaluation will affect the budget allocated to NUCs as well as their continuity. The new evaluation scheme will be carried out by a governmental committee and a national agency called the National Institution for Academic Degrees and University Evaluation (NIAD-UE). NUCs assessment will be based on the achievement of their medium-term (six year) goals which they are obliged to submit to MEXT as well as the yearly reports The Evaluation Committee for Independent Administrative Institutions (IAIs) in the Ministry of Public Management, Home Affairs, Posts, and Telecommunications is also eligible to comment on NUC performance and can make recommendations to the responsible minister. National University Corporation Evaluation Committee (NUEC) is new implanted organ of MEXT responsible for reviewing university plans and goals during the development stage. NUEC consist of specialized members in the fields of Education, Economy and Social Sciences such as former university presidents and professionals and it is chaired by the Nobel Prize winner, Prof. Ryoji Noyori. While

NIAD-UE is responsible for evaluating the teaching and research performance of NUCs every six years, the National University Corporation Evaluation Committee (NUCEC) -subcommittee within MEXT- is concerned with evaluating the managerial aspects. As a part of the third-party evaluation scheme, 'certified evaluation' (accreditation) became compulsory (Amano & Poole, 2005; Yamada, 2018; Goldfinch, 2006). Figure 2.3 depicts the NUCs reform as constructed by Oba (2013).

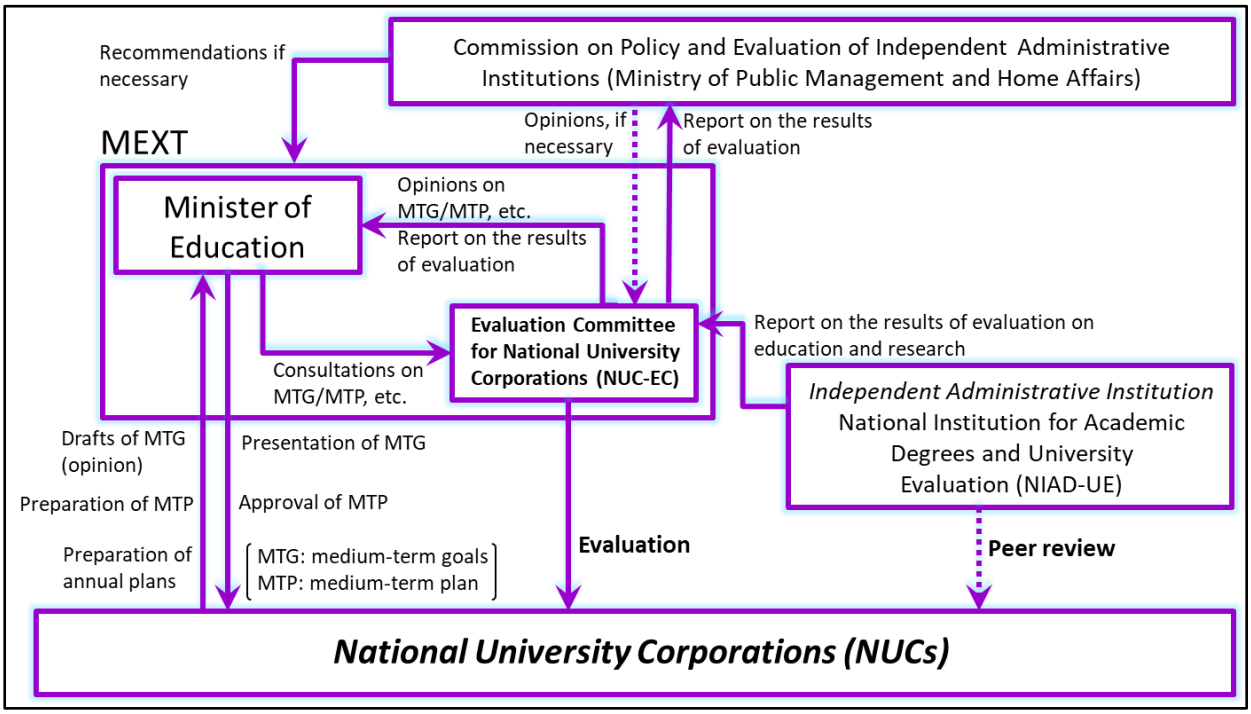

Figure 2.3: NUCs reform as constructed by Oba (2013)

Japanese faculty are highly involved in governance and management practices, governance is typically shared. As a result of the NUC, faculty are gradually losing their traditional power in governance and management, especially at the non-research universities. Japanese academics are experiencing increasing tensions and conflicts arising from the shift of the power although they are still enjoying academic freedom and autonomy to a significant level compared to their counterparts in other nations. They still have a great power over key academic area. They are also entitled to determine budget priorities, although this is gradually shifting from the faculty to the top management. The non-research universities are facing increasing struggles in increasing their revenues independently as they are not able to cover the cut in their budget through research activities (Arimoto, 2011). The university's governing body has been reinforced at

the institutional level, with a corresponding reduction in the autonomous rights and decision-making powers residing in faculty meetings. The participation and collaboration with experts and professionals from outside the university was highly increased (Ota, 2014).

The Japan Association of National Universities (JANU) has established the Working Group for Research and Study on National University Corporation Governance under its Board of Directors to monitor and evaluate the effectiveness of the university reforms. The working group performs the following tasks: investigate the national universities actions for governance reform, collect and share information on pioneer cases, identify university governance challenges, and conduct research to overcome future problems. The group has conducted several studies since inception and in 2017 "For Reinforced Governance Reform at the National Universities of Japan (Proposals)" study was published. This study is a fact-finding questionnaire survey about national universities' governance. It consists of eight section which starts with introduction section and ends with recommendations to enhance the current governance practices of national universities. The other six sections are organized as follows: survey results, external experts' views, and proposals. The survey covers the essential university governance aspects in the 86 Japan national universities which are: 1) Leadership of university president 2) Selection and term of office of the president and human resource development for future managerial posts (Selection of the president, Term of office of the president, Human resource development for future managerial posts, including the presidency). 3) Management Council. 4) Education and Research Council. 5) Auditors. 6) Accountability to society. The study pointed that the university leaders are aware of the importance of the information resources to the decision making which reflect itself in the creation of Information Resources section for the centralized management and utilization of in-house information (JANU, 2017). The existence of IR as well as professional auditors will improve the university governance practices.

Yonezawa (2014) discussed the impact of Japanese university reform which has introduced the concept of New Public Management in higher education policies, on the role of Professoriate in the process of decision making. The study was based on survey data collected in the beginning of 21st century. The study found that Professoriate regulatory framework consists of a "bureaucracy" governance mode that satisfies neither university managers nor faculty members. The author also discussed the historical transformation of the of university governance in Japan and recommended further comparative studies based on a thorough

understanding of the historical and organizational contexts of higher education systems and universities (Yonezawa, 2014).

Internationalization is a major aspect of the National Universities Corporatization which has taken place as a part of either national, political, or administrative reforms. The corporation changed the role of government from direct control to a supervisory role at macrolevel. (Ota, 2014). The study conducted by Yonezawa & Shimmi (2015) focused on the internationalization of universities seeking a world-class status. It has emphasized the importance of university reform. It also examined the internationalization challenges for Japan's top universities in term of the need for transformation in the university governance structure. The study explored the history of the higher education system in Japan followed by a discussion of the recurrent reforms and trends in the higher education globally generally and in Japan specifically. The researchers stated that "The construction of 'world-class' universities not only imply concentrated financial investment but also a comprehensive transformation of university governance in a global context" (Yonezawa & Shimmi, 2015).

The consequences of the reform were observed through a survey which were conducted in 2006, two years after the enactment of the NUC law. Only few NUCs have raised tuition fees because they fear losing students in a declining market. The number of full-time staff has been decreased. The differences in financial capability between NUCs have increased. NUCs were able to allocate more resources for innovation to be better equipped to face pressure and crises (Christensen T. , 2010).

2.2.4 NUCs and Private Universities in Japan

There is a fuzzy distinction between national universities and private universities which becomes more obscure after the incorporation of national universities (Oba, 2005). Before the incorporation, the governance authority is decentralized in Japan's public universities with faculty decisions carrying more weight than those of administrators. While the situation is totally the opposite in private universities where the governance authority is centralized (Ehara, 1998). The incorporation loosens MEXT practice of tight control over the national incorporation and accords them with more autonomous control over their structure and management. Moreover, the operational grant now given to national universities as a lump sum as opposed to previous line-item scheme. National and private universities are increasingly competing for the same

resources and grants. Though they are independent, they are obliged to comply with certain measures prescribed by MEXT such as enrolment quota, fundamental educational organization, types of degrees that they award, organization of the board of directors, and necessary facilities and their disposal (Oba, 2005; Oba, 2006).

The public sector has multiple, mostly intangible, or conflicting goals that serves wide spectrum of stakeholders with competing interests. These goals are formed in accordance with Governmental priorities and policy direction that put a great emphasis on social responsibility. This makes these public institutions more susceptible to the frequent and political changes, and less prone to cyclical movements in the economy. The low market orientation vanished the incentive mechanisms for productivity and effectiveness and strengthen the legal and formal constraints. The periodic structural change can destabilize governance mechanisms and cause periodic disruptions in top-level management while public policy processes can complicate the decision-making process and reduce implementation success. Managers of public sectors are facing a huge problem with the percentage of staff turnover in some skill areas resulting from low incentives and the salary differentials between the public and private sectors. The socio-cultural factors are very strong where there is a huge resistance for a central authority to oversee governance specially with the absence of guiding procedures for implementing and assessing governance. The shared services approach is very useful in public sector to reduce IT spending. Organizations may share systems and technologies with other agencies (Campbell , McDonald, & Sethibe, 2009).

Although private organizations do face the same resourcing difficulties and budgetary constraints, these problems are less complex than the public sector. Despite that the private and public universities are all non-for-profit organizations, the difference in corporation governance required a unique IT Governance scheme for each sector. Research shows that the private sector is more efficient in the development, implementation, and governance of IT while the public sector is lagging behind. Usually, IT is viewed as a service not as a value creator in public institutions (Campbell , McDonald, & Sethibe, 2009).

Despite the huge similarities between public and private universities, national universities differs from private universities in terms of: 1) the nomination of university president; 2) auditors appointed by MEXT; 3) medium-term goals presentation and the medium-term plan approval by the Minister of MEXT; 4)

systematic institutional evaluations by the evaluation committee; 5) development and maintenance of important facilities; 6) tuition fees regulations; and 6) some programs restricted to national universities (Oba, 2005).

2.3 Alumni Engagement Governance Literature Review

2.3.1 Alumni Engagement

Alumni programs are important for universities not only for fundraising but also, to improve learning and teaching, study plans, research, community outreach, career networking, university reputation, university/industry relationship, and strengthen the multi-dimensions interaction and communication of industry-university-research. Alumni may assist universities in finding and connecting with researchers and educators, mentoring and providing career advice for students, hosting recruitment and job-hunting events, and teaching lifelong learning courses. An increasing interest is paid to alumni work performance and quality of life by to accreditation bodies as an indicator of university (Smith, Gearhart, & Miller, 2019; Jepps, Gregory, & Cresswell, 2019; Dai & Lan, 2017).

Smith et. al. (2019) focused on discovering the intended outcome of implementing alumni societies and associations in community colleges. Researchers developed a survey and distributed electronically to collect data. The research found that the main focus of alumni societies is fundraising. As for the predicted future role of alumni societies, career assistance and mentoring students were at the top of the list which indicate universities efforts to provide more innovative ways to support their students.

Rancour (2019) provided tips based on personal experience to strategically engage students to become active alumni. Current students are the future alumni supporter. Universities which are capable of supporting students throughout the different stages of their academic life using technology as well as providing face-to-face interactions will gain the maximum benefit from their alumni engagement programs. The engagement programs involve all universities stakeholders including its alumni which may provide consultation and mentoring services to current students.

Some studies adopted social exchange theory to predict the alumni relationship with their alma mater. In this sense, the relationship is evaluated in economic terms where costs and benefits are weighed. The level of

alumni satisfaction with the academic experience coupled with the university status will shape this relation. University with strong reputation who are capable of effectively engage their students in extracurricular activities and provide good guidance and support to their students to fulfill their academic program through advising and mentoring will surely maintain a successful relationship with their alumni (Weerts & Ronca, 2007; Mazambani, Reysen, Gibson, & Hendricks, 2017).

Previous research shows that the perceived status of the university whether springing from the age of the university, perceived academic status and prestige, or name recognition and visibility affects alumni giving (Mazambani, Reysen, Gibson, & Hendricks, 2017). Fleming (2019), study found five factors (personal values, perceived institutional integrity, connectedness, commitment, and sense of fulfillment) that comprise alumni engagement and how they inform alumni relationships with their alma maters.

2.3.2 Alumni Engagement at NUCs

According to Okawa et al., (2015), NUC developed an increasing awareness about the importance of alumni engagement programs for both parties involved in the relation; alumni and their alma mater. Emanating from this believe, NUC incorporated alumni engagement programs goals in their medium-term goals and plans. Several measures were implemented such as homecomings events, career support, providing academic information, constructing alumni portal to store and share alumni information and connect them with their fellows and industry. In some universities, mentoring programs where alumni provide employment support and career education for university currently registered students were implemented. Moreover, for alumni who are intended to embrace an academic career, training sessions, seminars, and research presentations were organized to improve their skills.

The survey results show that the most important goal of the alumni engagement programs in Japanese universities (national, public, and private) is not to increase the fundraising, but to strengthen the relationship between the university and its alumni and to increase alumni interest in alma mater. This finding shows that universities are more aware of the strategic value of this relation which can help them in facing the heightened environmental challenges that threaten their existence. The identified issues hindering effective implementation of alumni engagement programs are alumni buy-in and support and securing alumni information and the expenses associating with this mater (Okawa, Shimada, Yamashita, & Junro, 2015).

The Okawa et al. (2015) study presents a valuable snapshot of a point in time early in the post-privatization phase following the conversion of the national universities governed directly by the Ministry of Education to more independent national university corporations (NUCs). Almost a decade later, the NUCs have begun implementing new competitive strategies, the other public universities and private universities have started to react, and the difficult trends (decreasing college-age population, constricted education and research subsidies) have only deepened. Furthermore, the Okawa et al (2015) study did not have the benefit of the most recent research applying "smart" alumni information systems and social networking. There is a need for new work to determine the present state of the Japanese higher education industry's relation to its alumni, and to plan for future improvements in the face of ever more challenging conditions.

2.3.3 Alumni Information System

The alumni organization, like any organization, has unique characteristics that requires special considerations. Collecting, distributing, storing, and categorizing alumni data requires financial and human resources, as well as a full support from the university leadership (Peterson, 2007; Smith, Gearhart, & Miller, 2019). Historically, alumni information systems developed to store the fundamental information of alumni. The efficiency of these systems was low and consumed a huge amount of university resources. A well-structured alumni system supplies the university with an effective tool to manage alumni activities. Nowadays, universities worldwide implement online web-based alumni systems capable of connecting alumni anytime, anywhere. The system offers lifelong opportunity for universities to connect with their alumni (Weerts, Cabrera, & Sanford, 2010; Anthony, 2020).

The conventional way of reaching out to alumni starts with the creation of an alumni database that contains alumni contact information along with other important information such as employment information, hobbies, and post-graduate professional certifications and studies. Linking alumni database with alumni social media has significantly boost the university ability to maintain a long-lasting relationship. There is a tremendous increase of professional social media such as LinkedIn. University strategies that focus on encouraging their students to create accounts in these professional social media are intended to help students in job hunting and also to track students in future. Strategies are important to connect students through the use of social media and to understand the benefits that can be achieved (Jepps, Gregory, & Cresswell, 2019). In term of alumni data collection and storage, usually university contacts alumni via phone and email, then

the data will be registered in paper files which will be entered manually into the alumni system. This process in time consuming and requires considerable human resources especially for universities with a gigantic number of alumni. Further, it causes repetition of work, loss, dislocation, and delay of information (Dai & Lan, 2017; Sabri, Ahmad, & Abdulrazaq, 2017).

Universities are implementing alumni systems to forge active and ongoing relationships with their graduates. Traditional alumni systems are static and have very little to no space for interaction between university stakeholders. Usually, these systems are accessible only to the alumni. Chi et. al., 2012, developed a standalone web-based Smart Alumni System (SAS) that incorporate traditional features of alumni systems, selected features of social networking, and data mining to boost mentoring between alumni and other university stakeholders (current students, faculty, staff, and guests). Accustomed functionalities of alumni systems include providing alumni with information about the University, university events, university newsletters. It also provides a portal to donate money to the university. Social networking "can be described as the act of sharing the associations of business or social relationships for the purpose of exploring common needs, interests or goals". Networking has become easy to implement due to technological advancements. The implemented data mining techniques helps in targeting alumni with the appropriate profile to answer other stakeholders' questions, donate, or participate. SAS help alumni in connecting with their fellow classmates, professors, and university personnel; share professional or personal advice; explore mutual interests; and finding new opportunities (Chi, Jones, & Grandham, 2012).

The growing number of social media users combined with technology advancements provide universities with an opportunity to actively communicate and engage their students and alumni at a reduced cost and minimal human resources. In order to receive the maximum outcome and eliminate the risk of social media utilization endeavor, university must put in place a policy to govern the process. University leads engagement in the policy development and enforcement is important to ensure success (Kowalik, 2011).

Peterson (2007) provides an overview of the "World Learning" experience in reaching out to their "largely young, globally dispersed, and highly mobile alumni" via Web-based technologies. The first step was sending emails to make the first contact. This step was followed by implemented a multi-functionality online system to collect alumni data and share the organization information with not only alumni but also alumni's

parents. Communicating with alumni parents targeted to receive their support either financially or through their volunteer participation in organization activities. World Learning received a 60% increase in parental financial giving following the introduction of the e-newsletter The basic functionalities of the system include "alumni directory" where alumni can enter and update their information; "forum" to distribute news about the organization, and "photo galleries". Other advanced features contain "donations" and "conference". Donations section presents information about alumni accomplishments, institution initiatives resulted from gifts, further guidance about ways to contribute and donate. Alumni engagement and participation was cultivated using variety of incentives like e-cards and scholarship donations. Alumni outreach system has been integrated with other important systems such as marketing and archive systems (Peterson, 2007).

Rattanamethawong (2015) introduced a framework for innovative alumni relationship management. This model was built on eight principles. Communications is the starting point where mass media and other specialized media are utilized to disseminate knowledge to university students and alumni. These communications are designed in a way that consider variances in demographic characteristics of alumni to enhance awareness among students and alumni and motivate them to actively participate and collaborate in alumni associations. The value creation depends on the communication program that is capable of improve alumni satisfaction and engagement (Rattanamethawong, Sinthupinyo, & Chandrachai, 2015).

System data can be analyzed with machine learning methods to discover hidden patterns which can be utilized to enhance university standing. The trends can reveal important knowledge that can guide university strategic direction. (Chi, Jones, & Grandham, 2012). The role of data specialist in the success implementation of alumni system is undeniable. Communication and coordination between system vendor and the organization regarding customization and training needs is vital. Active participation and engagement of organization employees from different departments and levels has a positive impact on the outcome of alumni outreach system implementation (Peterson, 2007; Smith, Gearhart, & Miller, 2019; Ratje, 2019). Nowadays, universities awareness about the advantages of integrating and directing student affairs, academic affairs, and alumni services towards common shared goals has been elevated. Student affairs and alumni activities are forming a tight nexus to enhance organizational image and students experience. This is achieved through placing cooperative programs such as student life quality improvement program, student orientation programs, and student attraction and retention enhancement programs (Singer & Hughey, 2002).

2.3.4 Challenges of Alumni Information System (AIS)

Alumni systems are prone to different practical, technical, and security challenges. These include alumni engagement, data issues (collecting, gathering, storing, and dissemination), data privacy security, gathering information from social media accounts, and current students involved (Chi, Jones, & Grandham, 2012).

Through the examination of alumni information system in East China, Dai & Lan (2017) recognized three essential problems associated with alumni information systems: data fragmentation; lateness of data transmission; and limited and inadequate functionalities. Emanating from their evaluation of the existing alumni systems, Dai & Lan (2017) construct an integrated smart alumni system consist of three main modules; "Alumni Social Network"; "Intelligent Data Acquisition and Storage"; and "Data Mining and Decision-Making Support". The alumni social network module allows alumni to edit and update their information and provides them with an interface to communicate with students, faculty, university management, and other alumni. The intelligent data acquisition and storage platform functions include data acquisition, data pre-processing, experts filtering, and data storage. The system can link data from several internal and external systems and platforms such as social networks and student's information system. Alumni section in the universities website usually is not integrated with the alumni information system. The techniques implemented in the system proved to be beneficial in improving the data accuracy and reliability, efficiency, and processes optimization. Data mining modules are used to reveal hidden knowledge than can be utilized in decision making to improve employment, teaching, research, management and service.

Universities create, collecting, store, and disseminate tremendous amount of data. These processes require considerable money and resources which could be of limited value if knowledge cannot be derived from the collected and stored data. Traditionally the alumni data is decentralized and scattered throughout different units and departments which makes the utilization of alumni data for decision making insufficient (Dai & Lan, 2017; Anthony, 2020).

The year of 2020 presented unprecedented changes and challenges landscape. The novel coronavirus pandemic has forced organizations to shift from face-to-face activities and events to virtual events to control the spread of the virus (The Blackbaud Institute Index, 2020; The State of the Higher Education Subsector, 2020). Online technologies that are utilized to conduct virtual events include livestreams, peer-to-peer

fundraising software, social media, and video. Virtual events require more advanced technologies and collaborations between IT teams and alumni engagement teams. Technologies that are used to advertise, host, and record the event, and then conduct post event activities such as thanking the participants and sharing the recorded event video with the participant and other university stakeholders. The quality of the used technologies and the internet connection are of utmost considerations (Virtual Events, 2020; Velasquez-Hague, 2020).

Universities are witnessing increasing information security concerns among students, parents, alumni, and donors. Universities are required to continue delivering academics, information, and services through online platform while mitigating the risks associated with the use of technology. The advancement of technology brings new opportunities and threats to the educational environment. Security threats are becoming fiercer and more sophisticated in nature. It has been advocated to embrace a comprehensive program consists of effective strategies, guiding policies and procedures, awareness programs, and security technologies to improve security landscape (Gray, 2014).

Universities must consider implementing the organizational structure to ensure a successful implementation of security initiatives and compliance. While the data security team is responsible for implementing security measures, the chief information security officer (CISO) is accountable for implementing and maintaining the data systems. The development of security programs starts with risk assessment; a comprehensive registry of internal and external risks associated with the use of IT. Best-practices standards such as ISO 27001 Information Security Management could be adopted to improve security management and governance endeavor. One of the highest risk areas which requires continuous evaluation and monitoring is access rights (Gray, 2014).

Deploying one technology for fundraising will hinder the university from effectively engaging alumni. A mix of specialized technology solutions must be integrated, and strategies must be in place to improve data management and workflow. Interconnecting scattered data repositories to a central hub (hub-and-spoke infrastructure) outstrip the deployment of a centralized information source. Hub-and-spoke infrastructure enhance the work efficiency of alumni engagement supporting staff and the advancement team since they can leverage their time in more vocal aspects rather than supporting the daily activities. Crowdfunding,

events, social media-driven giving, and phone programs must be all geared together towards the creation of life-long engaged alumni (Reeher, 2019).

2.3.5 A Model for Effective Governance of Alumni Data

Universities invest heavily in IT solutions to enhance learning and teaching, research, and business operations. Despite universities continuous efforts to enhance IT utilization, their efforts have not achieved the intended goals due to certain difficulties related to business/IT alignment, understanding the value of IT, human resources and organizational structure, strategies, technical difficulties, and evaluation. Internal and external factors may force the organization to entirely alter their way they are doing business. Amid the coronavirus pandemic, the need for comprehensive frameworks that focus on the intelligent technologies to continue organization operations has evolved.

I have constructed a conceptual framework for intelligent alumni engagement program that is established on number of elements which are strategies, organizational structure, data mining, awareness programs, management buy-in and involvement, evaluation and monitoring, and mix of technologies. Figure 2.4 on the next page depicts the framework for effective governance of alumni engagement program.

The starting point for carrying out any program is the strategy which is formed to accomplish certain organizational goals. The modern alumni engagement programs are built upon a reciprocal beneficial interrelation between the university and their alumni. The conventional alumni engagement programs focused on university benefits only which makes alumni feels used by the university. This can risk the continuation of the relation and may require university to correct its mistake and initiate reengagement programs which could be more challenging than maintaining the relation in the first place. The essential benefit that university opt for is to receive donations from alumni. Other benefits include utilizing alumni connections to find internships positions for their students, receiving research grants, and influencing governmental and political directions and policies. Alumni can also provide consultations and mentoring services to the university and its stakeholders in several matters such as career counselling, academic program evaluation, and academic mentoring. In return for their support, universities may reward alumni with a symbolic recompense such as inviting them to events, providing professional certifications studies,

granting discount on products, services or courses, providing an online access to the digital library and periodicals, access to the university facilities.

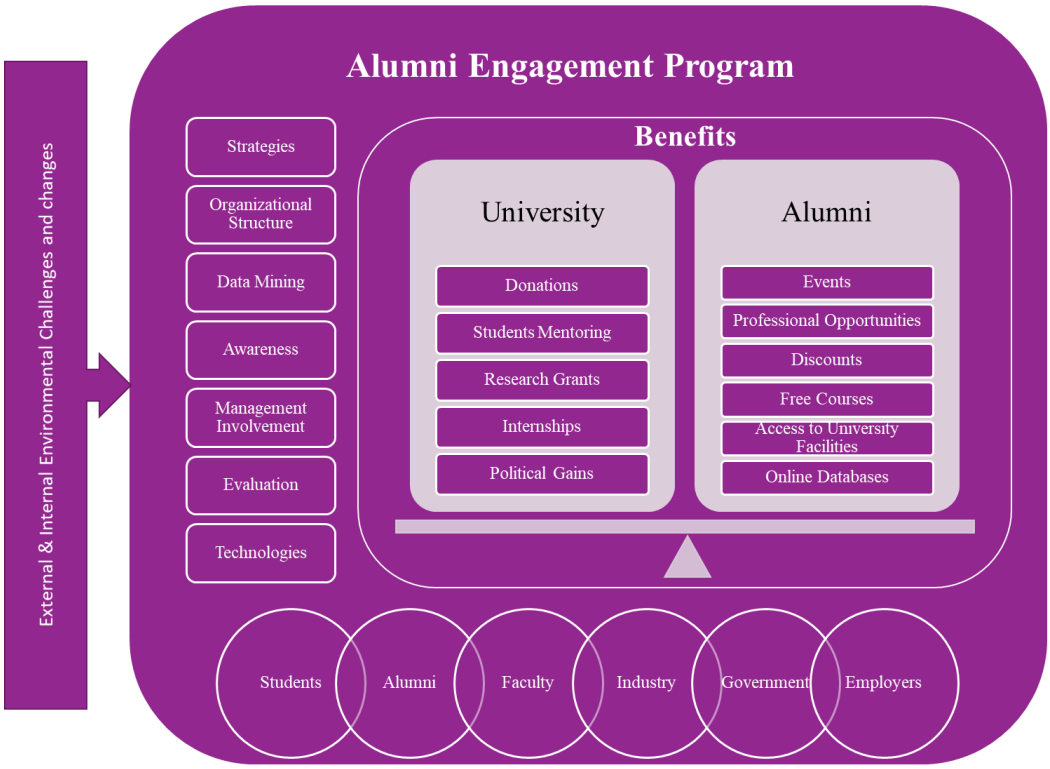

Figure 2.4: Framework for Effective Governance of Alumni Engagement Program

Universities are implementing a mix of technologies to support students throughout their academic journey. These technologies range from basic applications to perform main functions like course registration, communicating with faculty and staff, sharing course information and materials, and paying course fees; to more intelligent software that integrate data from different electronic online platforms (Student Information System, Learning Management System, Social Media Accounts, Communication Tools, etc.) and then utilize data mining techniques to better guide, advise, or support students or help in the decision making process. The quality of decision making relies on the quality of data and the used data mining techniques.

The majority of security countermeasures protect the organization from outside attackers while the real risk resides in the hands of the organization system users who possess higher levels of knowledge, resources, and access (Vance, Lowry, & Egget, 2013). Alumni relation with their alma mater does not end after graduation, alumni will still be granted with an access to the university systems to perform certain tasks like participating

in online courses, update their contact, employment, communication preferences, and education information, accessing online databases, mentoring students, and attending MOOCs. This access triggers a sequence of security concerns related to access rights, ethical use of alumni data, security awareness, availability of guiding policies and procedures, data ownership, and compliance with internal and external laws and legislations.

The existence of a well-defined organizational structure that explicitly states roles and responsibilities, reporting line, external and internal communications, and required skills and certifications will ensure a successful implementation of alumni engagement program. Another useful tool is the adoption of RACI (Responsible-Accountable-Consulted-Informed) matrix to acquire top management and other stakeholders buy-in and engagement. The Vice President for Information and Technology spearheads the IT Governance function through evaluating, directing, and monitoring IT initiatives toward the achievement of university goals. The role ensures an active and effective communications, participations and collaborations between IT and Business in different levels (governance bodies, management, and operational levels) which will enhance the outcome of alumni engagement system. The role will ensure the availability of guiding policies and procedures, organizational structure, technologies, evaluation and follow up measures, and top-management buy-in to actively govern the alumni intelligent system. As can be noticed, the system builds upon different components, not only automated technologies.

While Vice President for Information and Technology covers all aspect of IT, Chief Data Officer (CDO) focuses mainly on Data Governance. Some universities assign Data Governance (DG) function to Vice President for Information and Technology while others place it within Institutional Research (IR) function with a shared responsibility with stewards of the operational data systems and campus policymakers. A great emphasis has been placed on the role of the data dictionary to achieve DG goals. The data dictionary serves as a central metadata repository that provides shared definitions of data elements. Data analysts lead the business analytics initiatives that aims to discover hidden knowledge through interpreting, contextualizing, and correlating data (Chapple, 2013). The role of CDO is a very critical specialty in organizations where their main goals are knowledge creation, extraction and dissemination. The Chief Information Security Officer (CISO) works closely with the CDO to protect university data.

Emanating from the influence of student satisfaction, student personal attachment, and student engagement on their future contribution to support their alma as alumni, functions that elevate these aspects must be involved in the alumni engagement program. Examples of these functions are academic affairs, student affairs, and advising and counselling. Alumni section and donations section should strive to build a strong relation with these functions to yield better outcomes.

Best-practice standards could be adopted to the better understand the requirement to achieve the desired goals and to guide the implementation and follow up practices. Examples of best practices includes COBIT (Control Objectives for Information and Related Technology) developed by ISACA for IT Governance and ISO2700 for security management.

Relation management though it is critical to the success of the alumni engagement programs, yet it is a complex endeavor. Its complexity engenders from the magnitude of interaction between diversified constituents with different interests, goals, and needs. Communications should be guided through clear policies and procedures that protect all stakeholders from misuse of information, ethical misconduct, or invasion of privacy. Technical platforms provide tools to customized communications based on every single person preference. Another important consideration is the development of comprehensive awareness programs that consider every group responsibility and needs. Awareness programs should address questions like what every constituent needs to know? how to communicate the message? through which channel?

2.3.6 Alumni Donations

Traditionally, universities receive funds from external stakeholders and partners for research purposes only. There was no centralized governance to promote research collaboration and managing these funds. Every faculty makes an individual effort to promote research activities and donations were managed by the faculty who received it. The enactment of NUC law changed that reality. Nowadays, due to the decreasing budget received from MEXT and the intensified global competition, NUCs established university funds to promote fundraising activities. The received donations will be utilized to support financially troubled students, support research projects, improve university facilities, and enhance university global competitiveness. NUCs varies in their strategies adopted to promote and collect financial support from supporters.

I conducted an in-depth analysis of the fund information published in NUCs websites. Almost all universities (98%) published information about the university fund. I was able to find the fund business reports for 34 universities (40%). The current structure of NUC is centralized, yet still 5% of them have a separate structure where every fund rising activity is managed by different university organ. Donors can either select a specific project that they would like to support, or they can leave this decision to the university. Donors can donate by cash, bequest, and inherited property. 36% of universities promoted “Recycling Fundraising” where alumni can donate used books and CD. Universities usually collaborate with third party to transform these donations to cash. 19% of universities mentioned the utilization of Crowdfunding, a fundraising tool managed by third party partner that market for projects that support humanity. Some NUCs funds diversify their income by selling university goods and installing vending machines. With regards to internal cross-departmental collaborations, 8% only of fund offices stated that they collaborate with alumni offices to promote fundraising.

2.3.7 Donations To NUCs

Universities differs drastically in their ability to attract and maintain a strong ties with their supporters. As a result, the number of donors and the amount of donations varies among universities. While majority of universities report an increase in the number of donors as well as the amount donated, some universities report a decrease in the total amount received from donors. In 2020, the rampant of coronavirus pandemic brought people together and philanthropy support to university students increased for most NUCs. In the following paragraphs I will discuss the status of donations of the universities who published their business reports in their websites (Refer to Appendix B to see the list of references).

Data shows that usually the biggest group of financial supporters to universities are alumni, who are even growing in numbers annually, yet their donations are not huge in amount compared to other donors. On the other hand, the largest amount of donations is made by a very small number of organizations. For example, Tokyo University of Foreign Studies reports that the number of alumni donors comprise 74%, however, their donation amount constitutes 27% only of total denotations. On the contrary enterprises donations constitute 64% done by few numbers of organization who their number constitute 4% only of the total number of donors. Other universities who are almost have the same scenario are Kyushu Institute of Technology, Nagoya University, and Kyushu University.

Another general observation is the number of universities supporter are increasing since 2016 as well as the total amount of donations. The University of Tokyo case was different, the donations to the university decreased by almost 140% in the last two years while the number of donors increased by 3%. As for alumni donors, they increased in number by 8%, however, their donations declined by approximately 10%. Nara Institute of Science and Technology also reports a decrease in the total amount of donations receive from all groups of supporters.

Donations to Osaka University increased from 2016 to 2019 and the maximum amount of donations received in 2019 with the amount almost doubles compared to 2018. Figure 2.5 shows the percentage of alumni donations to Osaka University fund from 2016 to 2019. In 2016, the biggest portion of donations were from individual donors, of which alumni contribute the most with a percentage of 67% of the total donated amount. Corporation donations started to increase since 2017 which can be accredited to the introduction of the tax incentives. Corporation donations increased from 12% in 2016 to 59% in 2019, an increase of 392%. While alumni donations are smaller in amount than corporations, however they outnumber them in term of number of donors.

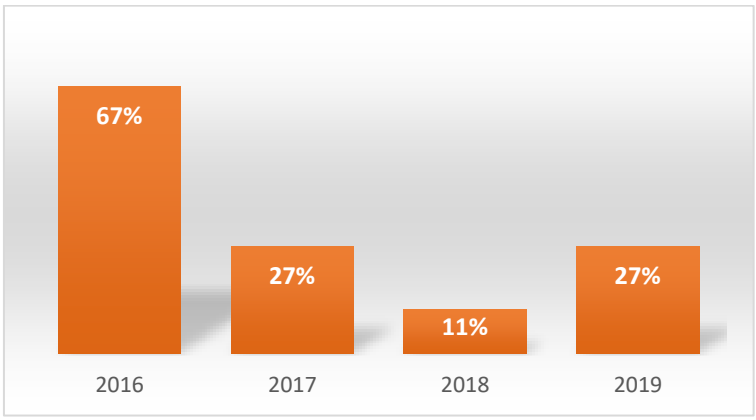

Figure 2.5: Percentage of Alumni Donations to Osaka University

Figure 2.6 shows the philanthropy giving to Tokyo University of Agriculture and Technology. As Osaka University, Tokyo University of Agriculture and Technology donations reached its peak in 2019 with. The big leap was in 2017 with an increase of 185% from the previous year, 2016. The donated figure slightly dropped by 1% in 2018, revived in 2019 by 13% in 2019, and dropped again by 18% in 2020. Donations to Niigata University also slightly declined in 2020, a layback since donations were increasing since 2017.

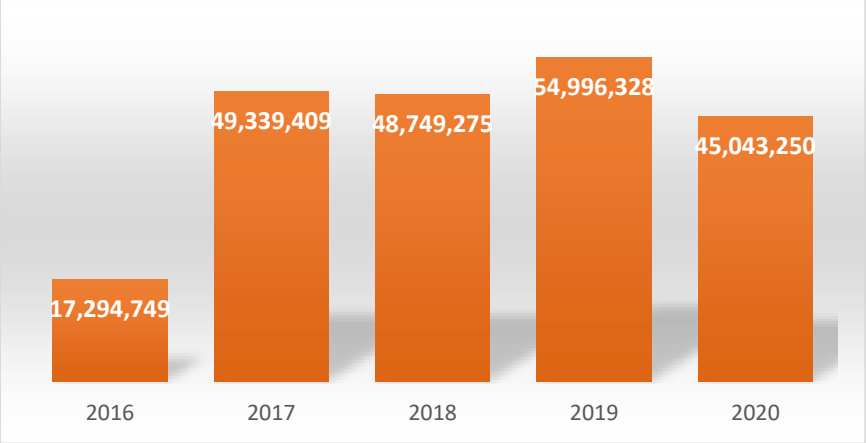

Figure 2.6: Donations to Tokyo University of Agriculture and Technology from 2016 to 2020

Donations to Fukuoka University of Education also dropped from 13,003,450 in 2019 to 9,207,796 in 2020. The percentage of decline is 29% which is higher than Tokyo University of Agriculture and Technology.

National Graduate Institute for Policy Studies and Obihiro University of Agriculture and Veterinary Medicine reports continuous improvements in the amount of donations from 2016 till 2018. Unfortunately for the later university, donations decreased in 2019 while the former university kept its pace.

Table 2.3 shows total donations to University of Toyama from 2019 to 2020 and the percentage of alumni giving. The number of donors to University of Toyama as well their total donation increased over time, though it did not follow a specific pattern, and it reached its peak in 2020. Yearly comparison from 2016 to 2020 shows 31% increase, 32% decrease, 109 increase, and lastly 28% increase in 2020. The portion of alumni support is minimal, and it hits the bottom in 2019 with a percentage of 1%. On the contrary, the biggest amount received from organizations, and it climaxed in 2019 with a percentage of 93%. The year of 2020 which witnessed the spread of corona virus triggered the alumni sense of social responsibility towards their alma matter in the time of crisis. The percentage of their donations reached 28%. Despite the dropped organizations donations to the university in 2020 by more than 50%, the total amount increases because alumni compensated this dropped. Gifu University alumni donations also small, it makes 2% of the total donations received since 2009.

Table 2.3: Donations to University of Toyama from 2019 to 2020

Year	% Of Alumni Donors	% Of Alumni Donations	Number of Total Donors	Amount of Total Donations
2016	16%	7%	138	23,935,341
2017	15%	2%	112	31,425,855
2018	18%	11%	112	21,312,720
2019	5%	1%	434	44,612,753
2020	36%	28%	856	57,103,815

Chiba University has received 395,561,992 in donations since inception of its fund from 7,007 of whom 69% were alumni. Despite the huge percentage of alumni donors to Chiba University, their donations constitute 38% only of total donations.

As University of Toyama, and Tokyo University of Agriculture and Technology, donations to Hiroshima University and Kobe University increased in 2019.

Table 2.4 shows the number of donors and the amount donated to University of the Ryukyus. As can be noticed from the table, despite the increase in the number of donors in 2020 by 58% compared to the year of 2017, the donated amount sunk by 93%. The number of donors enlarged by 43% in 2020 compared to 2019, however, the amount donated increased by 3% only.

Table 2.4: Number of donors and amount donated to University of the Ryukyus

Year	Number of Donors	Amount
2017	446	311,589,818
2018	536	13,766,872
2019	494	20,165,955
2020	704	20,800,625

The amount of donations to Tottori University from 2018 to 2020 are depicted in figure 2.7. Figure shows that magnificent upsurge in the amount donated took place in 2020 with an increased by with a percentage of 291% compared to 2019. Further, the number of donors also increased by 303% (from 59 to 238 donors). Moreover, despite). Despite the significant shrink in the number of donors in 2019 by approximately 40% as opposed to the year of 2018, the amount donated expanded by 7%.

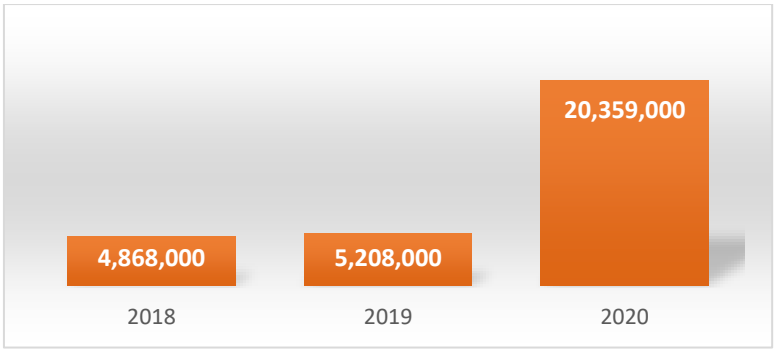

Figure 2.7: The amount of donations to Tottori University from 2018 to 2020

Utsunomiya University donations received from all groups of alumni and also the percentage of alumni contribution is shown in table 2.5 below. As can be seen, the total donation decreased by almost 50% between 2017 and 2020 despite the raise in number of donors by about 7%. Donations in 2020 improved by 10% in amount and number of donors enhanced by 2% as opposed to the previous year (2019).

Table 2.5: Total Donations to Utsunomiya University and percentage of alumni contributions

Year	Alumni		Total	
	Number	Amount	Number	Amount
2017	40%	4%	1574	29526
2018	24%	12%	1377	14387
2019	18%	4%	1651	13495
2020	9%	11%	1685	14820

Unlike other universities, the number of alumni supporters is falling notably since 2017. In 2018, it decreased by 46%. It decreased further by 11% in the following year and even lessened more in 2020 by 51%. Sadly, the total decline in alumni support from 2017 is up to 77%. The interesting fact that the majority of donors are either university staff or former university staff though their contribution is not big in number. Their average contribution is about 3% between 2017 and 2019 and it improved by 1% in 2020 compared to the former year. the number of donors slightly increased by 2% in 2020 compared to the previous year, the amount donated also increased by 10%.

The percentage of alumni donors to Kagoshima University constitute almost one fourth of the total number of donors (837 out of 3512). Their donations accommodate 41% of total donations to the university fund.

As for Kochi University, the total number of financial supporters is really small which is equal to 287, out of which 46 are alumni (16%). The university fund received about 5673797 yen in donations where alumni donations comprise slightly more than 21% of that amount.

Ehime University is also having a small percentage of alumni donors. Their percentage is only 5.1%, yet their contributions comprise 15.5% of total donations which is not a small portion.

Figure 2.8 shows the amount of donations to Gunma University fund. As can be noticed amounts varied annually. In 2017, donations reached an amount of 53,049 and drastically decreased in 2018 to 23,488 (a percentage of 56%) and reached 16,567 (a percentage of 29%) in 2019. In 2020, donations upturned and even surpass 2017 donations by 2%.

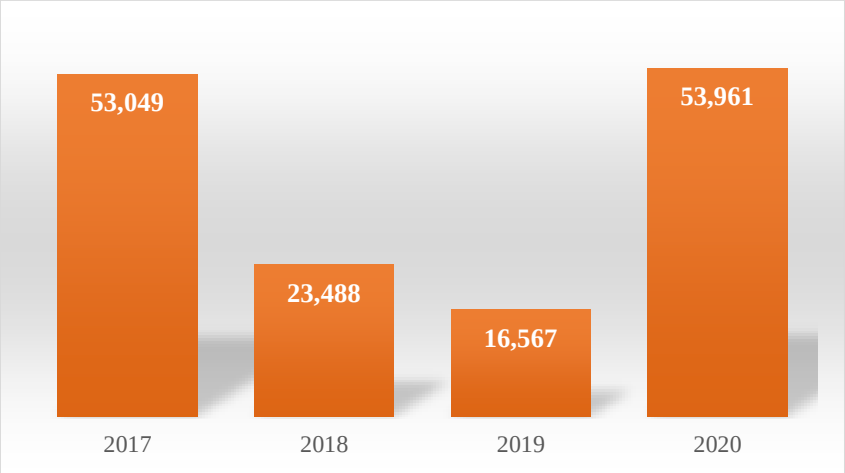

Figure 2.8: Amount of donations to Gunma University fund

Table 2.6 shows amounts of donations to Tohoku university from 2016 to 2019. As can be seen, the number of financial supporters to Tohoku University, including alumni, has been increasing since 2016 however, the donated amount decreased. Alumni was the biggest supporter to the university in 2016 with a percentage of 56% of total donors. Their donations constitute 95% of total donations. In 2017, despite the surge in number of alumni, the percentage of their contribution decline, it dropped as low as 16%. In 2019, the number of alumni donors jumped, reaching an increase of 375% compared to 2016. Unfortunately, despite the increase in their number, the donated amount decreased by 89% while the overall drop in the total donated amount reached 80%. In 2019, the giving revived by 96% compared to 2018.

Table 2.6: Amount of donations to Tohoku university from 2016 to 2019

Year	Total Donors	Total Donations	Alumni Donors	Alumni Donated Amount	% Of Alumni Donations	% Of Alumni Donors
2016	857	1473815224	483	1404545044	95%	56%
2017	1055	195515636	676	31282045	16%	64%
2018	1605	148320709	1405	89869128	61%	88%
2019	3489	291355631	2296	155247908	53%	66%

The table 2.7 below shows the number of financial supporters and the amount donated to Shimane University. The number of donors increase massively since 2016 as well as the donated amount. The highest amount collected in 2018 from 689 donors. In 2019, despite the raise of supporters by 14%, donations decrease by almost 10% compared to the former year.

Table 2.7: Number of financial supporters and the amount donated to Shimane University from 2016 to 2019

Year	Number Donors	Amount
2016	119	2,566,000
2017	634	12,377,000
2018	689	14,743,563
2019	786	13,194,363

Enterprise donations to Tokyo Institute of Technology increased from 6% in 2017 to approximately 50% of total denotations in 2018 and it further enlarged in 2019 reached a percentage of 56%. On the contrary, the percentage of alumni donations decreased from 52% of the total donations in 2017 to 27% only in 2018. The percentage slightly increased in 2019, exceeding 28%. While the total donations increased in 2018 by 4% compared to the previous year, in 2019, donations witnessed a notable decrease by 35% compared to the previous year (2018).

Donations to Shinshu university tremendously revived in 2020 by 128% compared to 2019. The number of corporations financially supporting Shinshu university are raising yet alumni is the biggest group of university supporter. Organization's donations increased from 9% in 2016 to 36% in 2020, and it reached its peak in 2018 constituting a percentage of 57 % of the total donations to the university fund. In 2016, alumni

donations were the biggest chunk of total donations to the university fund with a percentage of 79%. This percentage declined to 36% only in 2020 despite the increase in the number of alumni supporters.

It must be noted that the decline in the proportion of alumni donation not necessarily means their giving's decreased, the boost in the support received from other university supporters such as enterprises affected alumni contribution percentage. As opposed to enterprises who donate usually huge amounts, alumni donate small amounts of money.

2.3.8 American Universities Alumni Associations

In last ten years, the total voluntary support to American higher education shows a gradual increase per year, however, the amount is unevenly distributed among different institutions and totals were inflated by donations from mega-donors like Michael Bloomberg who donated $1.2 billion to Johns Hopkins University. Without those mega gifts, total donations slowed down and kept pace with inflation. Several university report no increases, and even a decrease in the amount of voluntary support received from all sources (alumni, non-alumni, individuals, corporations, foundations, others) (Seltzer, 2018; Kaplan, 2020; Toyn G. , The Ultimate Collection of Statistics for Alumni Engagement, Giving and Membership, 2020; Amour, 2020).

American universities utilize gifts received from alumni in four different ways. First, is to support operating budget, a money allocated for running university operations. Second, to sponsor current students with financial difficulties. Third, to create and support special programs that improve study outcomes such as connecting students with professionals, and internationalization and globalization programs. Furthermore, alumni gifts are used to improve university facilities such as libraries and sport facilities (The Ultimate Guide to Alumni Giving: Top Trends and Tips, 2020).

In 2017, alumni giving compromises 26.1% of the total voluntary support of higher education, an increase from the previous year, 2016, which was 24.2%. Unlike alumni giving, non-alumni giving slightly dropped from 18.3 % to 18% for the same period (Seltzer, 2018).

Conventionally, charity giving bring attractive tax benefits to donors such as deductions to income taxes. Unfortunately, the new Tax Cuts and Job Act reform Congress passed at the end of 2017 changed this reality

by reducing taxpayer benefits for charitable giving, causing alumni donations to shrink (The Ultimate Guide to Alumni Giving: Top Trends and Tips, 2020).

Alumni Donations may be increasing because of the existence of healthy economy. This information was supported by CASE 2017 report. The report shows 14.5% increase in alumni donation compared to the year of 2016. The report correlates this increase with the strong stock market during that period (The Ultimate Guide to Alumni Giving: Top Trends and Tips, 2020; Seltzer, 2018).

Universities must pay great attention to strengthen their relationship with major donors since the majority of donations comes from them. This information is supported by Fundraising Effectiveness Project data which shows that 90% of donations comes from 15% of donors (The Ultimate Guide to Alumni Giving: Top Trends and Tips, 2020).

Two major surveys dedicated to investigating alumni associations status and practices at American universities are VAESE and VSE. VAESE Alumni Benchmarking is a study launched in 2015 to overcome the lack of alumni relations studies. The study aims "to collect comparative data relating to things like alumni budgets, staffing levels, emails metrics, communication and engagement models, etc.". Universities from sixteen countries participated in the latest VAESE study published in 2020, However, 91% are from the United States (Toyn G. W., 2020).

VSE "Voluntary Support of Education survey" is the most comprehensive alumni survey of charitable giving to U.S. higher education institutions. The latest survey findings published in 2020 and it analyzed the data between July 1, 2018, and June 30, 2019 (I will refer to this period as the year of 2019). 913 American academic institutions participated in the survey. CASE sponsored the (VSE) in the last two years. The survey was carries out by Ann E. Kaplan, a senior director at CASE (Kaplan, 2020).

The Council for Advancement and Support of Education (CASE) is a global non-profit association that provides consultation and support to their members who are responsible for alumni engagement governance and planning and alumni fundraising activities. CASE serves more than 90,000 members and it has offices in different countries such as, America, Canada, Singapore, and Mexico (About CASE, 2021).

VSE survey revealed several interesting findings that can help universities to better understand the current landscape of alumni engagement and donations, therefore, improve their performance in this aspect. It shows that the year of 2019 witnessed the highest level ever reported of voluntary support to universities which reached $49.60 billion. While the total support of all sources (alumni, non-alumni, individuals, corporations, foundations, others) increased in 2019 by 6.1% over 2018, alumni support decreased from 26% of the total support in 2018 to 22.6 in 2019. The 2019 results also shows that growth rate varies among different types of institutions and by purpose. The maximum growth rate was reported by Baccalaureate institutions which reached a percentage of 29.5%. As for the purpose of giving, while capital purpose gifts rose by 9.8%, current operations giving rose by 3.4% only (Kaplan, 2020).

U.S. NEWS site reported the top 10 university with the highest average alumni giving rates during the 2017-2018 and 2018-2019 academic years. Princeton University set at the pinnacle with a two-year average alumnus giving rate equal to 55%, followed by Williams College with a percentage of 50%. The study which included 1451 American universities also found that the average alumni giving rate was 8%. Another interesting findings, seven of the 10 universities are National Liberal Arts Colleges (Moody, 2020).

The period between July 1, 2019, and June 30, 2020, witnessed a slight decrease in the total giving to US universities from $49.60 billion in 2019 to $49.60 billion as reported by CASE. The end of 2020 report begins to reflect the effect of turbulent social, environmental, and political challenges and opportunities manifested mainly in the spread of corona virus, Black Lives Matter movement, a new presidential administration and congressional makeup (Toyn G. , 2020).

Despite the drastic change in alumni attitudes and needs, several alumni organizations seem to be stuck in the ancient age and follow the same old tools and programs. Benchmarking data is essential for universities to evaluate their status and improve their standing compared to their peers (Toyn G. W., 2020).

Alumni Access website published a post by Toyn (2020) who presented a collection of alumni/advancement statistics that he gathered from around the web. Furthermore, he presented the key findings from the 2020 VAESE study (Toyn G. , 2020). The following sections present selective statics from his collected statistics.

2.3.8.1 Management Buy-in and Support

47% of alumni professionals thinks that the biggest problem affecting engaging more alumni is lack of support and buy-in from the top management since they do not value the bonding a strong relation with their alumni much. As a result, alumni associations are unable to get enough funds from administrators needed to finance their operation and implement tools that incentivize alumni to engage and donate. Within the past three years, 25% American public universities witnessed a cut in the budget allocated for alumni programs and activities.10% of alumni association view lack of management support as a roadstone that prevent them from sending regular emails.

2.3.8.2 Principles, Goals, Strategies & Programs

Universities must have in place strategic goals and plans to guide alumni association programs and fundraising activities. Data shows that 83% of associations who reported an increased in membership renewal rate has a strategic engagement plan in place. The case for American universities is worrying since 50% of alumni organizations either do not have strategic plan or they claim it is available but not in a written form. As for the top goal for these associations, 70% of the surveyed American universities specified “to increase alumni engagement.” as the top goal, however, 27% of those are lacking strategies to improve alumni engagement. 17% of alumni associations started to employ paid digital marketing to engage more alumni. Enrollment process should consider the characteristics of all groups of alumni. According to (Business Insider) study, 34% of millennials find that the enrollment process is lengthy which make them discard completing it.

The most revealing goals for alumni engagement programs as stated by alumni professionals are, first is “boost alumni engagement”, followed by “increase donor revenue”. Alumni professionals seem to be diverted from their main goal which aims to cultivate a lifelong relation that guarantee an ongoing support. They are pulled towards aggressive, shortsighted fundraising, neglecting its impact in the long run (Toyn G. W., 2020).

2.3.8.3 Organizational Structure

The awareness about strategic value of alumni association is increasing, which is embodied in function integration and inclusion in the governance level. Since 2017, the percentage of alumni association

integration reached 55%. Autonomous associations have dropped by 4%, and the percentage of alumni services association that have integrated with fundraising activities has increased by 20%. With regards to the reporting line, 72% of senior alumni relations executives report directly either to the university president or the vice president.

Unlike alumni association in other parts of the world, the number of alumni association staff at American universities is decreasing. 72% of alumni associations report that since 2015, the number of FTEs has either decreased or remained unchanged.

2.3.8.4 Alumni Services Tools

Alumni associations adopt a mix of strategies and tools such as career services, consultations, and lifelong learning to boost alumni engagement. Unfortunately, still there are universities who choose to neglect the strategic benefits of alumni engagement. Statistics show that in the last two years, 17% of alumni associations did not take any initiative to improve alumni engagement, while 60% their greatest effort was changing the website. Further, 24% of American universities still do not provide any kind of career services to their alumni.

34% of alumni of American public universities rate the value of the overall benefits and services they receive as low. Public American universities responded to question about the most valuable, yet underutilized service, event or benefit offered by their university as follow: career services 47%; networking events 42%; reunions 21%; access to campus resources/services (library/gym/transcripts, etc.) 22%; clubs/chapters 20%; educational (lifelong learning/seminars) 14%; digital communication (blog/social media/e-newsletter) 14%; electronic publications (e-zines, e-newsletters) 13%; alumni directory 6%; online community 2%; printed publications (Magazine, newsletters) 7%; discounts-campus (bookstore/gym etc.) 9%; insurance (home /auto/pet etc.) 6%; travel programs using an outside vendor 7%; travel programs that feature campus connection 3%; and financial services/banking 0%.

2.3.8.5 Alumni Behavior

Alumni associations are witnessing an increasing in alumni opt-out rates. The percentage reached 68% in the last year, a 13% increase since 2017. The percentage of universities which reported a decrease in alumni opt-out rates is 5% only. Universities should focus on engaging students at early stages because engaged

students most likely will support their alma mater. This is supported by data that shows 95% of alumni donors engaged in student activities. Only 19% of alumni their alma mater succeeded in making them feel recognized and special.

As previous research suggest that personal attachment is vital to stimulate alumni to donate, and to build a lifelong bond between alumni and their alma matter, statics about American universities support previous research findings. 49% of alumni donors feels very closed or attached to their alma mater, 44% donate aiming to feel more involved, and 47% of them donate because they feel “deep school pride.”. The percentage of alumni non-donors who have never received an invitation to participate in any alumni event or activity is 31%.

The big chunk of donations is made by mega donors. While only 17% of them are motivated to give aiming to receive tax benefits, 67% of mega donors will be triggered to support if they find a good cause to support. The percentage of mega donor’s support to universities is low, only 22%, down from 31% in 2016. Like mega donors, 47% of alumni thinks that there are more important causes to support rather than giving money to universities which they think do not need charitable contributions. Since 71% of donors made their decision to donate to an organization based on the information received from the organization itself, universities must thrive to expand the scope and the effectiveness of their communication strategies.

90% of donors prefer to receive some form of personal “thank you” such as personal calls and letters for their services or donations over other physical forms of recognition.72% of them usually discard them.

2.3.8.6 Culture

Innovation proved to be important aspect to engage more alumni because more than 80% of associations reported an increased in alumni membership rates have also indicate that their organization’s culture supports innovation. One of the interesting findings is that out of the 76% of alumni associations which indicate having a culture that supports innovation, only 23% have a process in place to support it.

2.3.8.7 Alumni Engagement

The VAESE study reveals that successful alumni organizations provide value-added alumni services and benefits exemplified in career services, technology and digital content, and consumer discounts. Alumni associations are struggling to deliver valuable benefits to their members. 69% of associations reports that the lack of value that members perceived about the organization is hindering their ability to engage more alumni. Data shows that 54% of alumni do not renew their membership either because they unable make the most out of their membership, or disappointed by the value of the available benefits. Furthermore, only 20% of members get help from staff to utilize their membership benefits. 69% of alumni associations report that word-of-mouth recommendations help them the most in engaging new alumni.

With regards to American public universities annual spending to support programs that aim to motivate alumni engagement and donations, only 13% of universities thinks that they invest a significant amount, 47% reported investing a limited amount, 23% stated that they do not spend on programs that provide benefits to their alumni but they invest on general programs that motivate alumni engagement and donations, and 17% still rely solely on philanthropic generosity of alumni and do not invest in any kind of programs to stimulate alumni engagement and support.

2.3.8.8 Membership

Data shows that due-based alumni associations are more likely to have a higher opt-out rates. 39% of Millennials states that they refrained from joining due-based alumni associations. Other data shows that the average number of years that a member will pay dues is 9. In order to increase alumni engagement, several universities considered cancelling membership fees. As a result, the percentage of due-based alumni membership has slightly dropped from 74% to 73% in 2020. 52% of American public universities alumni association are non-dues-paying and alumni have equal access to alumni benefits. 6% apply a tiered benefits model where contribution level defines their benefits. 33% of American public universities reported that the number of alumni who joined their associations increased within the past three years, 26% reported a decrease, and 42% reported no change.

2.3.8.9 Evaluation and Monitoring

There are different aspects that needed to be monitored and evaluated to measure programs success, however not all alumni association are paying attention to these functions. 91% of alumni professional either thinks they are doing a poor job, or they need to do more to actively engage alumni, especially younger alumni. Alumni associations are losing their battle against another aggressive donors who are more successful in attracting donors.

According to VAESE report, 27% of alumni associations are unaware of their alumni opt-out rates. Also, 41% of associations do not utilize social media amplification metrics such as likes, shares, and reposts to measure alumni engagement on social media. Furthermore, there is a drop in the use of use response rates like opens, clicks, and visits by 12% since 2017. On the other hand, the is a 7% increase in using Return on Investments (ROI) as a tool to measure alumni programs success. Surprisingly, since 2015, there is a 3% drop in the use of data analysis to measure the effectiveness of marketing efforts. Despite the technology enhancement, only 49% conduct data analysis.

2.3.8.10 Technology

Nowadays, the majority of business processes have been automated. New technologies paved the way for better utilization of resources and higher outreach rates. Sadly, the majority of alumni association are lagging far behind in keeping up with technology. 20% of alumni executives are not considering using technology in alumni engagement programs and 5% of alumni associations do not even have a website. The percentage of alumni associations that have a mobile application has increased from 12% in 2017 to 23%. Data shows that 75% of alumni thinks that their connection with their alma mater may be increased if their alumni benefits were mobile-friendly. Email has been considered as an effect tool to engage new alumni; this view is supported by 62% of alumni associations executive officers.

While 78% of alumni prefer to access their benefits online, 22% prefer their benefits to be sent by mail. Younger generations are more likely to be influenced by technologies. Millennials are 262% more likely to be influenced by mobile apps and advertising. 62% of them believes their loyalty may be increased if their alma mater communicates with them through social networks.

Alumni associations should think wisely about the value of technologies used in terms of risks, benefits, and resources needed to implement these technologies. Non-user-friendly, complicated, and lengthy online alumni services may harm achieving the intended goal of automizing these services and processes. 87% of alumni will quit completing online purchase or donation if they found the process is complicated. What makes the situation worse is that 55% of those will never consider performing this kind of online operations ever again.

Technologies can help alumni associations in delivering personalized services and communications to their alumni. The average unsubscribe rate for higher education is 150% higher than the national average rate across all industries. Targeted personalization has been perceived as an effective strategy to enhance customer engagement by 75% of marketers. Personalized subject lines emails are 26% more likely to be opened.

As for American public universities, 32% reports that they are not facing any difficulties in sending regular emails to their alumni, 33% reported that they lack creative capacity like designers and content creators, 29% indicated that they lack technical capacity, and 8% stated that they suffer from a high unsubscribe rate. 70% of American public universities thinks that they need to update the technology used to engage and deliver services to their alumni.

CHAPTER 3: EXPLORING SECURITY, RISK, AND COMPLIANCE DRIVEN IT GOVERNANCE MODEL FOR UNIVERSITIES: APPLIED RESEARCH BASED ON COBIT FRAMEWORK

Selecting and implementing the best-fit IT Governance framework is the key success factor to guarantee receiving the ultimate value of IT investment and fulfill the requirement of all university stakeholders. As non-profit organizations, universities have wide spectrum of goals focusing mostly on the social welfare of its tremendous number of stakeholders. The second most prevailing characteristic of academic intuitions is the decentralized form of organizational structure which grants great power to individual academic departments to make their own isolated decisions. This business model requires a special IT Governance model which is not readily available since all IT Governance frameworks designed to fit for-profit institutions scheme. In this chapter I introduced an IT Governance framework that fit NUCs special profile based on COBIT framework. The chapter starts by explaining COBIT framework. Then it discussed the governance and management objective. After that, I explained in detail the process that I followed to develop IT Governance framework for universities. The literature review discussing IT Governance in general, and IT Governance has been already covered in chapter 2.

3.1 COBIT IT Governance Framework

Control Objectives for Information and related Technology (COBIT) 2019 (hereafter I will refer to it as COBIT) is a comprehensive generic internationally accepted framework that aims to assists enterprises in understanding, designing, and implementing IT Governance and Management. COBIT builds on and integrates more than 25 years of development in this field. It incorporates new insights from science and operationalize these insights as practices. Enterprises either commercial or non-for-profit exist to create value for their stakeholders. Value is created through realizing benefits at an optimal resource cost while optimizing risk. Enterprises serves many stakeholders, and value creation means different and sometimes conflicting things to each of them. The governance system must consider all stakeholders needs when making benefit, risk and resource optimization decisions. Stakeholder needs must be transformed into the enterprise's actionable strategy. Stakeholder needs are influenced by several drivers; external and internal factors such as strategy changes, a changing business and regulatory environment, and new technologies that

initiate and affect how an enterprise or individuals act or change. COBIT uses goals cascade mechanism (Figure 3.1) to translate stakeholder needs into specific, actionable and customized enterprise goals, alignment goals (IT-related goals), and management and Governance goals. This mechanism helps the enterprise to set comprehensive goals that cover all areas and hence helps in meeting all stakeholder requirements (COBIT® 2019 Framework: Introduction & Methodology, 2018).

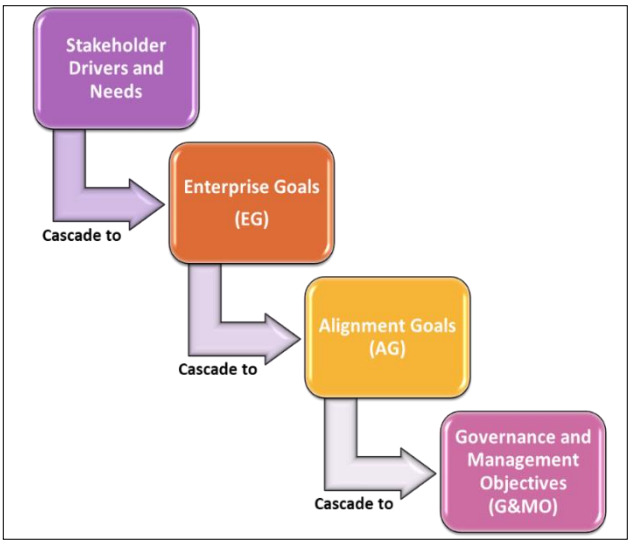

Figure 3.1: COBIT Goal Cascade

3.1.1 Governance and Management Objectives

The COBIT framework makes an explicit separation between governance and management since these two disciplines covers disparate activities, require different organizational structures, and serve different goals. Governance ensures that stakeholder needs are evaluated to determine balanced, agreed-on enterprise objectives. It also set the direction through prioritization and decision making. Furthermore, it ensures that performance and compliance are reviewed and monitored against agreed-on direction and objectives. COBIT grouped governance objectives in the domain of Evaluate, Direct, and Monitor (EDM). While the governance body set the direction, the management is responsible for planning, building, running and monitoring activities that ensure the achievement of the enterprise objectives. Management objectives are grouped in four domains: 1. Align, Plan and Organize (APO) which addresses the organization overall strategy and supporting activities for Information and Technology (I&T). 2. Build, Acquire and Implement (BAI) domain which addresses the definition, acquisition and implementation of I&T solutions and their

integration in business processes. 3. Deliver, Service and Support (DSS) domain which addresses the operational delivery and support of I&T services, including security. 4. Monitor, Evaluate and Assess (MEA) domain which addresses performance monitoring and conformance of I&T with internal performance goals, internal and external controls and compliance requirements (refer to figure 3.2) (COBIT® 2019 Framework: Introduction & Methodology, 2018).

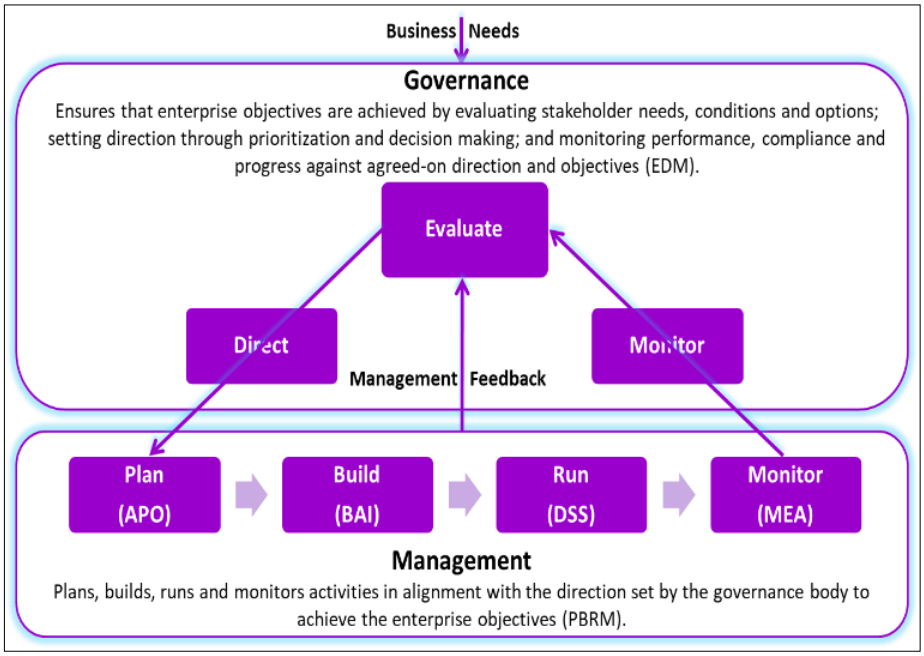

Figure 3.2: COBIT Governance and Management Domains

Boards and executive management are accountable for governance processes and activities while senior and middle management are accountable for the management processes and activities. COBIT core governance and management model consists of 40 governance and management objectives (COBIT® 2019 Framework: Introduction & Methodology, 2018).

COBIT defines seven enables to help the enterprise in achieving the governance and management objectives (figure 3.3). 1. Processes (describe an organized set of practices and activities to achieve certain objectives and produce a set of outputs that support achievement of overall IT-related goals). 2.Organizational structures (the key decision-making entities in an enterprise). 3. Principles, policies and frameworks (translate desired behavior into practical guidance for day-to-day management). 4. Information (information

required for the effective functioning of the governance system of the enterprise). 5. Culture, ethics and behavior of individuals and of the enterprise are often underestimated as factors in the success of governance and management activities. 6. People, skills and competencies are required for good decisions, execution of corrective action and successful completion of all activities. 7. Services, infrastructure and applications (include the infrastructure, technology and applications that provide the enterprise with the governance system for I&T processing) (COBIT® 2019 Framework: Introduction & Methodology, 2018).

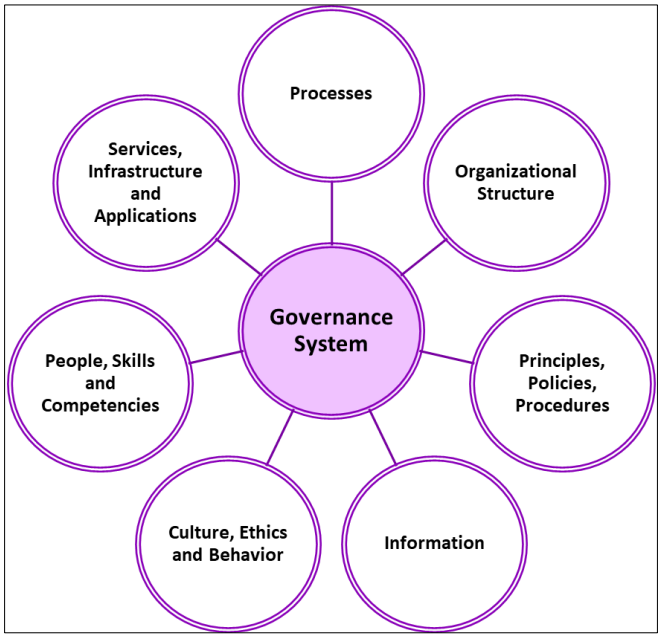

Figure 3.3: COBIT Governance and Management Enablers

3.1.2 Designing a best-fit Governance System

The COBIT 40 governance and management objectives are intrinsically equivalent which means that there is no natural order of priority among them. However, design factors may influence this equality and make some governance and management objectives more important than others, sometimes it may reach an extent that some of the objectives may become negligible. (COBIT® 2019 Framework: Introduction & Methodology, 2018)

The goals cascade method is considered as one of the key design factors. It supports prioritization of governance and management objectives based on prioritization of enterprise goals. COBIT identifies 13 different enterprise goals and 13 different alignment (IT-related) goals. A detailed mapping of enterprise

goals with alignment goals which helps in designing a tailored governance system for the enterprise is also created. Identification of the most relevant enterprise goal(s) and applying the goals cascade will lead to a selection of priority management objectives (COBIT® 2019 Framework: Introduction & Methodology, 2018).

3.2 Methodology

The method used in this work is an exploratory approach. I surveyed the literature to identify the universities drivers and objectives for IT Governance. I applied COBIT goal cascade mechanism to design security, risk, and compliance driven IT Governance model for universities based on COBIT framework. After I constructed the model, I mapped the main factors that may affect the success of IT Governance in universities found in the literature with COBIT Governance and management objectives.

3.3 University IT Governance and Management Objective

Universities must strive to adjust the available IT Governance framework to fit their special objectives and structure. Figure 3.4 depicts the constructed security, risk, and compliance driven IT Governance model for universities based on COBIT framework, created using COBIT goal cascade mechanism. The top purple block shows university stakeholders' drivers which are then translated to enterprise goals (showed in the second orange block). For universities, the most desired goals to be achieved are:

1. Compliance with external laws and regulations
2. Business Service Continuity and Availability
3. Compliance with internal policies

COBIT mapped each enterprise goals to one or more alignment goals (IT-related goals). The alignment goals linked to the previously identified enterprise goals (shown in the yellow block) are:

1. I&T compliance and support for business compliance with external laws and regulations
2. Managed I&T-related risk
3. Security of information, processing infrastructure and applications, and privacy
4. I&T compliance with internal policies

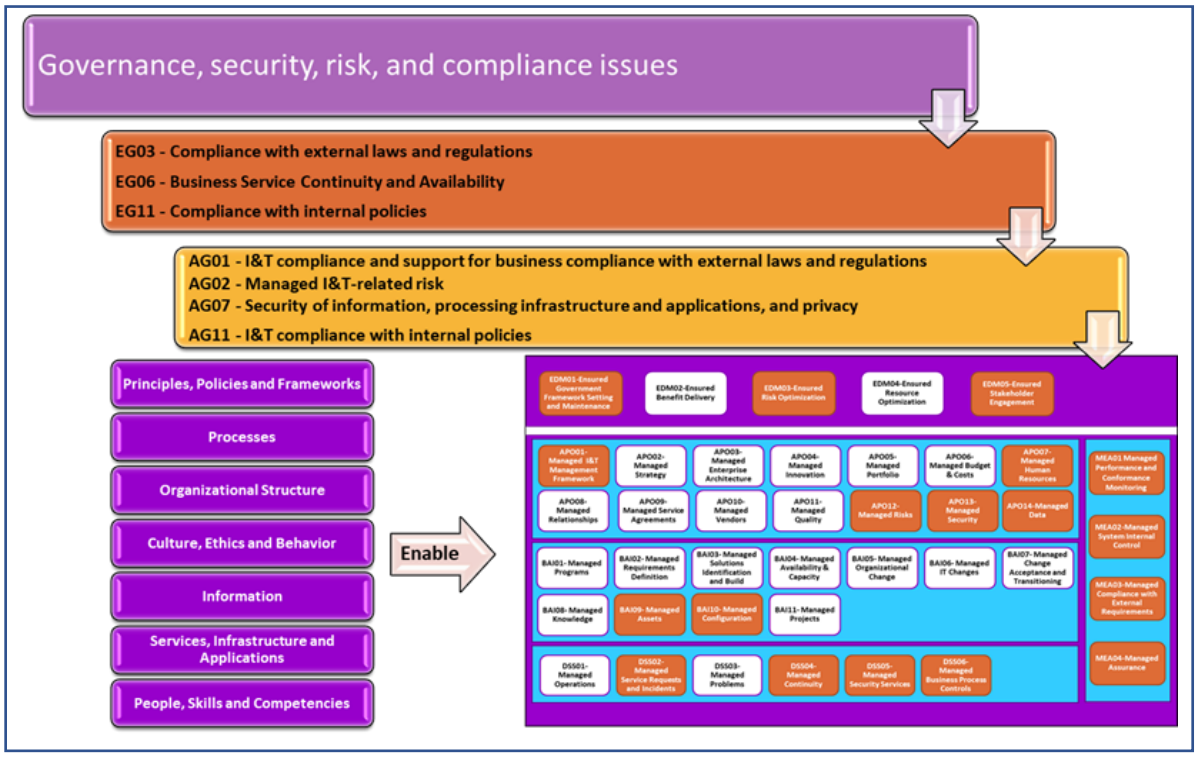

Figure 3.5: Security, Risk, and Compliance Driven IT Governance Model for Universities Based on COBIT Framework

Out of 40 Governance and Management goals, 18 were selected to ensure the achievement of previously mentioned enterprise goals and alignment goals. The 18 goals are highlighted with orange color in the last block of figure 3.4 and they are: 1.Ensured Government Framework Setting and Maintenance; 2.Ensured Risk Optimization; 3.Ensured Stakeholder Engagement; 4.Managed I&T Management Framework; 5.Managed Human Resources; 6.Managed Risks; 7. Managed Security; 8.Managed Data; 9.Managed Assets; 10.Managed Configuration; 11.Managed Service Requests and Incidents; 12.Managed Continuity; 13.Managed Security Services; 14.Managed Business Process Controls; 15.Managed Performance and Conformance Monitoring; 16.anaged System Internal Control; 17.Managed Compliance with External Requirements; and 18.Managed Assurance.

3.4 Mapping the key factors that affect the success of IT Governance in universities with COBIT Governance and management objectives

After I carefully surveyed the literature, the main factors that may affect the success of IT Governance in universities were identified. In order to make sure that the constructed IT Governance framework covers all key success factors, I mapped these factors with the selected governance and management objectives. Refer

to appendix E to see the mapping of IT Governance key success factors with COBIT Governance and management objectives.

3.5 Discussion

The main universities IT Governance objectives to ensure Security, Risk and Compliance are Government Framework Setting and Maintenance, Risk Optimization, and Stakeholder Engagement. The Board is held accountable for the achievement of these governance objectives through the execution of Evaluate, Direct, and Monitor (EDM) governance activities.

The management translates the governance strategy into actionable plans; evaluates the performance and conformance with the strategy and plans; and report the findings to The Board. Management objectives are grouped into four domains: Align, Plan and Organize (APO); Build, Acquire and Implement (BAI); Deliver, Service and Support (DSS); and Monitor, Evaluate and Assess (MEA). I identified 18 management goals that support the management of universities IT functions. In the proceeding sections I will discuss the Security, Risk, and Compliance Driven IT Governance Model in details.

3.5.1 IT Governance and Management Framework

To set and monitor the university IT Governance system, a formal institutional governance body with the right qualified and skilled personnel must be in place.

The social responsibility and ethical conduct are very important for universities since the university activities will impact a wide spectrum of internal and external stakeholders and it will also affect the society in general either directly or indirectly. The Board must align the enterprise's direction, goals and objectives with the ethical use and processing of information. The university IT Governance guiding principles, decision-making model, and levels of authority delegation must be well articulated and communicated to the designated stakeholders. The availability of ethical behavior guidelines and a reward system are important mechanisms to promote positive cultural change enforce compliance.

The Board must engage and obtain the executive management support, buy-in, and commitment to ensure successful achievement of IT Governance system goals. It must also form an I&T governance board accountable for guiding IT decisions in alignment with the university strategic direction.

The effectiveness of IT Governance system can be measured through assessing the performance of the components that institute the system such as human resources, structures, principles, policies, and procedures. Performance reports includes compliance assurance reports, noncompliance root causes reports, reviews of self-assessments, internal control monitoring and reviews. Universities should implement mechanisms to flag any change in compliance obligations or laws and regulations and adapt the Governance system accordingly.

After the direction setting for governing IT activities by the Board, now the Executive Committee is accountable for meeting the enterprise IT strategy and goals and managing the IT portfolios. The committee is also responsible for building the organizational structure for managing IT activities. It must develop effective and well communicated policies for recruiting skilled people. The roles and responsibilities must be clearly stipulated and communicated to the designated staff. The Committee must regularly review the IT management structure performance and report the findings to the Board.

To build a solid IT management system, the university direction, internal and external context must be fully understood. This includes challenges, culture, social responsibilities, risks, laws and regulations, and ethical values to name a few. This understanding will guide the creation of the policies required to control IT activities such as: compliance, access controls, security, privacy, confidentiality, ethical use of IT, data classification, internal controls, and intellectual property (IP) rights. These policies should be reviewed and updated at least yearly to reflect any change in the business environments.

The executive committee must identify decisions required for the achievement of university strategy, involve stakeholders who are accountable, responsible, consulted or informed in any decision-making process, and define the scope, focus, mandate and responsibilities of internal and external function including those performed by third parties in line with governance direction. Consider service continuity when defining roles, including staff back-up and cross-training requirements. Roles and responsibilities, authority level, access rights, reporting line, code of ethics, skills and competencies, adherence to rules and regulations, and professional practices are very important components that must be included in staff job descriptions.

In order to protect and secure information, information classification must be performed, a list of systems and data that specify owners, custodians and classifications must be created, and the level of critically for all

university data, information and systems must be defined, and finally protection level for each information category must be set.

Establishing an IT steering committee which consist of executive, business and IT management is the responsibility of the executive committee. IT steering committee is responsible for tracking status of projects, resolving resource conflicts, and monitoring service levels and service improvements.

3.5.2 Stakeholders Engagement

Building an effective IT Governance framework for universities requires identifying and involving appropriate stakeholders at all levels. IT leaders must engage champions from all campus groups. Assessing and maintaining stakeholders buy-in is as important as building it. IT leaders must ensure that the following stakeholder group has a voice in this strategic endeavor: IT Governance development team, Institutional leadership, Academic units, Business units, IT operations, and Users (Molina, 2017).

The Board is the accountable constituent in the governance body and compliance is one of the ultimate goals of governance function which will also contribute to security and risk management. The Board form the reporting and communications principles, evaluate reporting requirements, set the rules for validating and approving mandatory reports, develop escalation guidelines, and assess reporting effectiveness. To do so, university internal and external stakeholders must be identified and engaged. Reporting requirements for each group of stakeholders must be identified including extent, frequency, and communication formats and channels. It is important to consider developing mechanisms for validation and approval of mandatory reporting, and establishing reporting escalation techniques. The board periodically assess the effectiveness of reporting and communication requirements to ensure the accuracy and reliability.

3.5.3 Human Resources

The CIO chairs the human resources optimization process. CIO evaluate, assess, plan, and monitor staffing current and expected future requirements that support the university goals on regular basis. knowledge sharing, succession planning, staff backup, cross-training and job rotation initiatives are effective techniques for business continuity since they help in minimizing the reliance on a single individual performing a critical job function. Employees, contractors and vendors background checks are very important in IT recruitment

process for securing information and mitigating risks. Implementing adequate training programs starts with the gap analysis between the available skills and competencies, and required skills and competencies.

The management align individual goals with the relevant enterprise and IT goals, set formal career planning and professional development plan, design performance matrix, and rewards/ disciplinary systems.

3.5.4 Risk Management

Like any other governance function, the board is responsible for evaluating, directing, and monitoring IT risks. This is done through performing the following: understanding the organization, aligning the IT risk strategy with the enterprise risk strategy, determining IT risk appetite, IT risk tolerance levels, ensuring that IT risk appetite is below the organization's risk capacity, and attracting and retaining the necessary skills and personnel for IT Risk Management. The Board directs: the integration of the IT risk strategy into risk management practices and operational actions; development of risk communication plans that consider all organization stakeholders; development and publication of risk policies and procedures; evaluates the management of IT risk profile; monitors the fulfillment of risk governance and management processes goals; analyzes the root cause of any deviations; and initiates remedial actions to address the underlying cause.

The Board delegates the responsibility of risk management including IT risks to the Chief Risk Officer (CRO). The Enterprise Risk Committee is accountable for coordinating and managing the enterprise-wide relationships required to support enterprise risk management (ERM) activities and decisions. A special council for IT risk may be established to consider and advise the enterprise risk committee about IT risk matters. The CRO continually identifies, evaluates and reduces IT-related risk to maintains it in accordance with the IT risk appetite and IT risk tolerance levels as established by the governance body.

With regards to IT risks, the CRO establishes a method to collect, classify, record, and analyze IT risk-related data and expand the organization knowledge by surveying external data and loss experience from industry peers. The CRO also conduct periodic analysis to identify emerging risk issues and to understand the associated internal and external risk factors. IT risk scenarios and estimated likelihood of occurrence must be created and updated regularly as well as the risk attributes which contain information about risk expected frequency, potential impact, responses, resources, capabilities and current control activities related to risk items. Furthermore, CRO reports the findings of risk analysis to affected stakeholders with the proper

amount of information required to support enterprise decisions; reports the current risk profile to all stakeholders; and perform a response plan which minimize the impact of risk incidents.

3.5.5 IT Security

Experts in computer security are unanimous that universities are one of the least secured information environments. Students are an easy target and attractive candidates for security attacks. The percentage of universities conducting IS awareness trainings is low. To achieve better results of IS initiatives, universities need to enforce exposure of policies. Repeated exposure increases user retention of policies, which will in turn increasing awareness (Rezgui & Marks, 2008).

HEIs may not be judged harshly for data leakage incidents because stakeholders perceive them as a body for education and knowledge creation, rather than information guardians. Universities and colleges will receive social acceptance and respect as a reward for their efforts to secure stakeholders' information. For example, despite the information leakage incident that struck The University of Texas, Austin and resulted in jeopardizing 200,000 students' electronic records, the incident did not affect the university ranking (Kam, Katerattanakul, Gogolin, & Hong, 2013).

The Chief Information Security Officer (CISO) is accountable for managing information security programs and initiatives, however, the CISO role in the HE Sector has been very difficult to characterize. The information security and privacy policies are very important instruments in the Information Security Management System (ISMS). This policy is aligned with IT risk policy to improve operational efficiency. It sets behavioral guidelines to protect corporate information, systems, and infrastructure.

An effective ISMS must be in place to ensure information security. To build the system, the following activities must be performed: define the scope of the ISMS in terms the enterprise characteristics, structure, location, assets and technology; obtain management approval to implement or to make any change to the ISMS; formulate and maintain an information security plan that describes the management and alignment of information security risk with enterprise strategy and architecture; collect and analyze data about the ISMS with the aim to improve its effectiveness; and correct nonconformities to prevent recurrence.

The CIO is accountable for managing and protecting and securing data assets. Data management function aims to eliminate business risks and improve business service continuity and availability. To support the business goals and objectives an integrated organization-wide strategy to achieve and maintain data quality such as complexity, integrity, accuracy, completeness, validity, traceability, and timeliness is required, including the following. Define metadata categories, properties, and standards to make sure that metadata documentation captures data interdependencies. Develop data cleansing policy. Keep a log of the changes done through cleansing activities. Establish plans that includes methods for correcting the data. Methods may include multiple repository comparison, verification against a valid source, logic checks, referential integrity or range tolerance. Include data quality criteria in service level agreements to hold data providers accountable for cleansed data. Standardize data profiling methodologies, processes, practices, tools and templates that can be applied across multiple data repositories and data stores. Understands, maps, inventories and controls data flows through business processes over the data life cycle, from creation or acquisition to retirement. Manage the changes to shared data sets or target data sets for a specific through data governance structures, with relevant stakeholder engagement. Use metrics to expand approved shared data reuse and eliminate process redundancy. Ensure that the organization has data warehouse repository that provides access to historical data for meeting analytics needs supporting business processes.

Creating an asset register is the first step in the IT security program since you cannot protect what you do not know exists. The Chief Technology Officer (CTO) is accountable for managing IT assets through their lifecycle to make sure that their use delivers value at optimal cost, they remain fit for purpose, and they are accounted for and physically protected. Legal, regulatory or contractual requirements need to be identified and addressed when managing asset. A special attention is paid to critical assets since their failure will heavily affect the business processes. Software licenses are also considered as assets that must be secured, managed, and controlled. The CTO manages and monitors decisions related to IT services, solutions and infrastructures. This can be delivered by building a configuration model and specifying relationships among key resources.

According to Data Breach website, 46.2% of the data breaches incidents that struck American universities in the last 5 years were a result of an attack by outside party and malicious software. To secure university IT assets, a portfolio of IT security technologies, services and asset must be in place. The portfolio may include

the following: malicious software protection tools, traffic filtering, malicious attacks awareness and training programs, data encryption techniques, penetration testing, physical protection of endpoint devices, user access rights management, security policies, logs, and perimeter restrictions, such as fences, walls, and security devices on interior and exterior doors. Network segregation is a very useful technique to protect and secure university information. The access to universities network is granted through abundant access points. Endpoint devices that are connected to the university network are frequently not all university properties, such as students and researchers' personal tablets, laptops, and phones.

3.5.6 Incidents and Business Continuity Management

In order to secure IT assets, and ensure business continuity, effective awareness and training programs must be designed. These programs focus on enhancing the culture of awareness about what may considered as threat that requires attention and escalation to the designated personnel in the university to further investigate the matter and take proper emendation measures. Specialized programs must be designed to each group of university stakeholders depending on their needs and use of the technology within the organization. These programs must put in consideration the students and the top management as well.

The CTO must ensure the availability of standardized approach to deal with the IT incidents. This process covers the whole lifecycle of incident treatment program which starts with problem registration followed by incident request classification, prioritization, and resolution. The last stage of the incident treatment process is reporting the status to the designated stakeholders and close the issue. A detailed documentation for registering all reported incidents must be created as well as the actions taken to resolve issues. The recorded information is beneficial for continual improvement planning.

The Chief Operating Officer (COO) leads the development of the business continuity policy. The policy identifies the internal and outsourced business activities that are critical to the university operations or essential to meet legal and contractual obligations. Skilled and competent staff with clear roles and responsibilities are assigned to execute the policy. Business Impact Analysis (BIA) is the first step taken to develop the Business Continuity Plan (BCP). The BIA evaluates the impact over time of a disruption to critical business functions and the effect that a disruption may have on them. The BCP effectiveness is reviewed on regular basis and updated once a change in the operating environment occurs.

While the COO sets the strategy and direction to ensure the business continuity, the Business Continuity Manager is accountable for developing, implementing, testing, and reviewing the BCP and the disaster recovery plan (DRP). It is very important to include the following elements in the DRP: required skills and competencies, information backup requirements, security requirements, list of individuals involved in executing the plan and procedures along with their up-to-date contact information, facilities and IT infrastructure required to support the continuity and recovery procedures, and references to plans of outsourced service providers.

3.5.7 Performance Management, Compliance and Assurance

The Executive Committee sets the performance and conformance targets and then communicates it to the designated stakeholders. The CIO is accountable for evaluating the performance of processes and stakeholders. Business units submits reports to the management along with other agreed on supportive evidences that are used to measure and verify performance and conformance. This process assures the quality of work performed and hence ensures the business continuity.

There are three different levels of internal checks carried out by universities to ensure the adherence to internal and external policies, contractual requirement, and rules and regulation. The first level is the self-assessment test carried out by each business units. The second level is the internal control and compliance and the last is the audit function. Compliance unit creates a log of all required compliance actions, perform compliance checks, produce compliance assurance reports, and noncompliance issues and root causes.

Universities are subjected to mandatory quality checks as well as other regulatory checks to ensure that the universities adhere to legal and educational regulations. Monitor and evaluate university policies, standards, procedures, and methodologies in relation to IT to ensure compliance with relevant legal and regulatory requirements. Set a function to monitor any change in the legal requirement and response to the new requirement accordingly.

3.6 Summary

This research examined the literature in the field of IT Governance in the HEIs to provide the basis to better understand the unique business models of these organizations which requires a special setup for IT

Governance framework. In the context of HEIs, the literature shows that the most prevailing issues are related to security, risk, and compliance. Previous research were mainly case studies addressing the impact of implementing COBIT or other IT Governance frameworks such as ITIL and ISO/IEC 38500. Since COBIT is the most comprehensive internationally accepted framework, I did a major alignment to COBIT model to introduce the best-fit Security, Risk, and Compliance Driven IT Governance Model for Universities. This paper merges the academic and professional practices by first providing an in-depth review of the existing literature about IT Governance to identify the essential components for universities IT Governance, and then using that acquired knowledge to align a professional best practice to HEIs.

CHAPTER 4: IT GOVERNANCE AT JAPANESE NATIONAL UNIVERSITIES (NUCS)

NUCs are under great pressure to enhance their corporate governance and efficiency since they are the remedy to revitalize the economy. They are the main source for future innovators and leaders, and they are also the source for knowledge. In order to fulfill their role, it has been advocated to enhance their corporate governance especially IT Governance. IT Governance implemented in universities to ensure that their IT is properly managed, universities' strategic objectives and IT objectives are aligned, and the IT investment creates business value for the university stakeholders (Yaokumah, Brown, & Adjei, 2015; Hotzel, Wimmer, Heyde, & Lang, 2015). Chapter 3 presented further information about Japanese higher education history, direction, and governance. Appendix C summarizes the characteristics of Japanese reforms and the drivers for the consecutive reforms.

This chapter aims to identify the structure of IT Governance function at NUCs. It is organized as follows: research methodology, research instrument, discussion of IT Governance pillars and their interrelations, case studies findings, analysis and discussion of case studies finding, and finally conclusion and recommendations.

4.1 Research Methodology

This part of the research aims to address the second and third objectives of my research as stated in section 1.2: "identify and analyze the existing component of IT Governance in NUCs", and "identify the challenges facing CIOs in NUCs in implementing IT Governance system". Therefore, I conducted case studies research at NUCs. I developed my own tool to collect my primary data which is explained in detail in the following section (refer to 4.2). I built my tool around the concept of value creation as explained by ISACA, the organization that developed COBIT, and in accordance with COBIT based framework developed in chapter 3. This concept states that to create value from the IT function, all IT resources and projected must be planned to serve stakeholders' current and expected future needs by optimizing the university available resources, and controlling the risks associated with the use of IT such as technical risks. To that end, 11 distinctive

factors were identified as crucial IT Governance factors at NUCs which my survey questionnaire is expected to answer. These factors will be explained in the following section (4.3).

I conducted structured interviews by email to collect my primary data. My communications were in Japanese language, using a Google form to collect my data. I targeted the leader of IT function at NUCs whom I identified by looking at NUCs websites such as the university organizational structure and the list of top management. After I identified them, I searched for their contact information from multiple sources including university portals designed to search for university researchers' information since the majority of them are university faculty members. In some cases, email addresses of top IT leaders were not found, hence I asked universities public relations department to connect us with the top IT leaders. I asked of all 86 NUCs to participate in my study and I received responses from two universities. Refer to appendix H to see the Japanese version of my survey questionnaire which I shared with IT leaders at NUCs. Appendix G presents the English version of the survey questionnaire.

4.2 Research Instrument

Since a comprehensive tool to measure IT Governance status at universities does not exist, I developed my own tool. COBIT was my guiding principle since it is the only framework that cover all aspects of IT Governance function. I also considered other questionnaires identified by the EDUCAUSE review in developing my research instrument. These questionnaires are IT Governance Survey Questionnaire (2007), Information Technology Strategic Management in Higher Education: Survey Questionnaire (2003), and International Study of Identity Management and IT Security in Higher Education Survey Questionnaire (2007). In these studies, the researchers followed Weill & Ross (2004) definition of IT Governance which is "specifying the decision rights and accountability framework to encourage desirable behavior in using IT". As can be comprehend from the definition, the focus is on organizational structure for different IT functions.

The research instrument was organized as follows, the first two sections collect data about the university general information such as its size, and also about the participant. The other sections are intended to answer questions related to the identified eleven IT Governance aspects. To do as such, 147 measures were developed and there were grouped in ten categories which are principles, policies, and frameworks; processes; organizational structure; stakeholders' engagement, value delivery, culture, ethics, and behavior;

risk; information; people, skills, and competencies; and monitoring, evaluation, and reporting. The last section is for participant contact information and their other comments if any. The English version of the research instrument will be presented in appendix G and the Japanese version in appendix H.

4.3 IT Governance pillars and their interrelations

I identified eleven elements for effective IT Governance at universities. These elements are Business/IT Alignment, Management Buy-in and Support, Risk Management, Data Governance, IT Value Creation, IT Human Resources Management, Service Continuity, Stakeholders Engagement, Performance Evaluation & Monitoring, Culture, and Framework Setting. The connection and relation between these factors are complex. This section discusses these factors and their interrelations.

4.3.1 Business/IT Alignment

Business/IT alignment is a concept introduced to solve the deep-rooted divide between IT and business, a divide that hinders organizations from receiving the ultimate return on their IT investment. The divide is attributed to different elements. The first is the mismatch between business processes and the automated solutions provided. The second element is misconception of IT as a facilitator, not as a value generator that can not only positively or negatively impact the efficiency of business processes but also affect the university image and competitiveness. The last element is the bidirectional miscommunication between IT and business which affect business owners' ability to understand IT capabilities, and furthermore hinders IT professionals from understanding the needs of business and thus suggesting the right technical solutions to elevate their performance.

Several strategical and structural measures are being taken to strengthen the tie between IT and business, and to enhance the understanding, collaboration, and communication between them. On the strategical level, currently IT strategies and objectives are advocated to be shaped in accordance with the overall university academic and business strategies and objectives. IT assets, services and capabilities must be well documented and communicated to corresponding university stakeholders. On the structural level, IT positions and committees have been created on the highest university levels. IT leaders now participate in shaping the overall university direction. IT committees include representatives from all groups of stakeholders.

The existence of an effective alignment between business and IT will bring tremendous benefits to the university. First and above all, it will help university in achieving the stated strategies. Second, it will improve the interaction and collaboration between several departments which will affect different aspects such as the university agility and responsiveness to external and internal changes, stakeholders' engagement, awareness, and risk identification and mitigation. Third, it will improve IT resources utilization and the return on IT investment since the implemented technical solutions fits the business needs and requirements. Fourth, it will help IT to better strategically plan and budget the IT portfolio to not only serve the current business needs but also the anticipated future needs.

4.3.2 Stakeholders Engagement

Stakeholders Engagement is a process that is put in place either to receive stakeholders' input or to deliver specific information to them. Stakeholders' needs and requirements shape university goals and strategic directions including IT goals and strategies. Inclusion of all groups of stakeholders is of paramount importance to enhance stakeholders' trust and stimulate their buy-in and support for key initiatives. Further, their insights may help universities to proactively detect environmental risks and opportunities and to respond to them accordingly.

Universities should put in a place a comprehensive system that utilizes a mix of resources and different communication channels to engage with all groups of stakeholders. This system must consider the different needs and characteristics of these groups and design the right tactics to engage with them. These tactics should consider the goals, frequency, channel, content, and the desired outcomes of these communications.

Stakeholder's engagement can improve different aspects of a university such as management buy-in and support, risk management, value creation, and culture. The importance of stakeholder's engagement springs from its ability to enhance stakeholders understanding about the university strategic goals and direction and then clarify the role that they may play to help the university in achieving these goals. Making stakeholders understand that their input is valued and important to improve university performance and status will surely elevate their attachment and sense of belonging to their university.

Involving stakeholders and considering their requirements and opinions about IT initiatives will first improve the outcome of that initiative, second mitigate the potential risk, and third address conflicts among different stakeholders.

4.3.3 Management Buy-in and Support

Management buy-in and support is crucial for projects' success, especially innovative initiatives that may impose a major change in business processes and consume remarkable amounts of resources and effort. The IT function should strive to create a system that will ensure continuous support from top leaders. Getting the support from a single champion in the university is not sufficient for IT function since it is impact will almost affect all university departments and stakeholders. Any change in IT infrastructure, solutions, and processes will affect them severely The magical component to catalyze management support is communication since it will educate management about IT objectives, value, results, and future directions. Aware people are more likely to support your vision because they can see the value it can add to the university. Existence of channels to communicate with top management, the quality and clarity of delivered information, and the frequency of these communications, are factors that IT professional must consider and evaluate to grantee a successful communication plan.

In addition to resources allocation and budgeting gains, IT professionals should also understand the political power of management buy-in and support in increasing stakeholders' compliance to IT policies and procedures such as security measures. Furthermore, it may also help IT professionals in holding a position that make them able to participate and influence business priorities and directions.

4.3.4 Data Governance

Data is a valuable asset which needs to be protected and controlled especially in knowledge organizations like universities that create, store, and disseminate a wealth of information. The range of issues related to data governance and management is wide, including matters related to creating quality solutions to collect information; to build infrastructure for data storage, sharing, and analysis; to form policies and procedures to ensure data security and privacy; to set controls to ensure data quality; and to provide tools for data analysis and utilization.

Poor data governance may threaten the whole existence of a university since it can jeopardize the privacy and security of stakeholders' sensitive data such as their financial and personal information. Leakage of this information will hit the organization image and reputation severely since the stakeholder trust in the university including the trust of academic and industrial partners will decrease drastically. Most of these incidents are resulting from ignorance of users who are unaware of the implications of their actions. Security awareness programs and data security training sessions are of paramount importance to address the previously mentioned issue and cultivate a data security culture. Furthermore, job descriptions of each employee should include specific requirements regarding adherence to management and IT policies and procedures, the code of ethics, and professional practices.

Data analysis and knowledge creation is a crucial element to better support decision making process. Universities are building an increasing interest in business analytics to improve their performance and increase their efficiency. Data has the potential to enhance student learning experience, improve student success, enhance research, support effective community outreach, enhance institutional productivity, and improve university infrastructure.

The Big Data concept has evolved from the Data-Driven Decision-Making concept which was boosted in the 1980s and 1990s. Big Data is a very sophisticated concept that has been described by five elements known as the five Vs. The first three elements describe the nature of the data (volume, velocity, and variety), while the rest describe the data output (veracity and visualization). All of these five Vs are affecting the decision making heavily; how big is the data available to reach to an effective decision; how fast data can be analyzed to create knowledge; is the available data wide enough that covers almost all aspects of the organization; is the data collected of a high quality that can lead to a high quality decisions; and lastly can it be easily represented and understood to extract meaning (Lane & Finsel, 2014; Picciano, 2012).

4.3.5 Risk Management

The accelerated base of digitalization and reliance on IT infrastructure and solutions heightened the need for comprehensive IT risk Management programs. These programs help universities to better understand the risk associated with the use of IT and then strategically set plans and measures to mitigate the risks associated with that use.

IIA defines risk as “the possibility that an event will occur that could affect the achievement of objectives, which is measured in terms of impact and likelihood”. Risks impact and likelihood of occurring vary depending on the environment, the implemented controls, and the exposed asset of the organization. Risks may affect different aspects of universities such as financial resources, academic and administrative operations, compliance with external and internal rules and regulations, university reputation and image, stakeholders, and Information Technology systems and infrastructure. Risk assessment is the first step in any risk management initiatives.

According to ISACA Risk IT framework, a Risk Assessment exercise includes the analysis and evaluation of risks which has the following activities; determine the value of the information assets, identifies the applicable vulnerabilities and threats that exist or could exist, identifies the existing controls and their effect on the risk identified, determines the potential consequences, and finally prioritizes the derived risks and ranks them against the risk evaluation criteria set in the context establishment. To perform an effective Risk Assessment, a very good Risk Rating model needs to be defined. The model should consider the likelihood of a risk occurring and the impact it will have on the Organization.

Risk assessment is important function for data management and business continuity since it helps identifies the cybersecurity risks and risks that may affect service continuity. Effective risk management must strive to enhance stakeholders’ awareness about the risks associated with the use of IT and then foster their collaboration in mitigating and controlling these risks through setting mechanisms and channels for reporting potential risks.

4.3.6 Value Creation

Value creation has been considered as a complex equation which is hard to quantify and measure. It is a process of ensuring receiving the maximum return on IT investment while consciously monitoring and controlling the risks associated with these investments and also optimizing resources including human resources. The existence of centralized IT department is important to properly manage IT resources and ensuring that there are no duplications or overlaps between various initiatives. Sufficient resources such as budget and human resources must be allocated and planned properly to cover not only the current needs but also the future needs of the university stakeholders, considering the anticipated changes in the political

(internal) and strategic (external) environment. Whether IT will guarantee getting enough resources is a matter of how effective the function used to evaluate the value of IT investment is, and how IT Governing body communicate its worth to the university stakeholders. Awareness is the key to get stakeholders support including the support of top management and leaders of the institution.

Value function must ensure that all IT investments are linked to the university goals and direction which means that the value creation is heavily affected by business/IT alignment. Poor alignment will make these initiatives of no value because it will fail to address stakeholders' needs and requirements, hence stakeholders will end up not using them at all. This leads us to think about stakeholders' engagement carefully. Value function should be stakeholders-centered and strive to provide stakeholders with tools and solutions that empower them to better achieve their goals. Regular discussions must be conducted with all groups of stakeholders to address emerging challenges and needs. Another important aspect to improve value creation is considering internal environment during the formulation of IT priorities and strategies. This is important to avoid any resistance from stakeholders to the implemented IT solutions.

4.3.7 Human Resources Management

A thoughtful Human Resources Management system will consider the current and future needs of skillful, well trained, and ethical human resources to govern and control IT processes. Further, it will ensure the existence of effective tools and controls to empower employees and enhance their performance and commitment. The main control is employees job description. It builds a framework for that guides employee to fulfill their expected role in the organization. The job description of each employee should explicitly specify roles and responsibilities, accountability, decision rights, reporting line, required skills, and internal and external communications. Added to this it should includes specific requirements regarding adherence to management and IT policies and procedures, the code of ethics, and professional practices.

Employees job descriptions serves as a reference to evaluate their performance. Employee's promotions should be linked to their evaluation results. Specialized training and development programs should be in place to improve their performance.

Human Resources Management has great impacts on almost all aspects of IT Governance. It may affect Value Creation, Data management, Risk Management, Business Continuity, Stakeholders Engagement,

Governance Framework and also university culture. Value Creation will be affected by employees' skills, training, and clarity of their roles and responsibilities. As for Data Governance, the inclusion of accountability statement, compliance requirements, and ethical conducts will definitely affect data security and privacy. Further, it will enhance employees' awareness about the security and compliance requirements. Introducing incentives for compliance and security practices is a good tool to improve Data Governance and the culture of the university. BC should be considered during defining roles, including staff back-up and cross training requirements. Poor planning of the needed skills and positions and falling to find competent staff may impact Governance and Management Frameworks.

4.3.8 Service Continuity

Risk is inevitable, yet it must be managed through proper controls. IT functions are exposed to different threats that may affect different aspects of IT processes for example data security, privacy, and service continuity. While risk management deals with identifying all threats that may affect IT function, Service Continuity is a measure that put in place to face an identified risk (during Risk Management process) that may affect the delivery of IT services. As can be obviously noted, the quality of Risk Management will impact the quality of countermeasures set in the Service Continuity plans and procedures. Further, communications, Human Resources Management, and also university culture have great impact on Service Continuity.

4.3.9 Performance Evaluation & Monitoring

Performance Evaluation & Monitoring is a cornerstone of any IT Governance function. The three pillars of PEM are first the exitance of clear, documented, and communicated goals for every entity. Second is the availability of effective tools and models to measure the degree of the achievements of the state goals. CMM (Capability Maturity Model) and BSC (Balanced Scorecard) are examples of international reference models to measure performance. Lastly is the availability of tools to store, collect, and report performance data.

PEM is done at several levels, and it covers all aspects and entities. It includes but not limited to measuring the outcomes of IT projects, staff performance, security measures, and also the performance of overall governance system. PEM is done at the departmental level, organizational level and also on broader sense by governmental institutions and other global organizations.

The results of monitoring and evaluation is important to enhance performance such as data security by highlighting what security function achieved and areas that require more protection and controls. PEM outcomes may impact budget allocation, management buy-in and support, organizational culture, and stakeholders' engagement. Outstanding return on IT investment will motivate top management to invest more in IT projects and will also intrigue the stakeholders' interest in supporting the IT function. It can cultivate a supportive culture for IT initiatives and projects.

4.3.10 Culture

Cultivating a good culture towards the use of IT is a complex endeavor especially when the function of calculating the value of IT is ineffective or even sometimes do not exist. Building a supportive culture for IT function requires time and efforts. The first step is to utilize a mix of communication channels to enhance the awareness about IT impact, value, risk, and capabilities.

Management buy-in and support is essential to build this culture since they can influence other stakeholders' attitude toward IT function. Falling to engage university leaders will negatively impact IT effectiveness and utilization.

4.3.11 Framework Setting

By Framework Setting I mean setting the general structure and frameworks for IT Governance function. Usually, the structure of IT at universities is decentralized form of structure which heavily affect the value creation and data management function. It makes it difficult to trace, evaluate, and monitor the interwind systems with business processes scattered throughout the different departments. The decentralization of information will also affect data utilization for decision making.

There are several internationally accepted frameworks such as ITIL and COBIT that can be adopted to support different aspects of IT Governance and management. Frameworks serve as a reference model and also act as a common language for every individual in the organization. Organizations who developed these frameworks provides different certifications and training to their members and associates. Some institutions choose to develop their own frameworks which makes it difficult for them to find an organization-ready staff since they need special training to carry out the required operations.

4.4 Case Study A

University A was established by a merger of two institutions in 2003 as a research- and teaching-oriented university. The university treats research- and teaching as equally important factors for faculty and institutional success. The estimated number of academic staff is 734. The estimated number of all administrative staff, including medical workers and university attached school workers, is 1,335. The number of enrolled students is about 6650. The number of international students has fluctuated over years. It reached its peak in 2019 with a percentage of 2.4 of the total number of students. In 2020, the percentage of international students decreased to 1.5, the lowest percentage since 2016. More than three quarter (77%) of international students are Asian and more than 40% are Chinese.

The respondent to my structured interview by email is the Vice President for Information and Technology who is designated as the top IT leader in the university. He reports directly to the president of the university and has a permanent seat in the university highest strategic committee. He is involved in university-wide activities connected to the acquisition, deployment, and management of information technology but he is not quite sure about his role in other aspects of non-IT related institutional planning. The facts presented in this section are all the observations and evaluations by the respondent about case study A.

The university IT steering committee has representatives from all groups of stakeholders, yet their IT knowledge is questionable. There is a centralized IT department that is responsible for setting the university IT laws and regulations, and then monitor, evaluate, and direct the implementation of these laws and regulations, yet every single administrative and academic department is making its own isolated decision about the use of IT without involving the central IT department. More than 100 employees report to the central IT department and between 20 and 30 technical staff are reporting to other divisions. The university does not adopt any internationally accepted frameworks to govern and manage IT functions such as COBIT, ITIL, and ISO/IEC 27002:2005.

The respondent thinks that the university has a reputation for being forward-thinking in the use of IT and the IT function has full support, commitment, and buy-in from board and executive management. The university mission statement acknowledges Information Technology as a cornerstone of success. The IT plan aims to identify opportunities to differentiate the university competitively, secure financial and other resources, and

identify internal improvement opportunities. IT strategy is aligned with the university overall strategy and also with the academic goals. The top three triggers for changes to IT priorities are the changes in the external environment (economy, marketplace), appointment of new institutional leadership, and appointment of new IT leadership. The consideration of IT capabilities and requirement in any strategical change is unclear. The university does not conduct cross-training programs to train businesspeople about IT and/or training IT people about business. There are no guidelines for each management structure (including mandate, objectives, meeting attendees, timing, tracking, supervision and oversight) as well as required inputs for and expected outcomes of meetings.

While IT Governance body may occasionally consider taking the opinions of faculty members, students' opinions have never been sought for. Other constituencies that the body may rarely seek their opinion are the university president, vice presidents, chief administrative officer, chief financial officer, and deans. Apart from other universities and MEXT officials whose opinions the university may rarely consider, inputs from outside partners such as IT vendors and industry partners have never been targeted.

Even though the university financial resources and budget are decreasing in the last three years, the university is increasing the budget allocated to the IT function. The IT leader still thinks that IT budget is not sufficient to serve all IT-related business needs. The respondents have no clear opinion about whether IT project are planned properly with sufficient resources (budget, human resources, etc.) and if they implemented successfully within the allocated time frame. However, he believes these projects are not always linked to the university and IT priorities and objectives and they are not properly managed, evaluated, and followed up. When it comes to IT decision making, academic departments are eligible to take isolated decision, but with implementing information solutions, academic departments cannot implement them without referring to the centralized IT department. This separation cause duplications or overlaps between various initiatives and other forms of wasting resources. Despite that the IT leader strongly agrees that a clear mechanism to evaluate the return of IT investment does not exist, he believes that university stakeholders understand the degree to which IT achieves, or fails to achieve, its priorities.

With regards to aspects related to risk management, The respondent neither agree nor disagree with the following statements which are the university risk assessments highly consider IT related risk, the risk

tolerance levels against the risk appetite are clearly articulated, the risk communication plans are well defined and cover all stakeholders, there are appropriate mechanisms to respond quickly to changing risk and report immediately to appropriate levels of management, supported by agreed principles of escalation (what to report, when, where and how).

The IT function does not conduct regular discussions with all stakeholders to address all new challenges and needs. While the responsibility for sending out regular communications about IT has been assigned, IT management rarely communicate the management objectives and direction for IT to the university top management. Further, the results of IT initiatives are not regularly communicated to key stakeholders. The respondent neither agree not disagree about the existence of IT awareness programs for each group of stakeholders.

The enforcement of information security controls such as the cryptographic system to protect sensitive combined with staff compliance with information security protocols, norms, and regulations result in improve data security. The organization rarely faces data confidentiality incidents and data integrity incidents. On the other hand, other data management issues such as data availability incidents, IT incidents that were not identified in a risk assessment, Noncompliance with IT related policies, Noncompliance with laws and legislations are very frequent.

With regards to process maturity level of university policies, plans, and processes the Vice President for Information and Technology responded as follows: Non-existent (non-recognized as specific area of activity): Delegation of authority policy, Incident Recovery Plan, IT Audit Charter, Performance measurement policy, Rules for validating and approving mandatory reports, Third Party Vendor Policy, and User Lifecycle Management. Initial (recognized as specific area of activities yet, members are not aware of their existence): Reporting and communications principles, and Security Awareness Plan. Repeatable (recognized as specific area of activities and specific members will know them): Business Continuity Plan, Change Management, Disaster Recovery Plan, IT Strategy, Media Destruction, Retention & Backups, Risk Management, and Transparency policy. Defined (set of activities that are well understood by partners and processes are defined and documented): BYOD (Bring Your Own Device), and Remote Access. Managed (achieves its purpose, is well defined, and its performance is (quantitatively) measured): Acceptable Use

Policy, Access Matrix, Asset Control Policy, Back Up Plan, Budgeting and delivery execution policy, Information Security, IT Audit Procedures, IT Organizational Structure, IT Policy, IT Services, and Technology Standards. Optimized (achieves its purpose, is well defined, its performance is measured to improve performance and continuous improvement is pursued): Intellectual Property Rights, Internet and Email Usage Policy, License Management, Network Set up and Documentation, and Personal Information Security Policy.

The university considers data to be an important asset to improve decision making. Data is important. While the reports produced by academic and administrative departments are of equally good quality, the academic departments fail to provide reports in a very reasonable time. The data management practices are related to data definition and classification. The respondent holds a neutral opinion about the availability of comprehensive data inventory of information (systems and data) that includes a listing of owners, custodians and classifications including systems that are outsourced and those for which ownership should stay within the enterprise. The flow of information between different processes and personnel is not fully understood and articulated in corresponding policies and procedures. Although data is centralized, data is not readily available and easy to be collected and analyzed. Data are governed through proper policies and procedures, access controls, and pack-up procedures. The university occasionally encounters application errors.

At university A, the management of IT human resources is not up to the standard. The current number of IT human resources is insufficient to cover all university processes. Further, adequate analysis and evaluation of the future need of IT human resources has not been conducted. The university human resources are competent, and they always have clear roles and responsibilities and usually a clear reporting line. Yet they do not always have clear decision rights and specific targets and goals. The job description of each employees includes specific requirements in role and responsibility descriptions regarding adherence to management and IT policies and procedures, the code of ethics, and professional practices, however, it rarely includes accountability statements. The university is failing to provide specialized training and development programs for their employees. The university sometimes conduct proper performance monitoring and evaluation for IT Personnel and provide proper incentives to enhance performance. Employee's promotions are strongly linked to their evaluation results.

While university practices are always evaluated and monitored through self-evaluations, internal audit, audit by external third party, and also auditors assigned by MEXT, IT performance does not go through regular measurement and evaluation. reporting of IT.

4.5 Case study B

University B was established in 1949 as research and teaching oriented university. Currently the university consist of 3 faculties and two graduate schools. The number of students is slightly over 2800. The number of academic and administrative staff is 480. The estimated number of academic staff is between 200 and 300. 2018 and 2019 the QS World Universities Ranking placed the university among the top 801-1000 universities in the world (QS Top University, 2021).

The respondent to my structured interview by email is above 50 years old and he holds the title of the Vice President for Information and Technology (VP I&T) who is officially designated as the top IT leader at the university. The VP I&T reports directly to the university president and he is in the position for more than three years but no longer than 5 years. the respondent has a permanent seat in the university highest strategic committee and engaged in institutional planning, including non-IT planning. The facts presented in this section are all the observations and evaluations by the respondent about case study B.

The structure of IT function is centralized where there is a centralized IT department that is responsible for setting the university IT laws and regulations, and then monitor, evaluate, and direct the implementation of these laws and regulations. Academic departments cannot make decisions related to IT or implement information systems without involving the central IT department. The estimated number of technical staff reporting to the central IT department is less than ten and the estimated number of IT staff reporting to other divisions is also less than ten. The university Board does not have a technology subcommittee.

The university mission statement acknowledged IT as a cornerstone of success and IT capabilities and requirement are always considered in any strategical change. IT function has the full support, commitment, and buy-in from board and executive management. The university president also acknowledged the increasing role of IT to transform to Society 5.0 and highlights the need for improving IT and AI techniques to overcome national and global challenges especially in the time of pandemic that mandate the shift to

digital realm. The university IT strategies are aligned with the university overall strategies including academic strategies and goals. University IT priorities are influenced by the changes in the external environment, changes in the IT leadership, and new demands for IT services. In the past three years, the university budget is decreasing, however the university is increasing the budget allocated to the IT function. The allocated budget is sufficient to serve all IT-related business needs.

University B IT plan is important to build alliances with key decision-makers, enhance IT service levels, and fulfill an administrative mandate for planning. From the given list of IT Policies, plans, and procedures, no item has been identified as non-existent (non-recognized as specific area of activity), and only three items are initial (recognized as specific area of activities yet, members are not aware of their existence) which are Disaster Recovery Plan, Incident Recovery Plan, and Security Awareness Plan. Business Continuity Plan was the only item marked as repeatable which means that it recognized as specific area of activities and specific members know it. Asset Control Policy, Budgeting and delivery execution policy, Information Security, IT Organizational Structure, and IT Strategy are items that rated with a maturity level of 4 that means they achieve their purposes, are well defined, and their performance is (quantitatively) measured. Most items (15 items) have been recognized as optimized (achieves its purpose, is well defined, its performance is measured to improve performance and continuous improvement is pursued. The items marked s optimized are Acceptable Use Policy, Back Up Plan, Intellectual Property Rights, Internet and Email Usage Policy, IT Audit Charter, IT Audit Procedures, IT Services, License Management, Media Destruction, Retention & Backups, Network Set up and Documentation, Performance Measurement Policy, Personal Information Security Policy, Remote Access, and User Lifecycle Management. The second biggest group is the group of defined (set of activities that are well understood by partners and processes are defined and documented) items which consist of 11 items which are Access Matrix, BYOD (Bring Your Own Device), Change Management, Delegation of authority policy, IT Policy, Reporting and Communications principles, Risk Management, Rules for validating and approving mandatory reports, Technology Standards, Third Party Vendor Policy, and Transparency policy.

With regards to the implementation of IT Governance and management best practice frameworks, the university partially adopted some frameworks developed by ISO/IEC. The university implemented selected items from ISO/IEC 27001 (Information Security Management), ISO 9000 (Quality Management), and

ISO/IEC 27002:2005 Information technology - Security techniques - Code of practice for information security controls.

IT function conducts regular discussions with all stakeholders to address all new challenges and needs. While the IT function frequently seeks inputs from Vice President for academic affairs, Chief Administrative Officer, Chief Financial Officer, it is occasionally asks for inputs from governing board, university president, deans, faculty members, students, department or unit heads, IT vendors, industry partners, other universities. The IT function rarely seeks input from MEXT officials.

The responsibility for sending out regular communications about IT has been assigned. While the results of IT initiatives are regularly communicated to key stakeholders, IT management objectives and direction are not always communicated to the university top management. Communicating IT results helped university members to understand the degree to which IT achieves or fails to achieve its priorities.

The centralized nature of IT function allows the university to wisely utilize its resources without any duplications or overlaps between various initiatives or other forms of wasting resources. IT projects are always linked to the university and IT priorities and objectives, and it is properly planned with sufficient resources (budget, human resources, etc.). It is also completed successfully within the time frame and regularly evaluated and followed up. The university rarely encountered a project failure. Unfortunately, there is no clear mechanism to evaluate the return of IT investment.

The university experience frequent incidents related to noncompliance with laws and legislations including IT related policies. On the other hand, incidents related to data confidentiality, data integrity, data availability, application error, IT incidents that were not identified during IT risk assessment are rare.

Risk management practices at the university are not fully mature. The respondent holds neutral opinion about whether the university risk assessment highly consider IT related risk, risk tolerance levels against the risk appetite are clearly articulated, risk communication plans are well defined and cover all stakeholders, and adequacy of the mechanisms to respond to changing risk and report immediately to appropriate levels of management. IT Governance consider enterprise and IT service continuity when defining roles, including staff back-up and cross training requirements

University B has a comprehensive inventory of information (systems and data) that includes the listing of owners, custodians, and classifications. It also Includes systems that are outsourced and those for which ownership should stay within the university. The flow of information between different processes and personnel is not fully understood and articulated in corresponding policies and procedures. The respondents evaluate the quality of reports produced by administrative department as excellent and the quality of reports produced by academic departments as good. Also, the administrative departments reports' timeliness tends to be slightly better than the academic departments.

Data centralization is not quite clear, however other aspect of data governance such as data definition and classification, data policies and procedures, access controls, back-up, data availability, and utilization are performed consciously. Mechanisms implemented to secure information include security controls such as the cryptographic system. The university employees have a reputation of compliance with information security protocols, norms, and regulations.

The IT human resources are skillful, and their roles and responsibilities are explicitly articulated in their job description. The job description of each employee does not include specific requirements in role and responsibility descriptions regarding adherence to management and IT policies and procedures, the code of ethics, professional practices, and accountability statement. They are also assigned to clear targets and goals which they will be evaluated based on the achievements of these specified goals and targets however, the linkage between employees' promotions and their evaluation results is questionable. Further the reporting line is clearly drawn. On the other hand, university needs to improve practices related to the staff development programs and incentives programs to elevate staff performance. Added to this, cross-training programs are needed to train businesspeople about IT and/or training IT people about business.

IT evaluation and monitoring are important to the university, and it is performed in different levels. The quality of evaluation and monitoring needs to be reviewed. IT functions are undergoing self-evaluations, internal Audits, and audits by external third party. MEXT Auditors role in evaluating IT function performance is not clear. Although IT performance is an important activity, it is not closely linked to the IT budget allocation process.

4.6 Analysis and Findings

Appendix F includes a table that shows the 147 measures that were set to understand the general characteristics of the IT Governance at NUCs, and it also shows the governance area affected by this measure which is marked by "χ" symbol.

In both case studies, IT has been recognized as a success factor. However it has been only partially utilized to help each university to achieve its strategic goals. Unfortunately, there is a lack of understanding about the value that IT can add to the university. Specifically, IT still perceived as a utility tool not as strategic tool. Its role is limited to automating certain business processes without revealing its full potential in enhancing university performance and competitiveness.

The level of business/IT alignment is relatively low. In terms of the maturity level of processes related to this area, the average for each university is exactly the same which is equal to 3.6. The inclusion of top IT leader in the university highest strategic committee surely contributes to partially align IT direction with the university direction but since his role and contribution as well as IT role and contribution in enhancing academic, administrative, and governance performance is not fully understood by business leaders, his influence is not very strong. The personal traits of the IT leader are important to empower IT function. Technical expertise is not enough for IT leaders. It must be coupled with intensive knowledge about the university business processes as well as strong communication, persuasion, and negotiation skills.

The IT function is getting the full support from the university top management which can be noticed in the universities budget allocation practice since they allocate more money for IT function. Another evidence is the direction towards the appointment of IT leaders at the vice president level and granting them a seat in the highest strategic committee.

University stakeholders are wide, it includes students, alumni, parents of students and alumni, shareholders, staff, faculty, and external supporters and partners. Stakeholders' engagement is a very important aspect of IT Governance since it will help in better fulfill their needs, get their feedback about the current IT solutions, identify their future needs, and enhance their awareness about IT function including risk associated with IT. I ask universities about their engagement with 15 different groups of stakeholders. The results shows that

their communication with stakeholders is weak. I calculated the average of their engagement with their stakeholders on a scale of 4. For university A the average was 0.73 while the average for university B is better and its equal to approximately 1.9. As for the maturity of the policies that directly guide the stakeholders engagement namely Security Awareness Plan, Reporting and communications principles, and Transparency policy, the level of maturity for university A is 2, 1, and 1 consecutively, and for university B is 1,3, and 3. While both universities stated that the responsibility for sending out regular communications about IT has been assigned, the frequency and the amount of information delivered is not sufficient to effectively engage all groups of stakeholders.

When it comes to the availability of plans and strategies to guide risk management, the level of maturity level is higher than the maturity level of other IT Governance practices. The maturity level of university A is equal to 2.8/5 and for university B is equal to 3.5/5. The areas of risk management that are receiving a little attention are risk assessment and business continuity. The answers related to the risk assessment such as defining risk appetite level and risk tolerance were somewhere in-between, no clear answers were received about these specific areas. The very frequent incidents of non-compliance issues are maybe accredited to the low level of stakeholders' awareness about the risk associated with their use of IT.

The maturity level of data governance policies and plans related to data governance compared to the maturity level of risk management practices is slightly lower for university A and is equal to 2.6. On the other hand, University B is better with an average equal to 4.1 out 5. As these policies and plans guide the university IT management practices, the universities implementation of measures to improve data management practices such as data warehouse, and data encryption techniques is effective in protecting information assets from cyber-attacks. It has been noticed that universities put great emphasis on protecting its intellectual property out of the knowledge of its importance to them as knowledge organizations and also because of the damage that the leakage of personal information can have on the university image and reputation.

With regards to business continuity, both universities show weak maturity levels. The level of awareness about matters related to business continuity, disaster recovery, and incident recovery is either does not exist or only limited to specific members.

An adequate monitoring and evaluation function will cover all aspects of IT functions namely value delivery of IT investment, IT risks, data management, IT human resources, IT structure, stakeholders' engagement, culture, and business IT alignment. Th big challenge for evaluation some IT functions is emanating from the nature of IT function as a qualitative function and sometimes it hard to quantify its value. Many frameworks have emerged to help in solving this issue, yet organization adoption to these frameworks is not happening. The maturity level of the monitoring and evaluation processes is very low in university A and its equal to 1/5. The situation is way better in University B and it is equal to 4.2/5. University B is having a serious issue with monitoring processes and serious efforts should be taking to implement monitoring aspects in all areas.

IT Governance and management framework setting refers to establishing an explicit structure to guide IT function. This includes the adopted framework to guide this operation and also the institution organizational structure. The universities adoption to comprehensive IT Governance frameworks does not exist in both case studies. University B does implement selected component of generally accepted framework designed to govern and manage IT Risks. The implemented IT organizational structure is better defined I university B, yet it is not a comprehensive structure that can help the university to receive the ultimate value of IT investments. The principle of IT value creation relies on three pillars which are resource optimization, risk optimization, and benefits maximization.

Human resources management is a very important focus area of IT Governance. Universities must strive for implementing comprehensive measures to ensure ongoing progress of their staff to fulfill the changing and challenges that arise from the external and internal environment and guarantee business continuity. These measures include staff development courses, cross-training, incentives, awareness programs, and performance measurement and evaluation. The average of the implemented human resources management measures at university A is somewhere in between and it is equal to 2.7/5. The case of university B is better, and the average is approximately equal to 3.6.

The success of IT investment is related to how sufficient they are in meeting the current and future needs of university stakeholders. These projects must be planned properly with adequate resources including human resources. Further regular evaluation and monitoring should be put in place to assess whether the available IT resources meet the strategic needs of the universities and enhance its competitiveness in the global

marketplace. The data collected about the two case studies shows that their current IT investments are managed adequately, yet universities should think more strategically about the future needs by implementing more comprehensive stakeholders' engagement plan to meet all their needs. Furthermore, the lack of available function to evaluate the return of IT function is really concerning since it raises a question about whether the current investment meet stakeholders needs and expectations.

Building a university culture that have a positive attitude towards the use of IT starting with having a strong buy-in and support from the university top management who shape the university culture. Other aspects that form the university internal culture is connected to enhancing the stakeholders' awareness about the capabilities and risks associated with the use of IT.

To sum up, the university B performance in almost all aspects of IT Governance practices is better than university A. This is maybe accredited to the IT leader of university B who is having more years of experience in the position as opposed to the university A IT leader. Another reason may be related to the university size. University A is a large-scale university and have three campuses while university B is relatively small-scale university that has a single campus. In both case studies, there is a lack of comprehensive understanding about IT Governance practices. All NUCs pays special attention towards personal data privacy and security. NUCs should enhance their awareness about the risk management programs and they should enhance their risk assessment planning. The IT function is still at the management level, no real governance that consider strategic direction of the university and the interconnection between IT Governance components have been neglected for example the impact of stakeholders' awareness on their engagement.

4.7 Conclusion and recommendations

IT is gaining increasing strategic power at universities, especially after the spread of corona virus, which highlights the need for IT Governance to effectively manage the IT function. IT Governance is a very challenging endeavor that requires a comprehensive framework to be effectively implemented. Implementing a comprehensive framework is also another overwhelming problem in the higher education realm. The traditional decentralized structure of university which hands great power to the academic departments and allows them to solely manage their operations is still not overridden. There is a direction

towards a centralized governance of IT function, and this was increased after the spread of corona virus. Though it was a big challenge, yet it helped universities in realizing the need for advanced IT infrastructure and systems. The spread of the virus which mandated the complete shift to online platform accelerated the speed to acquire IT solutions to deliver knowledge to the students. The role of IT leader has been clarified and almost all universities appointed an IT leader at vice president level. Further, several universities appointed a technology advisor to the president. Because of the unique nature of university practices, a comprehensive understanding about university academic and administrative business practices is needed. The majority of NUCs assign the role of IT leader to one of their professors who is a member of a technical college. These professors tend to have great knowledge about theoretical aspects of IT and how to develop technical solutions and algorithms. However, their management and governance knowledge is limited. Further, they tend to undervalue the best-practices frameworks specially designed to govern the IT function. Appointing a professional practitioner of IT Governance may not be the solution since they may lack the intensive knowledge about not only university business practices but also the university internal politics and culture. A major realignment is needed to apply IT Governance frameworks such as COBIT to higher education institutions to fit their special nature as nonprofit organization that serves a wide range of stakeholders.

Our thorough literature review about university IT Governance in general and NUCs in particular clearly shows that there is a need for improving the performance of IT Governance at NUCs. The case studies conducted proved that further. There was clear evidence that NUCs tend to think about IT projects as secondary, nice to have tools, until the pandemic challenged their abilities to continue their business under this unprecedented crisis. Prior to this crisis, universities neglected the challenge arising from the new entrants to higher education who offered online programs. These universities are gaining more popularity especially among the low-income students who are looking for cheaper options. Moreover, traditional universities neglected the power of IT to enhance their global compatibility and competitiveness.

The COBIT framework is a useful tool to help IT leaders in comprehending a holistic view of IT function and help them in supporting the university to achieve its strategic goals. The IT function supposed to support the university strategic direction and not limit its focus on providing operational technical support to university stakeholders (Bhattacharjya & Chang, 2009). The separation between IT Governance operations

and IT management practices is essential to achieve the ultimate return on the current and future IT investments. While the IT Governance body is responsible for directing, monitoring, and evaluation the five main aspects of it function which are governance framework setting and maintenance, benefit delivery, risk optimization, resource optimization, and stakeholder engagement, IT management is responsible for planning, implementing, running, and evaluating it projects that are set by the IT Governance body.

Since every institution's strategic goals and direction as well as its characteristics and environment are different, the structure of IT Governance framework is also unique for every institution. To design the best-fit IT Governance structure for a university the list of design factors which should be considered includes compliance requirements, university strategy and goals, risk profile and threat landscape, university size, and the expected role of IT.

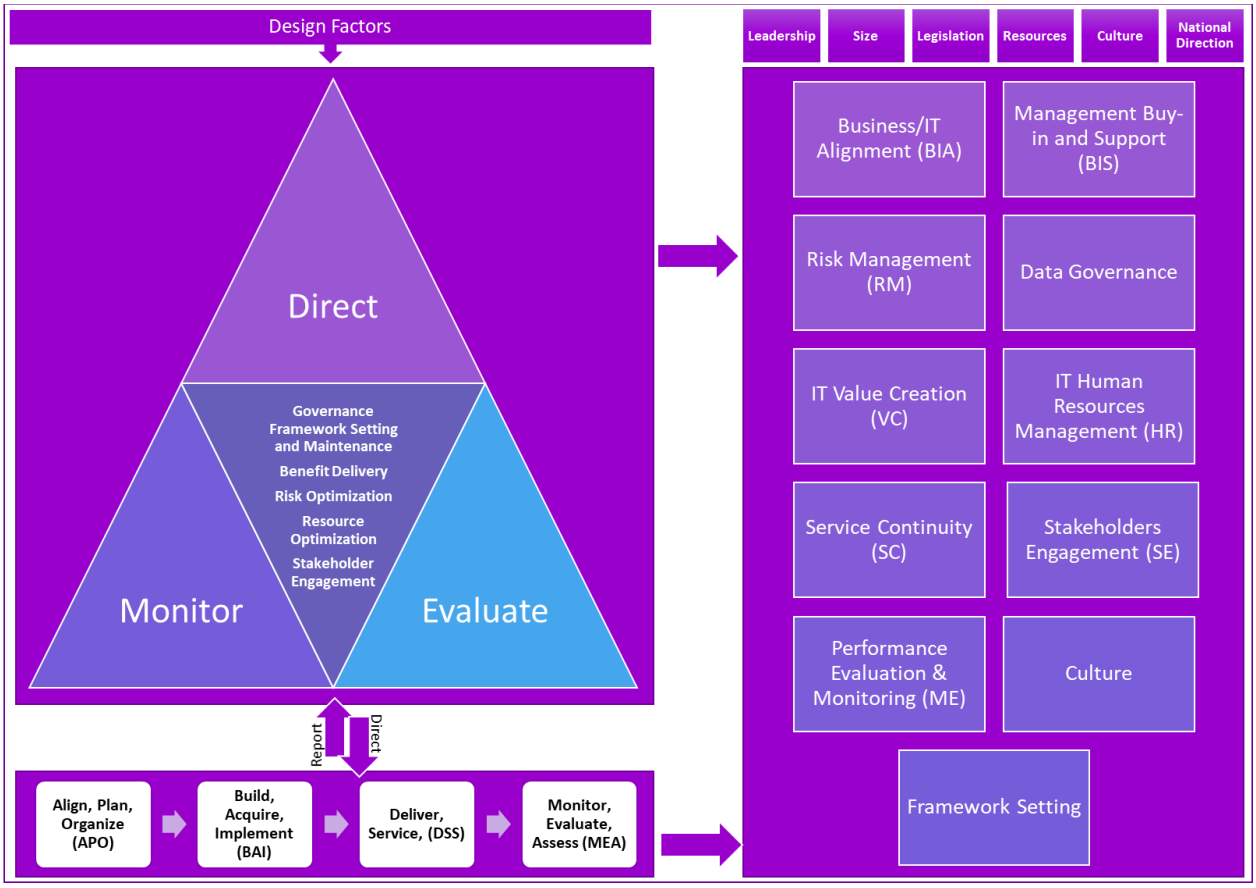

Figure 4.1: Key Elements of IT Governance and Management at NUCs

Figure 4.1 shows the key elements of IT Governance and Management that must be considered by NUCs based on COBIT principles. At the top of the framework are the design factors that shape the IT Governance and management structure and direction. The identified design factor for NUCs are university size, university and IT leadership, resources, culture, laws and legislations, and country direction.

The size of NUCs plays a vital role in defining its IT Governance structure. Big universities with huge resources are privileged to receive more financial resources and yet implement more advanced technology. On the other hand, governing these resources is extremely challenging. Smaller universities with competent IT leader may be able to manage IT function more effectively.

Japanese universities expected role locally and globally has been discussed and clarified at the highest country level, the cabinet. MEXT then formulate strategies, plans, and projects in accordance with the cabinet directions. One of the largest plans is the Science, Technology, and Innovation Basic Plan. The latest Basic Plan, the 6th Basic Plan, focuses on digitalization and connecting all country institutions (public and private) through advanced technical networks and systems. This concept increased the risks of IT and required effective IT risk management programs. NUCs practices in this regard needs to be improved.

Another national direction is increasing Japanese universities' competitiveness in the global market, an initiative in which universities' IT capabilities play a vital role in achieving its goals. Several competitive funds and projects have been implemented by MEXT to enhance universities status and attractiveness internationally. Due to MEXT unequal support to universities, large-scale and former imperial universities usually have more resources hence, they are more successful in attracting these funds.

CHAPTER 5: GOVERNANCE OF ALUMNI ENGAGEMENT PROGRAMS AT JAPANESE NATIONAL UNIVERSITIES (NUCS): CASE STUDIES

Japanese universities are undergoing unprecedented challenges springing from the decrease in the 18-year-old population, decreasing grants and subsidies while expenses are increasing constantly. Japanese universities are implementing different strategies to build stronger ties with their student with the aim to forge a lifelong relation with them. These strategies include providing financial support, employment support, and academic support through monitoring, advising, and counseling. Certain strategies are targeting graduates such as sending universities information using different means like magazines, brochures, and emails; convenience of use of university facilities; invitation of homecoming days; support for alumni associations, and lifelong learning programs. In returns, universities are expecting their alumni to provide feedback on educational results, participate in university events, spread information about the university, mediate in industry-academia-government collaboration, and help universities in fundraising and receiving research grants (Okawa, Shimada, Yamashita, & Junro, 2015).

University size, characteristics, and location defines its alumni engagement strategies which will affect the governance of these programs including IT Governance design and processes. It has been found that large-scale universities are paying more attention and efforts toward these programs. Further, Japanese National Universities (NUC) are adopting more effective alumni engagement programs compared to private and public university (Okawa, Shimada, Yamashita, & Junro, 2015).

Alumni services programs rely heavily on information technology resources to connect and communicate with their alumni; exchange and publish information; collect, store, and analyze information; and automating certain activities, for instance money donations. The governance and the quality of technologies used may positively or negatively affect alumni programs performance. In addition, it may pose new challenges especially service continuity and data management issues that include but not limited to information security, privacy, and ownership.

Despite the international elevated attention towards the benefits of alumni services programs, the research in this field at Japanese universities is scarce, the only available study in this field was conducted by Okawa et al., (2015) where the survey data were collected in March 2013. After eight years, I would like to conduct a follow up study to pay my debt to these forerunner researchers, who took the initiative to survey alumni services status at Japanese universities. Considering the escalated environmental crises exhibited in the wide spread of the novel corona virus and forcing universities to shift their entire activities to online platform, new elements that investigate the impact of IT Governance on the effectiveness of "Alumni Services" has been included.

This chapter will discuss the case studies in governance of alumni engagement programs at NUCs. Detailed literature review about alumni engagement governance was presented in chapter 5. In this chapter I will discuss the research methodology and then my research instrument. Also, I will present my case studies in detail followed by my analysis and findings.

5.1 Research Methodology

This section of my research aims to address the second and third objectives of my research which are "identify and analyze the existing component of IT Governance in NUCs", and "identify the challenges facing CIOs in NUCs in implementing IT Governance system". The scope of this section is the IT Governance of alumni engagement programs at NUCs. I chose this function due to its complexity emanating from the decentralized structure of alumni services, the perceived value of alumni engagement, increasing demand by alumni for IT services, IT security concerns especially data privacy and data ownership, university stakeholders buy-in and support, collaboration between university units and departments including academic departments.

This section of the research aims to answers things related to the current structure of alumni associations at NUCs, objectives of implementing this function, function feasibility, implemented IT Governance processes of alumni engagement. Given the novelty of this research, I developed my own survey instrument to collect my primary data. The following section (section 5.2) discuss the research instrument in detail. Structured interview by email were conducted with the leader of alumni associations at NUCS. I surf alumni associations websites of all 86 NUCs to identify these associations leaders and then I looked for their contact

information. I asked all of them to participate in my study and I received responses from three NUCs alumni associations and the following sections shows my findings. My communications were in Japanese language, and I shared with them the survey questions via google form.

5.2 Research Instrument

The research instrument incorporated almost entire Okawa et al., (2015) study aspects which were limited to inquiring about goals and objectives of "Alumni Services", the purpose of implementing "Alumni Services", the strategies adopted to enhance "alumni services" programs, the channels utilized to disseminate information to alumni, and the issues or problems affect an effective of "Alumni Services".

The other domain of "Alumni Services" governance is the IT Governance aspect which I cover by including questions derived from the COBIT framework principles. These areas are alumni services tools, organizational structure, and information security. I also incorporate measures to evaluate the effectiveness of alumni engagement programs such as the rate of alumni engagement. The last section of the questionnaire aims to collect participate contact information and offer a space to further express their opinion about the governance of "Alumni Services" including IT Governance aspects. The English version of the questionnaire can be found in appendix I while the Japanese version is presented in appendix J.

5.3 Case Study C

University C is a comprehensive national university that strives to be a Student-Centered University that produces innovative human resources capable of inventing scientific and advanced technical solutions to solving the local and global issues. The university mission relies on three main pillars which are regional innovation, future creation, and multicultural collaboration. THE Times Higher Education World University Rankings evaluated the university as a top 801-1000 university in the world for the years of 2018 and 2019. Unfortunately, the university ranking declined in following two years and lost its spot in the list of top 1000 universities.

The university has 6 faculties and 7 graduate schools offering 68 undergraduate programs and 30 graduate programs. The number of enrolled students is around 8600 students, 3% of whom are international students. The university graduated about 93,085 students since its foundation as a comprehensive public institution in 1949.

At university C, there is a centralized "Alumni Services" federation that governs and manages all independent "Alumni Services" associations where the university president is appointed as an honorary president of the "Alumni Services" federation. The federation established in 1999 with the aim to support university development by fostering a sense of collaboration among university alumni, students, staff, faculty, and former staff.

A Vice President of a branch alumni Association responded to my self-administered questionnaire. The age of the respondent is between 41 and 50 years old. The respondent report to the dean of the college which alumni association branch belongs to. The respondents strongly believes that there is a need for implementing "Alumni Services". Further he agrees that the implementation of "alumni services" is of great importance. The following paragraphs discuss the respondent answers.

The association aims to support the university to achieve its medium-term goal related to “Effective activation of exchanges between alumni”. To do as such, the association utmost sought-for goals are first is to maintain the relationship with the alumni, second is to form university network, and third is to increase alumni interest in their alma mater. Other desired goals are to respond to the needs of graduates and to improve the social reputation of the university. As can be observed, the association goals are narrow and focus solely in linking alumni with the university. The respondent thinks that the university has succeeded in fully achieving the stated goals of "Alumni Services" programs.

It can be obviously noticed that strategic goals of the relation are totally neglected by the association. It did not even consider fostering the relation to increase university financial resources or using alumni professional expertise to mentor university current students.

The respondent holds no opinion about whether "Alumni Services" has been strategically developed, implemented, monitored, and updated regularly to address any change in the internal and external environment. The impact of this short-sighted goals noticed in alumni low participation rates. The percentage of “Inactive” alumni, who held no connection or contribution of any type is 75%. The percentage of “Volunteer” alumni, who donate their time and effort to support the university and do not provide any kind of financial support is 5%. The percentage of “Supporter” alumni, who provide their full support by sacrificing their time, effort, and money is 5%. The percentage of “Donor” alumni, who provide only

financial support to the university is the highest reaching 25%. Since fundraising activities are conducted by another organ of the university, connections forged with alumni donors are not entirely accredited to the effectiveness of alumni association policy. Alumni financial support is flat in the in the past three year.

Alumni services function does not put great importance on the alumni student's life experience on the level of their engagement with the university after graduation. The only factor that has been studied to elevate "Alumni Services" programs is alumni professional and personal connections.

The level of integration and collaboration between student affairs, academic affairs, and alumni services towards shared goals to enhance organizational image and students experience is not clear to the respondent. The respondent disagrees with the statement "the impact of the technologies used on student satisfaction has been evaluated". He had no clear opinion about whether the emotional attachment between university academic and administration staff, and alumni during their studies has been identified as a key success factor for the "Alumni Services" program.

The university implemented a website as an alumni portal that aims to provide alumni with information about the university and its events. Other channels utilized to disseminate information to alumni are university publications such as newsletters, magazines, and brochures. As for career and employment support, the university provide employment support for fresh graduates (early career counselling, recruitment, and job-hunting), employment guidance facility, and career advancement support for medical workers. Social activities and events, homecoming days, alumni database, and student-faculty interrelation are the strategies implemented for alumni services programs which the respondent thinks that they fulfill the alumni needs and expectations.

The identified problems that hinder building a lifelong relation with alumni are related to the human resources management and the challenging nature of the personal traits of alumni. The issues are increasing burden on university staff, lack of clerical and administrative staff, few participants in planning, increased burden on indifferent faculty members, volatile nature of alumni/university relation, alumni buy-in and support.

The information and security concerns are related to access rights, ethical use of alumni data, security awareness, and data ownership. The only measure considered by university to face these issues is enhancing the governance of human resources through proper organizational structure that explicitly specifies roles and responsibilities.

The respondent thinks that the implemented technologies have fairly help the university in improving the "Alumni Services" programs. He evaluated the quality of alumni data and quality of alumni reports as good. He agrees that data mining techniques has been utilized to enrich "Alumni Services" programs. Although the respondent disagrees with the statement “the impact of the technologies used on alumni satisfaction has been evaluated”, he neither agree nor disagree with the statements “the available IT structure and solutions are effective in handling the shift from in-person "Alumni Services" to online platforms”, and “IT capabilities and requirement are always considered in any strategical change related to "Alumni Services"”. It can be said with confidence that the respondents do not thinks that technology is an important success factor to alumni services programs.

In 2015, the alumni association conducted a survey targeting university graduates. The questionnaire aims to investigate alumni ability to support university current student’s future career, investigate the perception of alumni about their student life at the university, and evaluate the perception of alumni about alumni association. 224 graduates responded, out of which 63% are above 60 years old, and only 3% are in their 30s. More than 53% of the respondents belong to the industry alumni association.

Graduates were asked about the possibility of providing employment support to the university students. 47% were willing to provide career advice, and 74% were welling to engage in employment support programs developed by the university to support their students. On organization level, only 27% of graduates can participate in linking university with their company to recruit students.

With regards to students’ life, the majority of students were thrilled about their relationship with other fellow students (68%) followed by the quality of education provided by the university (66%). Other impact factors with almost equal importance (42%) were the characteristics of the university regional environment such as food and climate, and university extra curriculum activities. Furthermore, the possibility part time job was appreciated by 17% of the respondents. The life in the student dormitory was also important (24%).

Furthermore, alumni valued the faculty engagement with students and the university social responsibility and support to the community and the environment. On the other hand, respondents identified English language skills and innovation techniques as areas of improvements.

As for the questions related to the alumni association, the questionnaire tackle two areas only. The first was about respondence alumni association membership status. Sadly, 65% of them were not member of any university alumni association. The second was about the distribution of e-mail newsletter and alumni association e-magazine where 64% of them reports that they have never receive at all.

The current structure of alumni association and their activities have been questioned by a number of respondents. Several respondents stated that the current structure of alumni associations is ambiguous and hard to understand. Further the role of centralized alumni association is unclear. They called for one single centralized association instead of the existed scattered alumni association where alumni apply for a single membership to it. Other respondents emphasized on the need for regular communications about university activities as well as information about alumni association and their role and activities. Added to this, some have asked about increasing the university visibility by actively disseminating university information to local and global community. It was interesting that some alumni asked the university to take more serious initiatives to improve its global ranking.

5.4 Case Study D

University D was established as a national university in 1874. The university declared that they are "committed to the spirit of solving actual, real-world problems by putting theory into practice, encouraging new endeavors, widely opening its doors to society, and fostering exchange with other nations". The university president stated that the university is "aiming to be a world-class research university centered on knowledge integration".

The university has 5 faculty and 6 graduate schools. The number of partner institutions is 140. The main the main financial resource for the university to cover its administrative expenses is the governmental subsidies. The Number of enrolled students is around 10000 students. As of 2018, the percentage of national students was 10%, out of which 85% are Asian students. Chinese students constitute %56 of the total Asian students.

in 2018 and 2020, QS World Universities Ranking placed the university among the top 751-800 university in the world. As for 2019, the university ranked among the top 701-750. The university ranking declined in 2020 to the position of the top 801-1000 top universities in the world. The university performance was not competent enough for THE Times Higher Education World University Rankings. The university appears in the ranking 2020, yet with not great ranking (1000+).

The centralized "Alumni Services" federation established in 2016 and reports directly to the General Affairs Planning Department. The university president has not been appointed as an honorary president to the federation. The university medium-term goals and plans includes aspects related to strengthen the ties with alumni. The goals stated the following “in close cooperation with alumni federation and alumni associations, strengthen information provision that is conscious of stakeholders such as graduates”.

The respondent agrees about the need for implementation "Alumni Services". He thinks that the university put great importance on the implementation of "alumni services". The Main purposes of implementing "alumni services" are directed towards strengthen alumni connection with the university, fundraising, improving university image and status, and fulfilling the university social responsibility. The selected goals for alumni services by the respondent are increasing alumni interest in their alma mater, maintaining the relationship with alumni, formation of university network, responding to the needs of graduates, uplifting the love of the university, improving the social reputation of the university, securing and increasing university applicants, part of social contribution and community outreach activities, revitalization of the area where the university is located, enhancing university management, improving the social status of graduates, connecting with researchers and educators, and improving university internationalization status (recruitment of international students, exchanges with overseas universities, and dispatch of Japanese students to study abroad). Unfortunately, the university has not fully achieved the intended goals of "Alumni Services" programs.

Alumni financial support to the university have been considered as a factor to indicate the success of alumni engagement programs. The alumni donations increased in the past year which can be translated as an improvement in alumni engagement. This interpretation is not accurate because data shows that alumni engagement rate is still low. The percentage of “Inactive” alumni is about 75% and less than 5% of alumni

are “Supporter”. The percentage of alumni “Donor” is also less 5% only and the case is not different for the percentage of “Volunteer” alumni.

The respondent thinks that the emotional attachment between university academic and administration staff, and alumni during their studies has been identified as a key success factor for the ""Alumni Services"" program as well as the impact of the technologies used on student satisfaction. The respondent did not give clear opinion about the level of integration between student affairs, academic affairs, and alumni services to enhance organizational image and students experience.

The respondent agrees that the statement that "Alumni Services" programs are strategically developed, implemented, monitored, and updated regularly to address any change in the internal and external environment, yet he holds no opinion about whether the implemented strategies including technologies fulfill the alumni needs and expectations.

The adopted strategies to enhance "alumni services" programs are dissemination of university information, conducting social activities and events, building alumni networks, hosting homecoming days, creating alumni database, strengthen student-faculty interrelation, establishing and supporting overseas alumni associations, and providing post-graduation employment and career support. Employment support services includes employment support for fresh graduates (Early career counselling, recruitment, and job-hunting), employment support for undecided alumni, employment guidance room, teachers training seminars and workshops, ongoing professional support, consultation, and opportunities.

Further, the university developed a website that serves as alumni portal. The main functionality of alumni portal is to providing alumni with information about the university and university events. Other channels utilized to disseminate information to alumni includes university websites, university publications (newsletters, magazines, brochures, etc.), and emails.

The respondent identified several issues affecting an effective of "Alumni Services" which are alumni information management, increasing burden on university staff, locating and connecting with alumni, lack of clerical and administrative staff, implementation and operating expenses, correspondence with alumni association organization, lack of university-wide unity (university-wide awareness), increased burden on

indifferent faculty members of graduates, university location conditions, formulation and implementation of Alumni Services" programs, alumni buy-in and support, short-sighted vision and strategies, the focused mainly on university gains. The mix of the identified issues is a clear indicator about the absence of a governance system for alumni services programs.

The university put great emphasis on data management which represented itself by the recruitment of Chief Information Officer (CIO), Chief Information Security Officer (CISO), and Data Specialist. Since security awareness and compliance with internal and external laws and legislations are major alumni data security concerns, the expertise of CIO and CISO were needed in "Alumni Services" committees. Chief Financial Officer also have a seat in this committee. The focus on data management improved alumni data quality and hence reports quality. The respondent think that alumni data and reports quality is reasonable. Data mining techniques has also utilized to improve alumni engagement programs.

The university tries to implement a system to mitigate the risk associated with the use of IT and to improve the security landscape. The governance system includes effective strategies, and guiding policies and procedures, information security awareness programs, advanced security technologies, ongoing monitoring and evaluation, and data management.

The novel corona virus pandemic affects the institution ability to conduct "Alumni Services" programs heavily, but luckily the available IT structure and solutions were effective in handling the shift from in-person "Alumni Services" to online platforms. The available technologies somehow help the university in improving the "Alumni Services" programs, however, here this a big question about whether alumni engagement programs consider IT capabilities and requirement in any strategical change.

5.5 Case Study E

University E has 10 faculties and 7 graduate schools. The number of enrolled students is 9000 students. The philosophy of the university is to “contributes to the improvement of a well-balanced society by transmitting its inheritance of the traditional culture rooted in the area, cultivating a fertile creative sense in students, and developing innovative science for world peace”. The main financial resource for the university to cover its administrative expenses is governmental subsidies. According to the QS World Universities Ranking, the

university positioned among the top 531-540 universities in the world. THE Times Higher Education World University Rankings include the university in the list of top 801-1000 in 2018 and 2019. Unfortunately, the university could not hold its position in the list of top 1000 in the last two years.

The federation of alumni association was established in 2018 under Fund Office in Public Relations Strategy Headquarters. The university president is the honorary president of the federation. The respondent to my questionnaire is the Chief examiner who reports directly to the president of the university. His age is between 21 and 40 years old.

The respondent thinks that the alumni engagement programs are needed, and the university is treating them with consciousness. Alumni professional and personal connections have been studied to elevate alumni engagement. The purposes of implementing "alumni services" are to increase alumni interest in their alma mater, maintaining the relationship with the alumni, formation of university network, fundraising, helping students and alumni in recruitment and job-hunting, responding to the needs of graduates, uplifting the love of the university. Sadly, the respondent does not think that the university could achieve these goals. The respondent strongly thinks that there is no collaboration and shared direction between student affairs, academic affairs, and alumni services to enhance organizational image and students experience.

More than 95% of alumni are “Inactive” alumni, less than %5 are “Supporter” alumni. The percentage of “Donor” alumni is also less than 5% and their donations are stable in the past three years. The percentage of “Volunteer” alumni, who donate their time and effort only to support their university is also less than 5%.

The respondent thinks "alumni services" Alumni Services" has not strategically developed, implemented, monitored, and updated regularly to address any change in the internal and external environment, hence they do not fulfill the alumni needs and expectations. Alumni engagement programs relies on the following tools, dissemination of university Information, social activities and events, alumni portals, alumni networks, homecoming days, alumni database, alumni Feedback surveys, providing an online access to the digital library and periodicals, employment support for fresh graduates (Early career counselling, recruitment, and job-hunting), and employment guidance room.

A Website has been developed to be the main reference for alumni to engage with their alma matter. The website aims to provide alumni with information about the university and university events. The university employ a wide range of channels to communicate with their alumni including social media accounts.

The main issues affecting the outcomes of "Alumni Services" programs are related to the strategy setting, resources, communication and collaboration, and data security and privacy. This includes alumni information management and security, increasing burden on university staff, locating and connecting with alumni, lack of clerical and administrative staff, implementation and operating expenses, correspondence with alumni association organization, few participants in planning, lack of university-wide unity (university-wide awareness), installation of on-campus consent, increased burden on indifferent faculty members of graduates, alumni buy-in and support, short-sighted vision and strategies

The corona virus pandemic affects the institution ability to conduct "Alumni Services" programs. The available IT structure and solutions were effective in handling the shift from in-person "Alumni Services" to online platforms."

The respondent believes that the university planning and utilization of IT resources is under expectation and the impact of the technologies used on alumni satisfaction has not been evaluated. He thinks that the university planning and utilization of IT resources is under expectation. He thinks that IT capabilities and requirement are not considered in any strategical change related to "Alumni Services". Furthermore, the quality of alumni data and alumni reports is poor and data mining techniques have not been utilized to analyze alumni data. The major alumni data security concerns are security awareness and compliance with internal and external laws and legislations. A list of strategies has been implemented to improve security landscape which is effective strategies, and guiding policies and procedures, information security awareness programs, advanced security technologies, organizational structure with clear roles and responsibilities, ongoing monitoring, and evaluation, adopting security management best-practices standards such as ISO27001. Although the university hired Chief Information Officer and Chief Information Security Officer (CISO), they do not play a direct role in alumni data governance and management.

5.6 Analysis and Findings

Universities strive to establish strong relation with their alma mater to achieve certain strategic goals. Most likely NUCs will incorporate these goals in their medium-term goals and plans which orchestrate entire university organs. Communicating these goals clearly to the designated departments responsible for delivering these services to alumni will surely enhance employee's awareness about the rationale of implementing certain tools which in turn will improve their collaboration and engagement. These department should be directed to shape their goals and objectives in accordance with the university wide goals. It must be noted that the university strategic direction is affected by the internal and external environment hence "Alumni Services" will also be affected by them. "Alumni Services" must be monitored and updated regularly to address any change in the university strategic direction.

Universities aim to achieve multiple strategic goals by implementing alumni services programs that may include but not limited to improve research activities, enhance teaching and learning, support current students and graduates, improve university management, globalization, improve university image and status, increase university applicants, support university social responsibly initiative and community outreach, fundraising, and supporting students and graduates' career. For instance, universities may improve research activities through using alumni connections to connect university with institutions or individuals willing to support university research activities by different means such as giving financial support and lending their facilities to the university to conduct research. Alumni themselves may also support research activities by either doing research on the university behalf or providing financial support to research activities.

In order to achieve the desired goals of alumni service programs, different measures should be studied and considered which are structure, alumni services provided by universities, struggles faced in implementing alumni services programs, IT alignment and considerations, and monitoring and evaluating alumni services performance. The following sections discussed these matters.

5.6.1 Alumni Services Structure

Conventional structure of alumni services is extremely decentralized form of structure where different functions are controlled and managed by different isolated departments. The collaboration and communication between these department usually do not exist and in best case scenario is weak.

At NUCs, departments who have direct interaction and communication with alumni are alumni associations, career advising centers, and graduation services department. Alumni associations are usually managed by different faculty. These association varies in their resources and capabilities. Currently there is a trend towards establishing a centralized alumni associations federation to enhance the efficiency and performance of these association through establishing a mean for collaboration and communication among these decentralized associations. The president of alumni associations federation reports directly to the university president which in most cases also signed as an is the honorary president of the "Alumni Services" federation. As graduation services department, it is usually placed under student affairs jurisdiction and handle matters related to issuing graduation certificates. Career services department deals with students' career, internship, and also graduated student career support and consultations.

5.6.2 Alumni Services

Alumni services programs utilize university financial, physical, human, and technological resources to deliver services and benefits to the university alumni. The aim is to forge a lifelong reciprocal relation between alumni and their alma mater. These services and benefits include social activities and events such as homecoming days and trips; technologies for communicating and connecting alumni with their friends and university staff; employment and career support services and consultations; products, services discounts; lifelong learning; health promotion support; digital library and periodicals online access; access to the university facilities such as fitness center; counselling services for alumni family, relatives, and partners; and consultation services (legal, financial, and academic). Channels utilized to disseminate information to alumni about alumni services includes university websites; university publications newsletters, magazines, brochures; emails; social media accounts; alumni portals, social activities, and events.

NUCs established career centers to support their students as well as their graduates. Employment support provided to graduates varies depending on university type, goals, and study programs. Examples of provided support to graduates include early career counselling, recruitment, and job-hunting; career advancement support for medical workers, teachers training seminars and workshops.

5.6.3 Alumni Services Struggles

Universities may face several financial, political, technical, strategical, and human resources struggles in implementing effective alumni services programs. Technical concerns include and IT capabilities, alumni information management and security. Human resources issues are related to increasing burden on university staff and faculty members and lack of clerical and administrative staff. Political problems include lack of university-wide unity and awareness, installation of on-campus consent, volatile nature of alumni/university relation, alumni buy-in and support, and lack of top management buy-in and support. Strategic struggles include issues related to strategies used to locate and connect with alumni, correspondence with alumni association organization, planning and implementation of alumni services programs, university location conditions, short-sighted vision and strategies that focus mainly on university gains. The scattered structure of alumni services programs heightened the communication and collaboration struggles.

5.6.4 IT/Business Alignment, Collaboration, and struggles

Alumni are not physically attached to their alma mater. Different technologies and communication channels are utilized to either exchange information or services between alumni and their alma mater. Technologies used may positively or negatively affect the implementation of alumni services programs depending on their quality and purpose. Well-planned and implemented technologies that serves the strategic direction of the university are definitely powerful tools enhance the outcome of these programs. Therefore, IT capabilities and requirement must be always considered in any strategical change related to "Alumni Services". The novel corona virus pandemic, though is a big challenge, helps universities in improving their IT structure and solutions to better serve their alumni needs.

Technologies should be governed and managed properly to ensure security and privacy of alumni data. The major alumni data security concerns are related to access rights, ethical use of alumni data, security awareness, availability of guiding policies and procedures, data ownership, and compliance with internal and external laws and legislations. Several strategies should be put in place to overcome these concerns such as adequate strategies, and guiding policies and procedures, IT/Business collaboration and alignment, information security awareness programs, advanced security technologies, organizational structure with clear roles and responsibilities, ongoing monitoring and evaluation, data management, adoption of RACI

(Responsible-Accountable-Consulted-Informed) matrix, adopting security management best-practices standards such as ISO27001.

5.6.5 Evaluating and Monitoring the Status of Alumni Services

Alumni services programs should consider the impact of individual donor characteristics, alumni professional and personal connections, external environment, university characteristics on their success. Alumni services programs should be regularly evaluated to ensure the achievement of their stated goals. To do so, data should be collected, store, analyzed to evaluate programs performance. The quality of the data will affect the quality of decision making and future planning and direction. Examples of data that may indicate the status of these programs are, number of engaged alumni, alumni satisfaction, and amount of alumni donations.

5.7 Conclusion

There is a lack of understanding about the strategic goals of alumni relations, universities are not fully aware about the chain of benefits that the relation can add to the university. Building a strong relation with alumni is not the goal by itself, the goal is to improve university performance and competitiveness locally and internationally.

While Okawa et al., (2015) study suggested that alumni services programs focus mainly on increasing alumni interest in their alma mater, my study found that fundraising is becoming one of the primary goals of these programs. NUCs business reports shows that the biggest group of donors is alumni, and this remained true. The base of alumni donors is increasing in number, yet the amount of donations is decreasing. The introduction of the new tax incentive law encouraged organizations to donate to universities. These organization though small in number, their donation amounts are usually bigger than the donations received from all groups of donors combined. Data about American universities alumni shows that alumni are willing to support their institution if they believe that they are supporting a good cause. This is also applicable to Japan, where NUCs business reports shows that alumni donations increased in the time of corona virus crisis. This fact reveals that universities are falling short in communicating their contribution to society through research and teaching.

With regards to internationalization of university aspects, only one university considered utilizing alumni programs for improving university internationalization status such as recruitment of international students, exchanges with overseas universities, and dispatch of Japanese students to study abroad.

I collected data on NUCs alumni association governance and management practices from every alumni association website. The data shows that there is a new direction towards the establishment of alumni federations to contributes to the development of the society, university, and the alumni associations of each faculty. Also, to enhance the collaboration between separate alumni associations. Out of 86 NUCs, 80 (93%) universities provided information about the structure of their alumni associations. The percentage of NUCs which have established alumni federations is 89%, while still 11% of them do not have a centralized alumni federation. 64% of NUCs published information about the establishment date of alumni federations, 73% of which established after the NUCs law (Refer to Appendix A to see the list of references).

There is confusion among members of alumni associations about the purpose and goals of alumni federation. The stated goal is many related to enhance the collaboration among the separated alumni associations, however, it ends up being managing the activities related to homecoming days mostly. The separated alumni associations differ drastically in their capabilities, activities, power, and resources. It has been noticed that alumni associations that belong to information technology and engineering faculties tend to be more influential and resourceful than others.

The expenses of alumni associations are covered by the membership fee, annual membership fee, donations, and other income. Members of alumni associations are university graduates. Some universities allow current students, faculty members, and former faculty members to join alumni associations. Almost all NUCs impose membership fees to join the association, the only exception is the “National Graduate Institute for Policy Studies” which requires no fees to join the alumni association. Students of the previously mentioned university will automatically become a member of the alumni association. Membership fees scheme differs not only between different universities, but it also differs among the different alumni associations within the same university.

NUCs alumni associations provide a set of services to their members that includes lifelong email address, sending universities magazine and newsletters, employment support, university physical facilities such as

library and sports utilities, electronic access to university systems like employment support system and online databases, and discounts for certain services and goods.

With regards to employment support, NUCs utilize their relations with alumni to help their current student's future career through mentoring sessions and lectures or connecting them with the workplace. In exchange, most of NUCs provides employment support to their graduates. Some of employment support activities are managed by alumni association while other are provided by career and employment center, the same center that provides career support and consultation for current students. Many NUCs allow alumni to use technical and physical career tools such as employment room and employment systems. Some universities implement an online platform to utilize alumni expertise to guide current students. The spread of corona virus hinder NUCs ability to provide these services to their alumni. For instance, Tohoku University entirely suspended support for graduates due to the pandemic.

Technology and data governance is a big struggle. Issues like alumni data ownership and security and privacy of alumni data is of utmost concern. Due to these struggles, some universities took a backward step recently and switch to offline system to store and manage alumni data, examples include Nagaoka University of Technology. Almost all associations published the university data privacy and security policy. Some NUCs have a shared data ownership policy between alumni federation and employment section.

CHAPTER 6: CONCLUSION

Since the early 1990s, Japanese policymakers have recognized the need to invest in science and technology to confront the economic slowdown, demographic challenges, and increased technological competition from other countries (Woolgar, 2007). In Japan, NUCs are under great pressure to enhance their corporate governance and efficiency since they are the remedy to revitalizing the Japanese economy. They are the main source for future innovators and leaders; and they are also the source for knowledge.

Information technology and modern telecommunication introduced new threats and opportunities for universities. Universities with strong IT infrastructure and governance may utilize this capability to offer Internet-based degree programs, enhance their international research collaborations, university-industry collaborations, networking, marketization, and improve teaching and learning processes. (Sporn, 2001).

This study was directed towards first analyzing the existing component of IT Governance in NUCs and second towards identifying the challenges facing CIOs in NUCs in implementing IT Governance systems. The last target is to develop an IT Governance framework for NUCs based on the COBIT framework.

Universities are facing many issues with regards to the control, management, and governance of intelligent IT. IT Governance is also a continuous process which focuses on three main areas: evaluating, directing, and monitoring IT initiatives. Literature shows that universities are not fully utilizing their IT capabilities, and this is clear evidence that they are having serious issues with their IT Governance practices.

A definition for university IT Governance has not constructed by any other researcher. After conducting this study, I think that the most applicable definition in my own words is “university IT Governance is the system for ongoing monitoring, evaluation, and directing of the IT function to guarantee that it creates added strategic value to the university by striving to fulfill the current and expected future needs of all university stakeholders, and providing agile response to the external and internal environmental opportunities and challenges. This system is governed through a network of comprehensive principles, policies and frameworks that guide the other system components which are information; services, infrastructure and

applications; and human resources; processes; organizational structures, and university culture, ethics and behavior". This definition is inspired by the COBIT framework.

I presented a thorough literature review in the field of IT Governance. It shows that there is an increasing emphasis on the important role of IT Governance in all organizations including universities. Universities are complex organizations, and their complexity does not rely solely in their technical infrastructure but also their unique organizational structure and culture which requires a special scheme for governing and managing their IT resources.

Designing a best-fit IT Governance scheme is considered a very challenging endeavor. Several IT Governance frameworks have been introduced to help organizations in understanding, designing, and implementing IT Governance and Management practices. These frameworks designed to fit top-down for-profit form of institutions which are the opposite form to the universities structure. I discussed the development of security, risk, and compliance driven IT governance models for universities based on the COBIT framework. After the model construction, the main factors that may affect the success of IT Governance in universities found in the literature were mapped to the COBIT Governance and management objectives.

Our case studies research shows that the vice president for Information and Technology is spearheading IT Governance processes and reports directly to the university president. Top management involvement is very essential element in guaranteeing effective implementation of IT Governance as they will direct, evaluate, and monitor the performance of the adopted IT Governance scheme, further, their involvement will shape the culture of the organization. An accountability framework must be in place which can be achieved through a clear roles and responsibilities for each individual in the universities. The reporting line and authority must be explicitly stated as well as the internal and external communication requirements with other stakeholders. At NUCs, certain aspects of human resources management are more developed than others. While roles and responsibilities for all staff are stated clearly, there is no clear plan for staff training and development.

With regards to the availability of effective guiding policies, laws, and procedures, my findings showed differences in the maturity levels while even some do not exist such as incident recovery plan, user lifecycle management, and security awareness plan. On the other hand, for areas that are receiving huge attention

national wide, the university developed the highest maturity level. Examples include personal information security policy and intellectual property rights.

Best practices are used to enlighten the management about the best way to maximize their profit from their IT investment while the risk is controlled, and resources are optimized. Unfortunately, a comprehensive framework for IT Governance at NUCS does not exist.

IT Governance cannot accomplish its goals by implementing the ultimate IT Governance structure with solid policies, laws, and procedures only. Relational mechanisms are the most challenging element of the IT Governance implementation. Results shows that the communication among different departments at NUCs is weak and sometimes does not exist resulting in wasting and duplication of resources. Further, stakeholders needs are not at the heart of IT function interest, the focus is to provide services as deemed to be appropriate by IT department leaders. Added to this, the results of IT projects are not always communicated to the top management which will affect the level of their buy-in and support.

To further evaluate the status of IT Governance at NUCs, I investigated the IT Governance of one of the challenging function at universities which is alumni services. The role of IT has increased recently specially during this age of social distancing. Studies discussing alumni services at Japanese universities seems to be limited to the series of studies by Okawa et al., (2015). The study presents a valuable snapshot of a point in time following the enacting NUCs law. Although Okawa et al., (2015) did not discuss the role of IT Governance in alumni services programs. My study found that there is a major issue with regards to understanding the added value of IT resources which can be seen in the low level of IT tools adaptation in building a relation with alumni or providing services to them.

My research is a starting point to understand the current status of IT Governance at NUCs and it also spot the difficulties in implementing a comprehensive IT Governance framework at NUCs. It also provides tools that can help other researcher to further research in the field. Future research will be directed towards conducting empirical studies to understand the interrelation between different facets of IT Governance such as the relation between human resources management and risk management, the relation between organizational culture and data management.

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APPENDIX C: THE HISTORY OF JAPANESE EDUCATIONAL REFORMS

The table below was based on Doyon (2001), Itoh (2002), Yamamoto (2004), Tabata (2005), Oba (2005), Christensen T. (2011), and Ehara (1998). It summarizes the main characteristics of Japanese reforms and the drivers that trigger the need for new reform.

Reform	Characteristics	Drivers for Change
Meji Restoration pre-1920	The existence of the three sectors of higher education institutions (national, local, and private) with massive investment in the national sector by the government. Stratified structure (universities and other forms of shorter-term higher education institutions, imperial university (*teikoku daigaku*), specialized schools (*senmon gakko*), public/private institutions, and gender). The central government was the one and only provider of universities by the end of the 1920s. Rational and efficient in terms of resource allocation and for manpower training. The formulation of Education System Order (*Gakusei*) in 1872 to generalize school education.	Eliminate status differentials between institutions. Increase the efficiency Expanding higher education enrollment Decrease in the need for the higher schools (*koto gakko*), which serves as a preparatory foreign language training schools for universities.

Reform	Characteristics	Drivers for Change
Post-1920 Reform	Partial Reform Permission to establish universities other than imperial universities. Persistence of status discrimination between imperial universities and the other universities.	Eliminating distinctions among the imperial universities and other institutions which deemed to be impossible due to the social and political resources that elite institutions possess.
Post-World War II (1945 - 1950) Occupation Era	The new university system (*shinsei daigaku*) was influenced by the American, the center of the Allied Forces. Educational policy was the responsibility of The Civil Information and Education Section (CI&E), a division of the Allied Forces. Forming the new standard for the new system was chaired by the Japanese University Accreditation Association (*Daigaku kijun kyokai*), which was independent of the government, but under the strong influence of CI&E. Authorization to establish new institutions was permitted by The Ministry of Education. Introduction of the accreditation system. Egalitarian system with a single track "6-3-3-4" scheme. All specialized schools and normal schools became universities. Impartiality between the imperial universities and other universities.	The new reform was imposed by force by the Allied Forces which does not suits the Japanese educational environment. Difficulties in understanding the constituents of "general education" which resulted in a decline of the quality of professional education. Insufficient support for the newly created graduate school. The lack of systematic management procedures in the national universities. Despite the fact that the egalitarian post-war system granted all the Higher Education Institutions the status of "university", their situation did not improve due to the functional differences between them.

Reform	Characteristics	Drivers for Change
	Closing of Preparatory schools for universities and higher schools. Introduction of junior colleges (*tanki daigaku*). Transformation of the post-baccalaureate program into American-like graduate education, in which courses were held, requirements for completion were defined, and master's degrees were newly established. Adoption of the clearly defined curricula and credit system.	
Japan Post-independence reforms	Enactment of the University Establishment Standard (*Daigaku secchi kijun*) by The Ministry of Education in 1956. Reduction of general education credits in the university curriculum and replacing it with more professional education credits. the system of "dissertation doctor" (*Ronbun hakase*) returned. The return of "dissertation doctor" (*Ronbun hakase*) pre-war scheme, which the degrees granted on the basis of submission and examination of theses only. The implementation of a more clear and systematic method of classifying institutions of higher education.	With the goal of managing the massification of higher education in mind, the report intended to transform the post-war university system, which was criticized as being deficient and vague in its mission

Reform	Characteristics	Drivers for Change
The transformation of higher education in the 1960s	The introduction of a nationwide scholastic aptitude test. The creation of the Division of General Education. Proliferation of private universities which brought financial difficulties and deterioration in the quality of higher education.	1960s proposals for reforms such as “38 Report” were considered too progressive for Japanese society and only few suggestions were implemented. The disappointment and the broad dissatisfaction with the higher education system which results is student riots throughout the country.
reforms in the 1970s	Enhancement in teaching methods and reduction in class size. Campus democratization initiatives embodied in involving junior faculty and students in decision-making The implementation of long-term national planning of higher education. by 1975 the population attending universities (including graduate schools) increased to 1,734,082, or 2.77 times the 1960 student population Tightening the control exerted over the private institutions and providing National financial support to them. A gradual reduction of authority held by universities and academics. Banning the expansion of private universities for a ten-year period.	To restrain higher education budgets. To improve institutions management efficiency.

Reform	Characteristics	Drivers for Change
	the curriculum standards were liberalized somewhat, and the establishment of new types of academic units other than faculty (*gakubu*) were allowed. Construction of "new-concept universities," which were expected to be models of university reform. The establishment of the special short-term training higher educational institutions (*senmon gakko*) in 1975. Enactment of Graduate School Establishment Standards (*daigakuin secchi kijun*) in 1974 that had allowed the Japanese University Accreditation Association to establish standards for graduate schools. Widening the scope of masters' courses by including advanced vocational education in addition to the academic training. The purpose of doctoral degrees was redefined as a fundamental qualification for academic life.	
Administrative reform in 1980	The Establishment of Provisional Commission for Administrative Reform (*Rinji gyosei chosakai* or *Rincho*) in 1981 The National Council on Educational Reform (*Rinjikyoikushingikai*), established in 1984 as an advisory body to the Prime Minister	Dissatisfaction with the reform's attempts The need for more autonomous management of the national institutions.

Reform	Characteristics	Drivers for Change
	The National Institute for Academic Degrees (*Gakui jyuyo kiko*) was found, which was allowed to grant degrees to qualified graduates of non-university institutions. Suspension of the national university's expansion. Increasing the tuition fees at national universities. Decreasing the national subsidies to private institutions. The Japan Scholarship Society (*Nihon ikuei kai*) started to grant interest-accruing scholarship loans. Great emphases were put on the evaluation of higher education processes for promoting deregulation and maintaining institutional quality.	The need to the Americanization to include flexibility, efficiency, and accountability measures in order to solve the Deep-rooted problems since 1960s.
1990 reforms	Introduction of neo-liberalistic administrative reform in the late 1990s. Inefficiency and lack of competitiveness in the global market. Enactment of Specialized School Order in 1903. The amendment of the Standards for the Establishment of Universities law in 1991 which allows universities to structure curricula in a way that reflect their own educational mission and objectives.	The decrease in public trust in the Japanese socio-economic system. Increase competitiveness, flexibility, and deregulation. Decrease the number of public servants. Enhance performance and management efficiency. The decrease in the 18-year-old population. The growing need for lifelong learning"

Reform	Characteristics	Drivers for Change
	Eliminating the distinction between subject areas, such as general education and specialized education. Introduction of incorporation of national universities idea by some of governmental advisory bodies. A sharp decrease in the population of the younger generation, which threaten the expansion and continuation of higher education. The introduction of university evaluation by a third-party organization (*daisansha hyoka*) Enactment of "term-limit system" (*ninkisei*), in 1998 which aimed to inspire research before one is elevated to a tenure-track position. Establishment of "National Center for University Entrance Examinations Test," (NCUEE) aka the "Sentâ Shiken" in 1990.	The desire to make Japanese education more international through increasing the number of foreigners studying in Japan and of Japanese studying abroad, and providing better English education To fulfill the need for highly trained and skilled workforce with graduates possessing high employability skills to raise the quality of education and research to be on par with its Western neighbors. Traditional views on academe have become almost obsolete among academics.

APPENDIX D: RESEARCH RELATED TO UNIVERSITIES IT GOVERNANCE

The table below summarizes the research conducted in the field of Universities IT Governance.

Sno	Research Title	Researcher/s	Purpose	Outcomes/Findings
1.	Measuring IT Governance Effectiveness Using IT Governance Diagnostic Diamond: A case study of Information Technology Division, IIUM	(Aliyu, 2010)	To investigate the level of IT Governance implementation at IIUM, International Islamic University Malaysia.	A new IT Governance model was developed for the information technology division at IIUM
2. .	Intelligent IT Governance Decision Making Support Framework for A Developing Country's Public University	(Arshad , Ahlan, & Ajayi, 2014)	To identify the IT Governance issues in a public university in Malaysia	An effective IT Governance that contributes to IT resources optimization and hence the university performance is needed.
3.	Adoption and Implementation of IT Governance: Cases from Australian Higher Education	(Bhattacharjya & Chang, 2009)	Exploring the IT Governance implementation in two Australian higher education institutions	The implementation of IT Governance structure with a clearly defined roles and responsibilities facilitates the implementation of IT Governance processes.

Sno	Research Title	Researcher/s	Purpose	Outcomes/Findings
				Enhancing the communication between IT and business has gradually improve the acceptance of IT as a valued service provider rather than cost center. Good communication between central IT and divisional IT groups has enhance the general acceptance of central standard strategies and policies. Organizations prefer COBIT over ITIL because the former is less expensive and provides free of charge documentation and research materials. Higher education institutions may benefit from other industries IT Governance experiences. The introduction of IT Governance structures improved relational mechanisms and the adoption of IT Governance processes.

Sno	Research Title	Researcher/s	Purpose	Outcomes/Findings
4.	IT Governance Mechanisms in Higher Education	(Bianchi & Sousa, IT Governance Mechanisms in Higher Education, 2016)	To explore the IT Governance mechanism that higher education institutions have implemented.	The literature on IT Governance in higher education institutions is scarce.
5.	Baseline mechanisms for IT Governance at Universities	(Bianchi, Sousa, & Pereira, 2017)	An exploratory study using semi-structured in-depth interviews with IT decision-makers at top and middle management that are responsible for IT in six universities across three countries (Brazil, Portugal, and the Netherlands). The study aims to identify the baseline for IT Governance mechanisms for universities considering structures, processes and relational mechanisms to create business values from IT investments.	A minimum baseline for universities IT Governance was presented and compared with the financial and health care industries. IT strategy committee found to be the only mechanism implemented in all case studies. The most applicable mechanism for university setting is the processes mechanisms while relational mechanisms are considered as the most effective and easy to implement.

Sno	Research Title	Researcher/s	Purpose	Outcomes/Findings
6.	Information Management and Governance in UK Higher Education Institutions: Bringing It in from the Cold	(Coen & Kelly, 2007)	Theory-based research that seeks to highlight some of the key IT GOVERNANCE issues for HEIs in order to grasp the knowledge required to develop an IT Governance framework for UK HEIs.	Construction of a flexible IT Governance framework which was built around five principles (governance, management, resources, structures, and services.
7.	An IT Governance Framework for Universities in Spain	(Fernández & Llorens, 2009)	To construct an IT Governance framework for the Spanish Association of University Rectors (CRUE)	A University oriented IT Governance Framework (IT GOVERNANCE4U) for Spanish universities has been constructed. The model was created using the knowledge obtained from the Joint Information Systems Committee (JISC) for universities in UK which adopted principles and characteristics of ISO/IEC 38500:2008 (Corporate governance of information technology)
8.	Universitic: IT Survey in Spanish and Latin American Universities	(Fernández Martínez, Llorens-Largo, & Hontoria Hernández, 2015)	To describe UNIVERSITIC, IT Governance survey which was designed for Spanish and Latin American universities.	Universities are aware of the important of IT management and in IT Governance they are usually plan IT implementation.

Sno	Research Title	Researcher/s	Purpose	Outcomes/Findings
9.	A study of The Review and Improvement of IT Governance in Australian Universities	(Hicks, Pervan, & Perrin, 2012)	To explore the progress of IT Governance concept in eight public universities in Australia. The data gathered through interviewing with IT and business leaders and with representatives of the core functional areas.	The decentralized, faculty-based IT functions in the studied university have led to a multitude of IT related issues. These include duplication of resources, difficulty in achieving IT/Business strategic alignment, and lack in IT risks management.
10.	A Holistic Survey of IT Governance in Thai Universities through IT Executive Perspectives	(Jairak & Praneetpolgrang, A Holistic Survey of IT Governance in Thai Universities through IT Executive Perspectives, 2011)	To identify the various aspects of IT Governance in Thai universities. A questionnaire was used to survey 117 IT executives from 117 universities in Thailand.	IT Governance practices are still status is in the initial stage in Thai universities and the IT/Business alignment has not been considered in all IT projects. The ability of IT executives to understand IT Governance principle, the budget allocated for starting IT Governance, and the absence of a comprehension IT Governance framework that suits the university context; has been found to be the major obstacles facing Thai universities in implementing IT Governance.

Sno	Research Title	Researcher/s	Purpose	Outcomes/Findings
11.	IT Governance Framework: One Size Fits All?	(Kam, Katerattanakul, & Hong, 2016)	To compare the management styles and organizational practices between higher education (bottom-up management style) and banking sector (top-down management style) to reveal the underlying factors that form organizational security norms in both industries.	Higher education management supports employee's participation for policy compliance. A new IT Governance framework (IT Governance) is needed to address the unique culture of higher education.
12.	Information Technology Governance: An Evaluation of The Theory-Practice gap	(Ko & Fink, 2010)	To provide theoretical and practical understanding of IT Governance and to find the current theory-practice gaps in four Australian universities.	A theoretical IT GOVERNANCE were developed. The study identified two major theory-practice gaps in respect to IT Governance mechanisms integration and raising senior management awareness and understanding of the IT Governance concept.
13.	IT Governance using COBIT Implemented in a High Public Educational Institution - A Case Study	(Ribeiro & Gomes, 2009)	A case study in a Portuguese public university that explores the use of COBIT to meet the objectives of ISO 9001 services certification and to	The implementation of COBIT framework helps the institutions in fulfilling the requirements for the quality

Sno	Research Title	Researcher/s	Purpose	Outcomes/Findings
			implement efficient mechanisms to control and manage the IT.	services certification and in managing and controlling IT affectively. The results showed that the institution has improved the quality of services, reduced the execution time in about 25%, reduced the percentage of incidents resolved and finalized by the IT departments in about 30%, and reduced the percentage of reopened in about 10%.
14.	The Drivers of ITIL Adoption in UNITEN	(Saleh & Almsafir, 2013)	To identify the main drivers for the adoption of ITIL in UNITEN, a private university in Malaysia.	The key performance indicator (KPI), intellectual capital, and university annual budget impetus the adoption of ITIL in UNITEN.
15.	Information Technology Governance Practices Based on Sufficiency Economy Philosophy in The Thai University Sector	(Subsermsri, Jairak, & Praneetpolgrang, 2015)	To develop a formal set of IT Governance practices based Thai economic philosophy, sufficiency economy philosophy (SEP), to support the generic context for Thai universities.	IT Governance practices based on SEP for Thai universities has been developed and mapped with ISO/IEC 38500 international standard for corporate governance of information technology.

Sno	Research Title	Researcher/s	Purpose	Outcomes/Findings
16.	Improving Service Management in Campus IT Operations	(Wan & Chan , 2008)	To shade the lights on the benefits gained from implementing IT service management (ITSM) to control campus-wide IT operations.	A framework that sends proactive notifications to IT operations management automate network and system alerts. This system will eliminate the IT service failure service impact on the business continuity.
17.	IT strategy and Decision-making: A Comparison of Four Universities	(Wilmore, 2014)	To determine the elements of decision-making processes that may lead to the successful identification and funding of IT projects that contributes to the achievement of university mission. To examine the actions taken by universities during the decision-making phases.	A framework that improves IT Governance and decision-making in a university context has been proposed.
18.	Information Technology Governance Barriers, Drivers, IT/Business Alignment, and Maturity in Ghanaian Universities	(Yaokumah, Brown, & Adjei, 2015)	To identify the status of IT Governance in universities in Ghana, by assessing the drivers and barriers to IT Governance, measuring IT/Business	60.6% of the institutions surveyed were at the non-existent and initial stages of IT Governance while only 6% were at the managed and optimized stages.

Sno	Research Title	Researcher/s	Purpose	Outcomes/Findings
			alignment and measuring IT Governance maturity level.	Reducing costs, increasing efficiency, and promoting institution-wide view of IT are the drivers for pursuing a formal IT Governance framework, while the barriers to IT Governance implementation include lack of participation, funding, and institutional culture.
19.	An ITIL-based IT Service Management Model for Chinese Universities	(Zhen & Xin-yu, 2007)	Developing the organization model, the process model and the technology model of an IT service management framework based on the ITIL and the realities of Chinese universities.	Presentation of the anticipated framework which has been already implemented in some of Chinese universities.

APPENDIX E: MAPPING OF HEIS INFORMATION SECURITY GOVERNANCE SUCCESS FACTOR WITH CORRESPONDING COBIT GOVERNANCE AND MANAGEMENT OBJECTIVES

This section provides a detailed mapping of HEIs information security Governance success factor with corresponding COBIT Governance and management objectives.

Sno	HEIs Information Security Governance Framework Components	COBIT 2019
1	Access Control, Identity Management, Authentication, and Authorization Practices	APO07.06 Manage contract staff
		APO14.09 Support data archiving and retention.
		DSS05.04 Manage user identity and logical access.
		DSS05.05 Manage physical access to I&T assets.
		DSS05.06 Manage sensitive documents and output devices.
		DSS06.03 Manage roles, responsibilities, access privileges and levels of authority.
		DSS06.06 Secure information assets.
		MEA02.01 Monitor internal controls.
2	Asset Management (Technical, Human, Financial)	APO07.01 Acquire and maintain adequate and appropriate staffing.
		BAI09 Managed Assets
		BAI10 Managed Configuration

3	Audits	APO13.03 Monitor and review the information security management system (ISMS).
		APO14.09 Support data archiving and retention.
		BAI09.05 Manage licenses.
		DSS05.05 Manage physical access to I&T assets.
		MEA04 Managed Assurance
		MEA03.04 Obtain assurance of external compliance.
4	Business Continuity Planning	DSS04.01 Define the business continuity policy, objectives and scope.
		DSS04.02 Maintain business resilience.
		DSS04.03 Develop and implement a business continuity response.
		DSS04.05 Review, maintain and improve the continuity plans.
5	Communication and Reporting	EDM01.02 Direct the governance system.
		EDM01.02 Direct the governance system.
		EDM05.01 Evaluate stakeholder engagement and reporting requirements.
		EDM05.02 Direct stakeholder engagement, communication and reporting.
		APO12.04 Articulate risk.
		APO12.06 Respond to risk.
		APO13.01 Establish and maintain an information security management system (ISMS).

		APO14.01 Define and communicate the organization's data management strategy and roles and responsibilities.
		APO14.02 Define and maintain a consistent business glossary.
		APO14.04 Define a data quality strategy.
		BAI09.02 Manage critical assets.
		BAI10.04 Produce status and configuration reports.
		DSS02.07 Track status and produce reports.
		DSS04.03 Develop and implement a business continuity response.
		DSS05.01 Protect against malicious software.
		DSS05.07 Manage vulnerabilities and monitor the infrastructure for security-related events.
		DSS06.04 Manage errors and exceptions.
		DSS06.06 Secure information assets.
		EDM03.03 Monitor risk management.
		MEA01.01 Establish a monitoring approach.
		MEA02.04 Identify and report control deficiencies.
		MEA04.08 Report and follow up on the assurance initiative.
		MEA01.02 Set performance and conformance targets.
		MEA01.04 Analyze and report performance.
		MEA01.05 Ensure the implementation of corrective actions.
6	Compliance	EDM01.01 Evaluate the governance system.

		EDM01.02 Direct the governance system.
		EDM01.03 Monitor the governance system.
		MEA01.04 Analyze and report performance.
		MEA03.01 Identify external compliance requirements.
		MEA03.02 Optimize response to external requirements.
		MEA03.03 Confirm external compliance.
7	Data Backups and Secure Off-site Storage	APO14.10 Manage data backup and restore arrangements.
		DSS04.07 Manage backup arrangements.
8	Data Classification, Retention, and Destruction	APO01.07 Define information (data) and system ownership.
		APO14.02 Define and maintain a consistent business glossary.
		APO14.03 Establish the processes and infrastructure for metadata management.
		APO14.05 Establish data profiling methodologies, processes and tools.
		APO14.08 Manage the lifecycle of data assets.
		APO14.09 Support data archiving and retention.
		DSS06.05 Ensure traceability and accountability for information events.
		DSS06.06 Secure information assets.
9	Education Programs and Training	APO01.10 Define and implement infrastructure, services and applications to support the governance and management system.
		APO07.03 Maintain the skills and competencies of personnel.

		APO13.02 Define and manage an information security and privacy risk treatment plan.
		DSS04.06 Conduct continuity plan training.
10	Governance Framework	EDM01.01 Evaluate the governance system.
		EDM01.02 Direct the governance system.
		EDM05.03 Monitor stakeholder engagement.
		APO01.04 Define and implement the organizational structures.
		APO01.05 Establish roles and responsibilities.
		APO01.06 Optimize the placement of the IT function.
		APO01.07 Define information (data) and system ownership.
11	GRC Personnel	APO01.08 Define target skills and competencies.
		APO07 Managed Human Resources
12	I&T Security Management	APO01.01 Design the management system for enterprise I&T.
		APO01.03 Implement management processes (to support the achievement of governance and management objectives).
		APO01.09 Define and communicate policies and procedures.
		APO13 Managed Security
		DSS05.01 Protect against malicious software.
		DSS05.02 Manage network and connectivity security.
		DSS05.03 Manage endpoint security.

		DSS06.01 Align control activities embedded in business processes with enterprise objectives.
		DSS06.04 Manage errors and exceptions.
13	Incident Management & Response	DSS02 Managed Service Requests and Incidents
14	Information Management, Security, and Privacy	APO14.01 Define and communicate the organization's data management strategy and roles and responsibilities.
		APO14.04 Define a data quality strategy.
		APO14.07 Define the data cleansing approach.
		DSS05.06 Manage sensitive documents and output devices.
		DSS05.02 Manage network and connectivity security.
		DSS06.02 Control the processing of information.
		DSS06.05 Ensure traceability and accountability for information events.
		MEA01.03 Collect and process performance and conformance data.
15	Monitoring and Evaluation	EDM01.03 Monitor the governance system.
		EDM05.03 Monitor stakeholder engagement.
		APO01.11 Manage continual improvement of the I&T management system.
		APO07.04 Assess and recognize/reward employee job performance.
		APO13.03 Monitor and review the information security management system (ISMS).

		APO14.01 Define and communicate the organization's data management strategy and roles and responsibilities.
		APO14.03 Establish the processes and infrastructure for metadata management.
		APO14.04 Define a data quality strategy.
		APO14.06 Ensure a data quality assessment approach.
		BAI09.02 Manage critical assets.
		DSS02.07 Track status and produce reports.
		DSS04.08 Conduct post-resumption review.
		DSS06.01 Align control activities embedded in business processes with enterprise objectives.
		MEA02.01 Monitor internal controls.
		MEA02.03 Perform control self-assessments.
		MEA01.01 Establish a monitoring approach.
		MEA01.02 Set performance and conformance targets.
		MEA01.05 Ensure the implementation of corrective actions.
16	Personnel Clearances or Background Checks	APO07.01 Acquire and maintain adequate and appropriate staffing.
17	Resources & Tools for GRC	APO01.10 Define and implement infrastructure, services and applications to support the governance and management system.
		DSS05.01 Protect against malicious software.
		DSS05.02 Manage network and connectivity security.

		DSS05.03 Manage endpoint security.
		DSS05.05 Manage physical access to I&T assets.
		DSS05.06 Manage sensitive documents and output devices.
		DSS05.07 Manage vulnerabilities and monitor the infrastructure for security-related events.
		DSS06.01 Align control activities embedded in business processes with enterprise objectives.
		DSS06.06 Secure information assets.
		MEA01.01 Establish a monitoring approach.
		MEA01.03 Collect and process performance and conformance data.
18	Risk Management	APO12 Managed Risk
		BAI09.02 Manage critical assets.
		EDM03 Ensured Risk Optimization
		MEA02.01 Monitor internal controls.
		MEA02.02 Review effectiveness of business process controls.
19	Testing and Practicing	APO12.06 Respond to risk.
		APO14.10 Manage data backup and restore arrangements.
		DSS04.04 Exercise, test and review the business continuity plan (BCP) and disaster response plan (DRP).
		DSS04.07 Manage backup arrangements.
		DSS05.02 Manage network and connectivity security.

20	Top Management Buy-in and Involvement	APO01.02 Communicate management objectives, direction and decisions made.
		APO01.06 Optimize the placement of the IT function.
		APO13.01 Establish and maintain an information security management system (ISMS).
		BAI09.03 Manage the asset life cycle.
		DSS02.03 Verify, approve and fulfill service requests.
21	University-wide IT Risk & Security Awareness Programs	APO01.02 Communicate management objectives, direction and decisions made.
		APO01.05 Establish roles and responsibilities.
		APO01.09 Define and communicate policies and procedures.
		APO13.02 Define and manage an information security and privacy risk treatment plan.
		DSS04.06 Conduct continuity plan training.
		DSS05.01 Protect against malicious software.
		DSS05.05 Manage physical access to I&T assets.
		DSS06.03 Manage roles, responsibilities, access privileges and levels of authority.
		DSS06.06 Secure information assets.
22	Vulnerability Management	DSS05.07 Manage vulnerabilities and monitor the infrastructure for security-related events.

APPENDIX F: MEASURES THAT DEFINE IT GOVERNANCE AT NUCS

The table below shows the 147 measures that were set to understand the general characteristics of the IT Governance at NUCs, and it also shows the governance area affected by this measure which is marked by "χ" symbol. The abbreviations I used in the table are stand for the following: Business/IT Alignment (BIA), Management Buy-in and Support (BIS), IT Value Creation (VC), Service Continuity (SC), Stakeholders Engagement (SE), IT Risks Management (RM), Data Governance (DG), Organization Culture (C), Performance Evaluation & Monitoring (PEM), Framework Setting (FS), and IT Human Resources Management (HRM).

ID	Description	BIA	BIS	VC	SC	SE	RM	DG	C	PEM	FS	HRM
1	Institution's mission statement acknowledgment IT as a cornerstone for success	χ										
2	IT strategy is strongly aligned with the university overall strategy	χ										
3	the academic goals and IT goals are aligned	χ										
4	IT Strategy	χ										
5	Acceptable Use Policy						χ		χ			
6	IT Audit Charter									χ		
7	IT Audit Procedures									χ		
8	IT Policy	χ					χ		χ			
9	Business Continuity Plan				χ		χ					
10	Disaster Recovery Plan				χ		χ					
11	Incident Recovery Plan				χ		χ					
12	Security Awareness Plan				χ	χ	χ		χ			χ

ID	Description	BIA	BIS	VC	SC	SE	RM	DG	C	PEM	FS	HRM
13	Information Security							χ				
14	Media Destruction, Retention & Backups							χ				
15	Change Management				χ		χ					
16	Remote Access							χ				
17	License Management						χ	χ				
18	User Lifecycle Management						χ	χ				χ
19	Risk Management						χ					
20	IT Organizational Structure										χ	
21	Back Up Plan				χ							
22	Access Matrix	χ						χ				χ
23	BYOD (Bring Your Own Device)						χ					
24	Technology Standards	χ		χ								
25	Network Set up and Documentation						χ					
26	Third Party Vendor Policy							χ				
27	Asset Control Policy			χ			χ					
28	Internet and Email Usage Policy							χ				
29	Personal Information Security Policy							χ	χ			
30	Intellectual Property Rights							χ				
31	IT Services	χ		χ			χ					
32	Delegation of authority policy							χ			χ	χ

ID	Description	BIA	BIS	VC	SC	SE	RM	DG	C	PEM	FS	HRM
33	Budgeting and delivery execution policy											
34	Performance measurement policy									χ		χ
35	Rules for validating and approving mandatory reports							χ		χ		
36	Reporting and communications principles					χ		χ		χ	χ	χ
37	Transparency policy					χ		χ	χ			
38	COBIT (Control Objectives for Information and related Technology)	χ	χ	χ	χ	χ	χ	χ	χ	χ	χ	χ
39	ITIL (Information Technology Infrastructure Library)	χ	χ	χ	χ	χ	χ	χ	χ	χ	χ	χ
40	ISO/IEC 27001 (Information Security Management)							χ			χ	
41	ISO 9000 (Quality Management)							χ		χ	χ	
42	Val IT (Value from IT Investments)			χ							χ	
43	ISO/IEC 27002:2005 Information technology - Security techniques - Code of practice for information security controls							χ			χ	

ID	Description	BIA	BIS	VC	SC	SE	RM	DG	C	PEM	FS	HRM
44	BSC (Balanced Scorecard) - performance management										χ	
45	COSO (The Committee of Sponsoring Organizations of the Treadway Commission) - risk management, internal control and fraud deterrence						χ	χ			χ	
46	CMM (Capability Maturity Model)									χ	χ	
47	PMBOK (Project Management Body of Knowledge)			χ		χ					χ	
48	ISO/IEC 38500: 2015 Information Technology - Governance of IT for The Organization	χ	χ	χ	χ	χ	χ	χ	χ	χ	χ	χ
49	IT capabilities and requirement are always considered in any strategical change	χ		χ								
50	The importance of IT plan	χ										
51	The top three triggers for changes to IT priorities	χ										
52	Existence of guidelines for each management structure										χ	
53	IT decision making structure										χ	

ID	Description	BIA	BIS	VC	SC	SE	RM	DG	C	PEM	FS	HRM
54	Existence of centralized IT department										χ	
55	academic department do make decisions related to IT without involving the central IT department.										χ	
56	IT steering committee has representatives from all groups of stakeholders	χ				χ					χ	
57	The business representatives on the IT steering committee have extensive IT knowledge	χ									χ	
58	institution's Board have a technology subcommittee										χ	
59	The senior-most IT leader has a permanent seat in the university highest strategic committee	χ	χ								χ	
60	The senior-most IT leader participate in institutional planning, including non-IT planning?	χ	χ								χ	
61	IT organization seeks input from Trustees/regents/ governing board					χ						

ID	Description	BIA	BIS	VC	SC	SE	RM	DG	C	PEM	FS	HRM
62	IT organization seeks input from President/ chancellor					χ						
63	IT organization seeks input from Provost/academic vice president					χ						
64	IT organization seeks input from Chief administrative officer					χ						
65	IT organization seeks input from Chief financial officer					χ						
66	IT organization seeks input from Deans					χ						
67	IT organization seeks input from Faculty members					χ						
68	IT organization seeks input from Students					χ						
69	IT organization seeks input from Department or unit heads					χ						
70	IT organization seeks input from IT vendors					χ						
71	IT organization seeks input from Industry partners					χ						
72	IT organization seeks input from other Universities					χ						

ID	Description	BIA	BIS	VC	SC	SE	RM	DG	C	PEM	FS	HRM
73	IT organization seeks input from Ministry of Finance officials					χ						
74	IT organization seeks input from Ministry of Public Management and Home Affairs officials					χ						
75	IT organization seeks input from MEXT officials					χ						
76	Existence of IT awareness programs for each group of stakeholders					χ			χ			χ
77	Frequency of communicating IT management objectives and direction to the university top management					χ			χ			
78	the responsibility for sending out regular communications about IT has been assigned					χ						χ
79	The results of IT initiatives are regularly communicated to key stakeholders					χ			χ			
80	Members of my institution understand the degree to which			χ		χ			χ	χ		

ID	Description	BIA	BIS	VC	SC	SE	RM	DG	C	PEM	FS	HRM
	IT achieves, or fails to achieve, its priorities											
81	IT Budget is sufficient to serve all IT-related business needs	χ		χ								
82	The overall budget climate in the past three years											
83	The budget climate of IT in the past three years		χ	χ								
84	IT investments are always linked to the university and IT priorities and objectives	χ		χ								
85	IT investments are planned properly with sufficient resources (budget, human resources, etc.)			χ								
86	IT investments are completed successfully within the time frame			χ								
87	IT investments are managed properly			χ								
88	IT investments are evaluated and followed up			χ						χ		
89	Academic departments implement their own information solutions with no			χ				χ			χ	

ID	Description	BIA	BIS	VC	SC	SE	RM	DG	C	PEM	FS	HRM
	involvement of the central IT department											
90	There is a clear mechanism to evaluate the return of IT investment.			χ						χ		
91	There are duplications or overlaps between various initiatives or other forms of wasting resources			χ								
92	The job description of each employees includes specific requirements in role and responsibility descriptions regarding adherence to management and IT policies and procedures, the code of ethics, and professional practices.						χ	χ	χ			χ
93	Regular discussion with all stakeholders to address all emerging challenges and needs			χ		χ			χ			
94	IT initiatives challenge long-standing procedures and processes						χ		χ			

ID	Description	BIA	BIS	VC	SC	SE	RM	DG	C	PEM	FS	HRM
95	Reputation for being forward-thinking in the use of IT								χ			
96	IT functions have the full support, commitment, and buy-in from board and executive management		χ						χ			
97	Internal environment, including management culture and philosophy has been considered during the development of IT structure and processes						χ		χ		χ	
98	The enterprise risk assessments highly consider IT related risk						χ					
99	Risk tolerance levels against the risk appetite are clearly articulated						χ					
100	Risk communication plans are well defined and cover all stakeholders					χ	χ		χ			
101	Existence of appropriate mechanisms to respond quickly to changing risk and report immediately to appropriate levels of management,					χ	χ					χ

ID	Description	BIA	BIS	VC	SC	SE	RM	DG	C	PEM	FS	HRM
	supported by agreed principles of escalation											
102	Frequency of data confidentiality incidents							χ				
103	Frequency of data integrity incidents							χ				
104	Frequency of data availability incidents							χ				
105	Frequency of IT incidents that were not identified in a risk assessment						χ					
106	Frequency of noncompliance with IT related policies						χ					
107	Frequency of noncompliance with laws and legislations						χ					
108	Frequency of project failure											
109	Frequency of application error							χ				
110	Information security controls have been enforced to protect sensitive information							χ				
111	Employees follow information security protocols, norms, and regulations							χ				χ
112	IT Governance consider enterprise and IT service				χ		χ					χ

ID	Description	BIA	BIS	VC	SC	SE	RM	DG	C	PEM	FS	HRM
	continuity when defining roles, including staff back-up and cross training requirements											
113	Quality of reports produced by academic departments							χ				
114	Quality of reports produced by administrative departments							χ				
115	Reports requested from academic departments are provided in a very reasonable time							χ				
116	Reports requested from administrative departments are provided in a very reasonable time							χ				
117	Information flow between different processes and personnel is well understood and articulated in corresponding policies and procedures.							χ				
118	Existence of a comprehensive inventory of information							χ				
119	Information is well defined							χ				

ID	Description	BIA	BIS	VC	SC	SE	RM	DG	C	PEM	FS	HRM
120	Information is categorized or classified							χ				
121	Having a proper policies and procedures to be managed, control, and protected							χ				
122	Information is protected against unproper access, modification, or dissemination through access controls mechanisms							χ				
123	Information is properly backed up							χ				
124	Information is important in decision making							χ				
125	Information is readily available and easy to be collected and analyzed							χ				
126	Information is centralized							χ				
127	The current number of IT human resources is sufficient to cover all university processes											χ
128	Adequate analysis, evaluation of the future need of IT human resources									χ		χ
129	IT Staff have clear roles and responsibilities											χ

ID	Description	BIA	BIS	VC	SC	SE	RM	DG	C	PEM	FS	HRM
130	IT Staff have clear reporting line											χ
131	IT Staff have the required skills			χ								χ
132	IT Staff have specialized training and development programs			χ								χ
133	IT Staff have proper incentives to enhance performance									χ		χ
134	IT Staff have specific targets and goals									χ		χ
135	IT Staff have clear decision rights											χ
136	IT Staff have proper performance monitoring and evaluation									χ		χ
137	IT Staff have accountability statements											χ
138	Cross-training programs						χ		χ			χ
139	Employee's promotions are linked to their evaluation results											χ
140	Self-evaluations									χ		
141	Internal Audit									χ		
142	Audit by external third party									χ		
143	Auditors assigned by MEXT									χ		

ID	Description	BIA	BIS	VC	SC	SE	RM	DG	C	PEM	FS	HRM
144	Best practice framework									χ	χ	
145	Regular measurement and reporting of IT performance									χ		
146	Attitude toward reporting the performance of priority initiatives								χ	χ		
147	Adequate analysis, evaluation of the current and future use of IT			χ						χ		

APPENDIX G: ASSESSMENT OF THE CHALLENGES FACING JAPANESE NATIONAL UNIVERSITIES IN IMPLEMENTING IT GOVERNANCE SYSTEMS - SURVEY QUESTIONNAIRE

Japanese society is undergoing many challenges such as: global competition, aging society, decline birthrates, demise of traditional industries, as well as global environmental and resource issues. Japanese government focused on higher education to overcome these challenges.

Throughout its history, Japan has recognized the importance of education in developing the society and revitalizing economy. Since 1990s, Japanese higher education policy has been more economic-centered. The continuous changes in globalization trends and computerization in the "knowledge society" force the universities to be positioned under the limelight due to its vital role in facing the current opportunities and challenges.[1]

University governance plays a vital role in the running of any university and directing its effort toward the achievement of its objectives. "Universities are driven by complex cultural and motivational factors, arising from their status as non-profit organizations, which directly affect their management and governance."[2]. Guidelines, legislations, policies, procedures, management styles and reporting hierarchy are some of the methods applied to govern a university.

Nowadays IT plays a very important role in the running of organizations and universities are no exception. IT Governance is a subset of the university corporate governance and it is it implemented to govern and manage IT effectively. People, information, technology service, infrastructure, applications, culture, ethics, processes, principles, policies, frameworks and organizational structure are the tools for IT Governance. IT Governance concept is defined as "a set of relationships and processes designed to ensure that the organization's IT sustains

1 (Higher Education Policy Planning Division , 2011)

2 (Fernández & Llorens, 2009)

and extends the organization's strategies and objectives, delivering benefits and maintaining risks at an acceptable level."[3]. IT governance is often the weakest link in a corporation's overall governance structure.

The environmental challenges are threatening the existence of many universities and requiring a prompt attention. IT Governance may be the key for the universities to reposition itself and overcome the problems that threaten their existence.

This research aims to investigate the role that IT Governance plays in enhancing Japanese universities performance in areas such as: research, teaching and learning, competitiveness, and resources utilization.

Thank you and appreciate your help and cooperation

3 (Iliescu, 2010; Gunawan, Kalensun, Fajar, & Sfenrianto, 2018)

1. Identification

University name: _____

Participant age group: a) 21 - 40 b) 41 - 50 c) Above 50

2. General Information

2.1 Which title most closely resembles yours?

a) Vice President for Information and Technology
b) Executive Director of IT
c) Director of IT
d) Others, please specify_____

2.2 Are you officially designated as the top IT leader (e.g., CIO) of your institution?

a) Yes b) No

2.3 To which position(s) do you report? (Check all that apply)

a) University President
b) Provost/academic VP
c) Chief financial officer (CFO)
d) Chief administrative officer
e) Executive VP/COO
f) Dean
g) Other, please specify_____

2.4 To which position(s) does the top IT leader in your institution report? (Check all that apply)

a) University President
b) Provost/academic VP
c) Chief financial officer (CFO)
d) Chief administrative officer
e) Executive VP/COO
f) Dean
g) Other, please specify_____

2.5 How long have you been in your current position?

a) Less than one year
b) One to three years
c) Three to five years
d) Five to seven years
e) Seven to 10 years
f) 10 to 20 years
g) More than 20 years

2.6 At your institution, what is the estimated number of students?

a) Less than 1,000
b) Between 1,000 and 5,000
c) Between 5,000 and 10,000
d) Between 10,000 and 15,000
e) More than 15,000

2.7 You are personally very involved in university-wide activities connected to the acquisition, deployment, and management of information technology.

a) Strongly disagree b) Disagree c) Neither agree nor disagree d) Agree e) Strongly agree

2.8 At your institution, what is the estimated number of academic staff?

a) Less than 100
b) Between 100 and 200
c) Between 200 and 300
d) Between 300 and 400
e) Between 400 and 500
f) More than 500

2.9 At your institution, what is the estimated number of all administrative staff?

a) Less than 200
b) Between 200 and 400
c) Between 400 and 600
d) Between 600 and 800
g) More than 800

2.10 At your institution, what is the estimated number of staff reporting to the central IT department?

a) Less than 10
b) Between 10 and 20
c) Between 20 and 30
d) Between 30 and 40
e) Between 40 and 50
f) Between 50 and 60
g) Between 60 and 70
h) Between 70 and 80
i) Between 80 and 90
j) Between 90 and 100
k) More than 100

2.11 At your institution, what is the estimated number of IT staff reporting to other divisions?

a) Less than 10
b) Between 10 and 20
c) Between 20 and 30
d) Between 30 and 40
e) Between 40 and 50
f) Between 50 and 60
g) Between 60 and 70
h) Between 70 and 80
i) Between 80 and 90
j) Between 90 and 100
k) More than 100

2.12 Which statement best describes your institution?

a) Research and teaching are the primary missions, but research is what really drives faculty and institutional success.
b) Research and teaching are both primary missions, and they are equally important for faculty and institutional success.
c) Teaching is the primary mission, but faculty research is rewarded.
d) Teaching is the primary mission, and faculty research does not factor heavily in faculty and institutional success.

3. Principles, Policies and Frameworks

3.1 Does your institution's mission statement acknowledge Information Technology as a cornerstone of success?

a) Yes b) No c) I don't know

3.2 At your institution, IT strategy is strongly aligned with the university overall strategy?

a) Strongly disagree b) Disagree c) Neither agree nor disagree d) Agree e) Strongly agree

3.3 At your institution, the academic goals and IT goals are aligned.

a) Strongly disagree b) Disagree c) Neither agree nor disagree d) Agree e) Strongly agree

3.4 At your institution, what is the level of implementing the following…

Notes:

0 - Non-existent: Non recognized as specific area of activity.

1 – Initial: Recognized as specific area of activities yet, members are not aware of their existence.

2 - Repeatable: Recognized as specific area of activities and specific members will know them.

3 - Defined: Set of activities that are well understood by partners and processes are defined and documented.

4 - Managed: Achieves its purpose, is well defined, and its performance is (quantitatively) measured.

5 - Optimized: Achieves its purpose, is well defined, its performance is measured to improve performance and continuous improvement is pursued.

ID	Policy, plan, or procedure	a) 0	b) 1	c) 2	d) 3	e) 4	f) 5
3.4.1	IT Strategy						
3.4.2	Acceptable Use Policy						
3.4.3	IT Audit Charter						
3.4.4	IT Audit Procedures						

ID	Policy, plan, or procedure	a) 0	b) 1	c) 2	d) 3	e) 4	f) 5
3.4.5	IT Policy						
3.4.6	Business Continuity Plan						
3.4.7	Disaster Recovery Plan						
3.4.8	Incident Recovery Plan						
3.4.9	Security Awareness Plan						
3.4.10	Information Security						
3.4.11	Media Destruction, Retention & Backups						
3.4.12	Change Management						
3.4.13	Remote Access						
3.4.14	License Management						
3.4.15	User Lifecycle Management						
3.4.16	Risk Management						
3.4.17	IT Organizational Structure						
3.4.18	Back Up Plan						
3.4.19	Access Matrix						
3.4.20	BYOD (Bring Your Own Device)						
3.4.21	Technology Standards						
3.4.22	Network Set up and Documentation						
3.4.23	Third Party Vendor Policy						
3.4.24	Asset Control Policy						

ID	Policy, plan, or procedure	a) 0	b) 1	c) 2	d) 3	e) 4	f) 5
3.4.25	Internet and Email Usage Policy						
3.4.26	Personal Information Security Policy						
3.4.27	Intellectual Property Rights						
3.4.28	IT Services						
3.4.29	Delegation of authority policy						
3.4.30	Budgeting and delivery execution policy						
3.4.31	Performance measurement policy						
3.4.32	Rules for validating and approving mandatory reports						
3.4.33	Reporting and communications principles						
3.4.34	Transparency policy						

3.5 Please describe your institution's use of the following frameworks in its IT governance processes and structures.

Note: IT Governance is defined as "a set of relationships and processes designed to ensure that the organization's IT sustains and extends the organization's strategies and objectives, delivering benefits and maintaining risks at an acceptable level."

ID	Framework	a) Do not use	b) Use selected elements	c) Use most or all elements	d) Possess certification
3.5.1	COBIT (Control Objectives for Information and related Technology)				
3.5.2	ITIL (Information Technology Infrastructure Library)				
3.5.3	ISO/IEC 27001 (Information Security Management)				
3.5.4	ISO 9000 (Quality Management)				

ID	Framework	a) Do not use	b) Use selected elements	c) Use most or all elements	d) Possess certification
3.5.5	Val IT (Value from IT Investments)				
3.5.6	ISO/IEC 27002:2005 Information technology - Security techniques - Code of practice for information security controls				
3.5.7	BSC (Balanced Scorecard) - performance management				
3.5.8	COSO (The Committee of Sponsoring Organizations of the Treadway Commission) - risk management, internal control and fraud deterrence				
3.5.9	CMM (Capability Maturity Model)				
3.5.10	PMBOK (Project Management Body of Knowledge)				
3.5.11	ISO/IEC 38500: 2015 Information Technology - Governance Of IT for The Organization				

4. Processes

4.1 IT capabilities and requirement are always considered in any strategical change?
a) Strongly disagree b) Disagree c) Neither agree nor disagree d) Agree e) Strongly agree

4.2 What is the importance of IT plan? Please check the top three reasons. (Select up to three)
a) To align technology with other institutional priorities
b) To build alliances with key decision-makers
c) To identify opportunities to differentiate our institution competitively
d) To orient a new leader to the state of IT at the institution

e) To secure financial and other resources
f) To enhance IT service levels
g) To document institutional IT priorities
h) To keep an eye on the leading edge
i) To identify new service requirements
j) To Improve communications with users
k) To identify internal improvement opportunities
l) To increase top management support
m) To fulfill an administrative mandate for planning

4.3 Please identify the top three triggers for changes to IT priorities in your institution. (Select up to three)
a) Changes in the external environment (economy, marketplace)
b) Changes in institutional funding for IT
c) Legislative regulations
d) New institutional leadership
e) New IT leadership
f) New directives from the board of directors/regents/governors
g) New demands for IT services

4.4 At your institution, there are guidelines for each management structure (including mandate, objectives, meeting attendees, timing, tracking, supervision and oversight) as well as required inputs for and expected outcomes of meetings.
a) Strongly disagree b) Disagree c) Neither agree nor disagree d) Agree e) Strongly agree

5. Organizational Structure

5.1 At your institution, IT decision making is:
a) Centralized (central IT department who make all decisions related to IT)
b) Decentralized (every department – academic and administrative – is responsible for its use of IT. There is no central IT department)
c) Federal (there is a central IT department who delegates certain responsibilities to other sub units)
d) Others, please specify_____

5.2 At your institution, there is a centralized IT department that is responsible for setting the university IT laws and regulations, and then monitor, evaluate and direct the implementation of these laws and regulations.
a) Strongly disagree b) Disagree c) Neither agree nor disagree d) Agree e) Strongly agree

5.3 At your institution, academic department do make decisions related to IT without involving the central IT department.
a) Strongly disagree b) Disagree c) Neither agree nor disagree d) Agree e) Strongly agree

5.4 The IT steering committee has representatives from all groups of stakeholders.
a) Strongly disagree b) Disagree c) Neither agree nor disagree d) Agree e) Strongly agree

5.5 The business representatives on the IT steering committee have extensive IT knowledge.
a) Strongly disagree b) Disagree c) Neither agree nor disagree d) Agree e) Strongly agree

5.6 Does your institution's Board have a technology subcommittee?
a) Yes b) No c) I don't know

5.7 At your institution, the senior-most IT leader (e.g., CIO)..

D	Statement	a) Yes	b) No	c) I don't know
5.7.1	Has a permanent seat in the university highest strategic committee			
5.7.2	Participate in institutional planning, including non-IT planning?			

6. Stakeholders Engagement

6.1 How often your IT organization seeks input from the following constituencies

ID	Constituencies	a) Never	b) Rarely	c) Occasionally	d) Frequently	e) Very frequently
6.1.1	Trustees/regents/ governing board	0	1	2	3	4
6.1.2	President/ chancellor					
6.1.3	Provost/academic vice president					
6.1.4	Chief administrative officer					
6.1.5	Chief financial officer					
6.1.6	Deans					
6.1.7	Faculty members					
6.1.8	Students					
6.1.9	Department or unit heads					
6.1.10	IT vendors					
6.1.11	Industry partners					

6.1.12	Universities					
6.1.13	Ministry of Finance officials					
6.1.14	Ministry of Public Management and Home Affairs officials					
6.1.15	MEXT officials					

6.2 At your institution, you designed IT awareness programs for each group of stakeholders.
a) Strongly disagree b) Disagree c) Neither agree nor disagree d) Agree e) Strongly agree

6.3 How often does IT management communicate the management objectives and direction for IT to the university top management.
a) Never b) Rarely c) Sometimes d) Often e) Always

6.4 At your institution, the responsibility for sending out regular communications about IT has been assigned.
a) Strongly disagree b) Disagree c) Neither agree nor disagree d) Agree e) Strongly agree

6.5 The results of IT initiatives are regularly communicated to key stakeholders.
a) Strongly disagree b) Disagree c) Neither agree nor disagree d) Agree e) Strongly agree

7. Value Delivery

7.1 Members of my institution understand the degree to which IT achieves, or fails to achieve, its priorities.
a) Strongly disagree b) Disagree c) Neither agree nor disagree d) Agree e) Strongly agree

7.2 IT Budget is sufficient to serve all IT-related business needs?
a) Strongly disagree b) Disagree c) Neither agree nor disagree d) Agree e) Strongly agree

7.3 How would you characterize the budget climate of your institution in the past three years?
a) Decreasing budgets
b) Flat (stable) budgets
c) Increasing budgets

7.4 How would you characterize the budget climate of IT in the past three years?
a) Decreasing budgets
b) Flat (stable) budgets
c) Increasing budgets

7.5 At your institution, IT investments are……

ID	Statement	a) Strongly disagree	b) Disagree	c) Neither agree nor disagree	d) Agree	e) Strongly agree
7.5.1	Always linked to the university and IT priorities and objectives					
7.5.2	Planned properly with sufficient resources (budget, human resources, etc.)					
7.5.3	Completed successfully within the time frame					
7.5.4	Managed properly					
7.5.5	Evaluated and followed up					

7.6 At your institutions, academic departments implement their own information solutions with no involvement of the central IT department

a) Strongly disagree b) Disagree c) Neither agree nor disagree d) Agree e) Strongly agree

7.7 There is a clear mechanism to evaluate the return of IT investment.

a) Strongly disagree b) Disagree c) Neither agree nor disagree d) Agree e) Strongly agree

7.8 At your institution, there are duplications or overlaps between various initiatives or other forms of wasting resources.

a) Strongly disagree b) Disagree c) Neither agree nor disagree d) Agree e) Strongly agree

8. Culture, Ethics and Behavior

8.1 The job description of each employees includes specific requirements in role and responsibility descriptions regarding adherence to management and IT policies and procedures, the code of ethics, and professional practices.

a) Strongly disagree b) Disagree c) Neither agree nor disagree d) Agree e) Strongly agree

8.2 At your institution, you conduct regular discussion with all stakeholders to address all emerging challenges and needs.

a) Strongly disagree b) Disagree c) Neither agree nor disagree d) Agree e) Strongly agree

8.3 At my institution, IT initiatives challenge long-standing procedures and processes.

a) Strongly disagree b) Disagree c) Neither agree nor disagree d) Agree e) Strongly agree

8.4 My institution has a reputation for being forward-thinking in the use of IT.
a) Strongly disagree b) Disagree c) Neither agree nor disagree d) Agree e) Strongly agree

8.5 IT function have the full support, commitment, and buy-in from board and executive management
a) Strongly disagree b) Disagree c) Neither agree nor disagree d) Agree e) Strongly agree

8.6 At your institution, internal environment, including management culture and philosophy has been considered during the development of IT structure and processes.
a) Strongly disagree b) Disagree c) Neither agree nor disagree d) Agree e) Strongly agree

9. Risk

9.1 The enterprise risk assessments highly consider IT related risk
a) Strongly disagree b) Disagree c) Neither agree nor disagree d) Agree e) Strongly agree

9.2 The risk tolerance levels against the risk appetite are clearly articulated.
a) Strongly disagree b) Disagree c) Neither agree nor disagree d) Agree e) Strongly agree

9.3 At your institution, the risk communication plans are well defined and cover all stakeholders.
a) Strongly disagree b) Disagree c) Neither agree nor disagree d) Agree e) Strongly agree

9.4 At your institution, there are appropriate mechanisms to respond quickly to changing risk and report immediately to appropriate levels of management, supported by agreed principles of escalation (what to report, when, where and how).
a) Strongly disagree b) Disagree c) Neither agree nor disagree d) Agree e) Strongly agree

9.5 At your institution, how often do you experience…

ID	Incident	a) Very Frequently	b) Frequently	c) Occasionally	d) Rarely	e) Never
9.5.1	Data confidentiality incidents					
9.5.2	Data integrity incidents					
9.5.3	Data availability incidents					
9.5.4	IT incidents that were not identified in a risk assessment					
9.5.5	Noncompliance with IT related policies					

ID	Incident	a) Very Frequently	b) Frequently	c) Occasionally	d) Rarely	e) Never
9.5.6	Noncompliance with laws and legislations					
9.5.7	Project failure					
9.5.8	Application error					

9.6 At your institution, information security controls (such as the cryptographic system) have been enforced to protect sensitive information and proprietary/business secrets.
a) Strongly disagree b) Disagree c) Neither agree nor disagree d) Agree e) Strongly agree

9.7 At your institution, employees follow information security protocols, norms, and regulations.
a) Strongly disagree b) Disagree c) Neither agree nor disagree d) Agree e) Strongly agree

9.8 IT Governance consider enterprise and IT service continuity when defining roles, including staff back-up and cross training requirements.
a) Strongly disagree b) Disagree c) Neither agree nor disagree d) Agree e) Strongly agree

10. Information

10.1 At your institution, how would you rate the quality of reports produced by academic departments?
a) Very Poor b) Poor c) Fair d) Good e) Excellent

10.2 At your institution, how would you rate the quality of reports produced by administrative departments?
a) Very Poor b) Poor c) Fair d) Good e) Excellent

10.3 At your institution, reports requested from academic departments are provided in a very reasonable time.
a) Strongly disagree b) Disagree c) Neither agree nor disagree d) Agree e) Strongly agree

10.4 At your institution, reports requested from administrative departments are provided in a very reasonable time.
a) Strongly disagree b) Disagree c) Neither agree nor disagree d) Agree e) Strongly agree

10.5 At your institution, the flow of information between different processes and personnel is well understood and articulated in corresponding policies and procedures.
a) Strongly disagree b) Disagree c) Neither agree nor disagree d) Agree e) Strongly agree

10.6 At your institution, there is a comprehensive inventory of information (systems and data) that includes a listing of owners, custodians and classifications. It also Includes systems that are outsourced and those for which ownership should stay within the enterprise.
a) Strongly disagree b) Disagree c) Neither agree nor disagree d) Agree e) Strongly agree

10.7 At my institution, information is……

ID	Criteria	a) Strongly disagree	b) Disagree	c) Neither agree nor disagree	d) Agree	e) Strongly agree
10.7.1	Well defined					
10.7.2	Categorized or Classified					
10.7.3	Having a proper policies and procedures to be managed, control, and protected					
10.7.4	Protected against unproper access, modification, or dissemination through access controls mechanisms					
10.7.5	Properly backed up					
10.7.6	Important in decision making					
10.7.7	Readily available and easy to be collected and analyzed					
10.7.8	Centralized					

11. People, Skills, and Competencies

11.1 At your institution, the current number of IT human resources is sufficient to cover all university processes.
a) Strongly disagree b) Disagree c) Neither agree nor disagree d) Agree e) Strongly agree

11.2 At your institution, you conduct adequate analysis, evaluation of the future need of IT human resources
a) Strongly disagree b) Disagree c) Neither agree nor disagree d) Agree e) Strongly agree

11.3 At your institution, all IT staff are having……

ID	Criteria	a) Rarely	b) Sometimes	c) About half the time	d) Usually	e) Almost always
11.3.1	Clear roles and responsibilities					
11.3.2	Clear reporting line					
11.3.3	Required skills					
11.3.4	Specialized training and development programs					
11.3.5	Proper incentives to enhance performance					
11.3.6	Specific targets and goals					
11.3.7	Clear decision rights					
11.3.8	Proper performance monitoring and evaluation					
11.3.9	Accountability statements					

11.4 At your institution, you conduct cross-training programs to train business people about IT and/or training IT people about business.

a) Strongly disagree b) Disagree c) Neither agree nor disagree d) Agree e) Strongly agree

12. Monitoring, Evaluation, and Reporting

12.1 At your institution, IT evaluation and monitoring are very important, and these processes are performed in different level.

ID	process	a) Strongly disagree	b) Disagree	c) Neither agree nor disagree	d) Agree	e) Strongly agree
12.1.1	Employees promotions are linked to their evaluation results					
12.1.2	Self-evaluations					
12.1.3	Internal Audit					
12.1.4	Audit by external third party					
12.1.5	Auditors assigned by MEXT					
12.1.6	Best practice framework such as Balance Scorecards, KPI are used to measure performance					

12.2 At your institution, you organize regular measurement and reporting of IT performance.

a) Strongly disagree b) Disagree c) Neither agree nor disagree d) Agree e) Strongly agree

12.3 Which statement best characterizes your institution's attitude toward reporting the performance of priority initiatives?

a) Reporting performance is an important activity that is closely linked to the budget allocation process.
b) Reporting performance is an important activity but it is not closely linked to the budget allocation process.
c) My institution does not place much emphasis on reporting performance.

12.4 At your institution, you conduct adequate analysis, evaluation of the current and future use of IT.

a) Strongly disagree b) Disagree c) Neither agree nor disagree d) Agree e) Strongly agree

13. Conclusion

13.1May we contact you by phone or e-mail to obtain further insights or clarifications on your responses?

a) Yes b) No

13.2If yes, fill out the following table.

ID	Information	
13. 2.1	Name	
13. 2.2	Phone number	
13. 2.3	Email	

13.3Do you wish to receive a copy of the key findings from this study?

a) Yes b) No

13.4If you have any other comments or insights about IT Governance, please share them with us.

_____

_____

_____

You have reached the end of the survey. Thank you!

If you have any questions or concerns, please e-mail <fabdulrasool.85@gmail.com>

All comments are welcome and will be considered.

APPENDIX H: 国立大学の課題 IT ガバナンス・システム導入査定 –調査紙–

現在の日本社会に複数の課題が存在している。その中、国際的競争、人口の高齢化、少子化、伝統的業界の衰退があげられる。さらに、世界的にも環境問題と資源の問題が存在する。日本の政府は、上記の課題を克服するため高等教育に着目した。

日本の歴史の中では、社会の発展と経済の活性化における教育の重要性が認められている。1990 年代以降、日本の高等教育政策はより経済中心になっている。グローバル化の傾向と「知識社会」における情報化の継続的な変化に対応するにあたって、大学が重要な役割を果たすべきだと思われる。そのため、大学が注目される。[4]

大学のガバナンスは、大学運営に重要であり、目標を達成できるように、組織の努力を向けるうえで重要な役割も果たす。「大学は、非営利組織としての地位に起因する複雑な文化的要因および動機付け要因によって推進されており、これらの要因もまた管理およびガバナンスに直接影響される。」 ガイドライン、法律、ポリシー、手順、管理スタイル、報告階層は、大学を管理するために適用される方法の一部である。[5]

IT は組織の運営において極めて重要な役割を果たしており、大学の運営も例外ではない。IT ガバナンスは大学のコーポレート・ガバナンスのサブセットであり、IT を効果的に統制および管理するために実装されている。そのため、人事、情報、テクノロジーサービス、インフラストラクチャ、アプリケーション、文化、倫理、プロセス、指針、ポリシー、フレームワークおよび組織構造は、IT ガバナンスのツールである。IT ガバナンスは、「組織の IT がその組織の戦略と目標を維持し、拡張し、利益をもたらし、リスクを許容可能なレベルに維持するように設計された一連の関係とプロセス」[6]として定義される。 IT ガバナンスは、多くの場合、企業の全体的なガバナンス構造における一番の弱点である。

環境上の課題は、多くの大学の存在の脅威となっており、迅速な注意が必要である。IT ガバナンスは、社会における大学の地位を向上させ、大学の存在を脅かす問題を克服するための鍵となる可能性があると言えよう。

本研究の目的は、研究、教育、学習、競争力、リソース利用などの分野で日本の大学のパフォーマンスを向上させる上で IT ガバナンスが果たす役割を調査することである。

ご協力を感謝いたします。

4（高等教育局、2011）

5 (Fernández & Llorens, 2009)

6（Iliescu, 2010; Gunawan, Kalensun, Fajar, & Sfenrianto, 2018）

1. 基本情報

大学名：_____

実験協力者の年齢層:　　a) 21 歳以上 40 歳未満　　b) 41 歳以上 50 歳未満　　c) 50 歳以上

2. フェースシート

2.1 自分の職名に最も近い選択肢を選んでください。

e) IT 副学長
f) IT 担当常務
g) IT 担当役員
h) その他(詳細をご記入ください) _____

2.2 最高情報責任者（CIO 等）と正式に任命されていますか?

a) はい　　b) いいえ

2.3 上司にあたる職名の選択肢を選んでください（当てはまるものは全て選んでください）。

a) 学長。
b) 学園長 / 副学長
c) 最高財務責任者 (CFO)
d) 最高総務責任者 (CAO)
e) 最高執行責任者（COO）
f) 学部長
g) その他(職名をご記入ください) _____

2.4 情報責任者(リーダー)の上司にあたる職名を選択肢を選んでください（当てはまるものは全て選んでください）。

a) 学長
b) 学園長 / 副学長
c) 最高財務責任者 (CFO)
d) 最高総務責任者 (CAO)
e) 最高執行責任者（COO）
f) 学部長
g) その他(職名をご記入ください) _____

2.5 現在の職位についてからの期間を選んでください 。

h) 1 年未満

i) 1 年以上 3 年未満

j) 3 年以上 5 年未満

k) 5 年以上 7 年未満

l) 7 年以上 10 年未満

m) 10 年以上 20 年まで

n) 20 年を超える

2.6 貴校の想定されている学生の人数を選んでください。

h) 1,000 人未満

i) 1,000 人以上 5,000 人未満

j) 5,000 人以上 10,000 人未満

k) 10,000 人以上 15,000 人未満

l) 15,000 を超える

2.7 自分は、情報技術の取得、展開、管理に関連する大学全体の活動に非常に関与している。

a) 全くそう思わない b) あまりそう思わない c) どちらでもない d) そう思う e) 非常にそう思う

2.8 貴校の教員スタッフの想定されている人数をご記入ください。

f) 100 人未満

g) 100 人以上 200 人未満

h) 200 人以上 300 人未満

i) 300 人以上 400 人未満

j) 400 人以上 500 人未満

k) 500 を超える

2.9 貴校の全事務職員の想定されている人数をご記入ください。

e) 200 人未満

f) 200 人以上 400 人未満

g) 400 人以上 600 人未満

h) 600 人以上 800 人未満

i) 800 を超える

2.10貴校の中央 IT 部門に報告する職員の想定される人数をご記入ください。

a) 10 人未満
b) 10 人以上 20 人未満
c) 20 人以上 30 人未満
d) 30 人以上 40 人未満
e) 40 人以上 50 人未満
f) 50 人以上 60 人未満
g) 60 人以上 70 人未満
h) 70 人以上 80 人未満
i) 80 人以上 90 人未満
j) 90 人以上 100 人未満
k) 100 を超える

2.11貴校の他部門に報告する IT スタッフの想定される人数をご記入ください。

a) 10 人未満
b) 10 人以上 20 人未満
c) 20 人以上 30 人未満
d) 30 人以上 40 人未満
e) 40 人以上 50 人未満
f) 50 人以上 60 人未満
g) 60 人以上 70 人未満
h) 70 人以上 80 人未満
i) 80 人以上 90 人未満
j) 90 人以上 100 人未満
k) 100 を超える

2.12貴校に最も当てはまる選択肢を選んでください。

e) 研究および教育は主要なミッションであるが、研究は教員および組織の成功を本当に推進するものです。
f) 研究と教育はどちらも主要なミッションであり、教員と組織の成功にとって等しく重要である。
g) 教えることが第一の使命であるが、教員の研究は報われる。
h) 教育は主な使命であり、教員の研究は教員と組織の成功を大きく左右しない。

3. 指針・ポリシー・フレームワーク

3.1 貴校のミッションステートメントに、情報技術が成功の礎であることを認識していますか。

a) はい　　b) いいえ　　c) わからない

3.2 貴校は、IT 戦略は大学全体の戦略と整合されていますか？

a) 全くそう思わない　b) あまりそう思わない　c) どちらでもない　d) そう思う　e) 非常にそう思う

3.3 貴校は、IT の目標と学問的な目標と整合されていますか？

a) 全くそう思わない　b) あまりそう思わない　c) どちらでもない　d) そう思う　e) 非常にそう思う

3.4 貴校では、下記の項目はどのくらい実装されていますか？

備考:

0 - 存在しない：特定の活動として認められていない。

1 – 初期段階：特定の活動として認められているが、組織のメンバーが存在を認識していない。

2 - 反復可能: 特定の活動として認められている。特定の組織のメンバーは活動の存在を認識している。

3 - 定義された: 活動の内容はパートナーに正しく認識されている。活動の工程は定義されていて、記録されている。

4 - 管理されている状態 目的を達成し、明確に定義され、そのパフォーマンスが（定量的に）測定されます。

5 - 最適化: 目的を達成し、明確に定義され、パフォーマンスを測定してパフォーマンスを改善し、継続的な改善を追求します。

ID	項目：指針・計画・工程	a) 0	b) 1	c) 2	d) 3	e) 4	f) 5
3.4.1	IT 戦略						
3.4.2	利用規定方針						
3.4.3	IT 監査特許状						
3.4.4	IT 監査手順書						
3.4.5	IT 指針						
3.4.6	事業継続計画						
3.4.7	災害復旧計画						

ID	項目：指針・計画・工程	a) 0	b) 1	c) 2	d) 3	e) 4	f) 5
3.4.8	事件復旧計画						
3.4.9	安全意識計画						
3.4.10	情報安全						
3.4.11	メディア破棄、保存、バックアップ						
3.4.12	変更管理						
3.4.13	遠隔アクセス						
3.4.14	ライセンス管理						
3.4.15	ユーザー・ライフサイクル管理						
3.4.16	危機管理						
3.4.17	IT 組織図						
3.4.18	バックアッププラン						
3.4.19	アクセスマトリクス						
3.4.20	Bring Your Own Device（自分のデバイスを持ち込む）						
3.4.21	技術標準						
3.4.22	ネットワークセットアップおよびドキュメンテーション						
3.4.23	サードパーティベンダー方針						

ID	項目：指針・計画・工程	a) 0	b) 1	c) 2	d) 3	e) 4	f) 5
3.4.24	資産管理方針						
3.4.25	インターネットおよびメールの使用ポリシー						
3.4.26	個人情報セキュリティポリシー						
3.4.27	知的財産権						
3.4.28	IT サービス						
3.4.29	権限委譲ポリシー						
3.4.30	予算編成と配信の実行ポリシー						
3.4.31	パフォーマンス評価ポリシー						
3.4.32	必須レポートの検証と承認のルール						
3.4.33	報告書とコミュニケーションの原則						
3.4.34	透明性ポリシー						

3.5 貴校の、IT ガバナンス・プロセスと管理構造における下記のフレームワークの使用についてご記述ください

備考: IT ガバナンスは、「組織の IT がその組織の戦略と目標を維持し、拡張し、利益をもたらし、リスクを許容可能なレベルに維持するように設計された一連の関係とプロセス」として定義される。

ID	フレームワーク	a) 使用しない	b) 部分的に使用する	c) 全部、あるいはほぼ全てを使用している	d) 認証書を所有している
3.5.1	COBIT (Control Objectives for Information and related Technology)				
3.5.2	ITIL (Information Technology Infrastructure Library)				
3.5.3	ISO/IEC 27001 (Information Security Management)				
3.5.4	ISO 9000 (Quality Management)				
3.5.5	Val IT (Value from IT Investments)				
3.5.6	ISO/IEC 27002:2005 Information technology - Security techniques - Code of practice for information security controls				
3.5.7	BSC (Balanced Scorecard) - performance management				
3.5.8	COSO (The Committee of Sponsoring Organizations of the Treadway Commission) - risk management, internal control and fraud deterrence				

ID	フレームワーク	a) 使用しない	b) 部分的に使用する	c) 全部、あるいはほぼ全てを使用している	d) 認証書を所有している
3.5.9	CMM (Capability Maturity Model)				
3.5.10	PMBOK (Project Management Body of Knowledge)				
3.5.11	ISO/IEC 38500: 2015 Information Technology - Governance Of IT for The Organization				

4. 工程

4.5 IT の機能と要件は、戦略的な変更において常に考慮されますか？

a) 全くそう思わない b) あまりそう思わない c) どちらでもない d) そう思う e) 非常にそう思う

4.6 IT 計画の重要性とはですか？ 上位 3 つの理由を確認してください。（3 つまで選択）

h) テクノロジーと他組織の優先事項を整合する

i) 主要な意思決定者との提携を構築する

j) 機関を競争的に識別化するための機会を特定する

k) 新しいリーダーを組織の IT の状態を知らせる

l) 財務およびその他のリソースを確保する

m) IT サービスレベルを強化する

n) 組織の IT 優先順位を文書化する

o) 最先端に目を向ける

p) 新しいサービス要件を特定する

q) ユーザーとのコミュニケーションを改善する

r) 内部改善の機会を特定する

s) トップマネジメントのサポートを増やす

t) 計画の管理上の義務を果たす

4.7 IT 優先順位の変更を起こす最も影響力のある 3 つの要因を特定してください。（3 つまで選択）

a） 外部環境の変化（経済、市場）

b） IT の制度的資金の変更

c） 立法の規制

d） 組織の新しいリーダー

e） IT の新しいリーダー

f） 理事会/議員/総裁からの新しい指令

g） IT サービスに対する新たな需要

4.8 貴校には、各管理構造（委任、目標、会議出席者、タイミング、追跡、監督、監視を含む）に加えて、会議に必要な入力と予想される結果に関するガイドラインがありますか？

a) 全くそう思わない b) あまりそう思わない c) どちらでもない d) そう思う e) 非常にそう思う

5. 組織構造

5.1 貴校は、IT の意思決定は次のとおりですか？

e） 集中管理（IT に関連するすべての決定を行うのは中央 IT 部門）

f） 分散管理（学科および管理部門が IT の使用に責任を負う。中央の IT 部門はない）

g） 連邦的管理（特定の責任を他のサブユニットに委任する中央 IT 部門があります）

h） その他(ご記入ください)_____

5.2 貴校は、大学の IT 法規制を設定し、これらの法規制の実施を監視、評価、および指示する中央 IT 部門がありますか？

a) 全くそう思わない b) あまりそう思わない c) どちらでもない d) そう思う e) 非常にそう思う

5.3 貴校は、中央の IT 部門が関与することなく、学術部門が IT に関連する決定を行いますか？

a) 全くそう思わない b) あまりそう思わない c) どちらでもない d) そう思う e) 非常にそう思う

5.4 IT 運営委員会には、すべての利害関係者（ステークホルダー）グループの代表者がいますか？

a) 全くそう思わない b) あまりそう思わない c) どちらでもない d) そう思う e) 非常にそう思う

5.5 IT 運営委員会のビジネス代表者は、広範な IT 知識を持っていますか。

a) 全くそう思わない b) あまりそう思わない c) どちらでもない d) そう思う e) 非常にそう思う

5.6 貴校の理事会にはテクノロジー小委員会がありますか？

a) はい b) いいえ c) わからない

5.7 貴校の最上級の IT リーダー（CIO など）の役割にに関して

ID	質問	a) はい	b) いいえ	c) わからない
5.7.1	大学最高戦略委員会の常任議席を持っていますか？			
5.7.2	非 IT 計画を含む制度計画に参加していますか？			

6. ステークホルダーの IT との関わりの度合い

6.1 貴校の IT 組織はどのくらいの頻度で下記の関係者からインプットを求めますか？

ID	機関・	a) 一切起きない	b) 滅多に	c) たまに	d) 頻繁に	d) 頻繁に
6.1.1	評議員/理事/理事会					
6.1.2	社長/総長					
6.1.3	プロボスト/学術副社長					
6.1.4	最高総務責任者 (CAO)					
6.1.5	最高財務責任者(CFO)					
6.1.6	学部長					
6.1.7	教員					
6.1.8	学生					
6.1.9	専攻長あるいは領域長					
6.1.10	IT ベンダー					

ID	機関・	a) 一切起きない	b) 滅多に	c) たまに	d) 頻繁に	d) 頻繁に
6.1.11	業界のパートナー					
6.1.12	（他の）大学					
6.1.13	財務省職員					
6.1.14	公務省内務省職員					
6.1.15	文部科学省職員					

6.2 利害関係者の各グループ向けに IT 認識プログラムを設計されていますか。
a) 全くそう思わない b) あまりそう思わない c) どちらでもない d) そう思う e) 非常にそう思う

6.3 IT 管理は、大学のトップマネジメントに IT の管理目標と方向をどのくらいの頻度で伝えますか
a) しない b) まれにする c) 時々する d) 頻繁にする e) 常にする

6.4 貴校では、IT に関する定期的な連絡を送信する責任者が決まっていますか？
a) 全くそう思わない b) あまりそう思わない c) どちらでもない d) そう思う e) 非常にそう思う

6.5 IT イニシアチブの結果は、主要な利害関係者に定期的に伝えられます。
a) 全くそう思わない b) あまりそう思わない c) どちらでもない d) そう思う e) 非常にそう思う

7. バリューデリバリー

7.1 貴校のメンバーは、IT がその優先順位を達成している、または達成していない度合いを理解していますか？
a) 全くそう思わない b) あまりそう思わない c) どちらでもない d) そう思う e) 非常にそう思う

7.2 IT 予算は、IT 関連のすべてのビジネスニーズを満たすのに十分ですか？
a) 全くそう思わない b) あまりそう思わない c) どちらでもない d) そう思う e) 非常にそう思う

7.3 過去 3 年間の貴校の予算環境をどのように特徴付けますか？
d) 予算の削減
e) 予算額安定
f) 予算の増額

7.4 過去 3 年間の IT の予算環境をどのように特徴付けますか？

a） 予算の削減

b） 予算額安定

c） 予算の増額

7.5 貴校の IT 投資についてご回答ください

ID	質問	a) 全くそう思わない	b) あまりそう思わない	c) どちらでもない	d) そう思う	e) 非常にそう思う
7.5.1	常に大学および IT の優先事項および目標とリンクされていますか？					
7.5.2	十分なリソース（予算、人事など）で適切に計画されていますか？					
7.5.3	時間枠内に正常に完了されていますか。					
7.5.4	適切に管理されていますか？					
7.5.5	評価およびフォローアップされていますか？					

7.6 貴校は、学術部門が中央 IT 部門の関与なしに独自の情報ソリューションを実装しますか？

a) 全くそう思わない b) あまりそう思わない c) どちらでもない d) そう思う e) 非常にそう思う

7.7 IT 投資の収益を評価する明確なメカニズムがありますか？

a) 全くそう思わない b) あまりそう思わない c) どちらでもない d) そう思う e) 非常にそう思う

7.8 貴校には、さまざまなイニシアチブの間で重複、あるいはは他の形のリソースの浪費がありますか？

a) 全くそう思わない b) あまりそう思わない c) どちらでもない d) そう思う e) 非常にそう思う

8. 文化、倫理および行動

8.1 各従業員の職務内容には、管理および IT のポリシーと手順、倫理規定、および専門的慣行の順守に関する役割と責任の記述の特定の要件が含まれますか？

a) 全くそう思わない b) あまりそう思わない c) どちらでもない d) そう思う e) 非常にそう思う

8.2 貴校は、すべての新たな課題とニーズに対処するために、すべての利害関係者（ステークホルダー）と定期的に議論を行いますか？

a) 全くそう思わない b) あまりそう思わない c) どちらでもない d) そう思う e) 非常にそう思う

8.3 貴校は、IT イニシアチブが長年にわたる手順とプロセスに挑戦していますか？

a) 全くそう思わない b) あまりそう思わない c) どちらでもない d) そう思う e) 非常にそう思う

8.4 貴校は、IT の使用について前向きであるという評判を持っていますか？

a) 全くそう思わない b) あまりそう思わない c) どちらでもない d) そう思う e) 非常にそう思う

8.5 IT 機能には、取締役会および経営陣からの完全なサポート、コミットメント、および賛同がありますか？

a) 全くそう思わない b) あまりそう思わない c) どちらでもない d) そう思う e) 非常にそう思う

8.6 貴校では、IT 構造とプロセスの開発中に、管理文化や理念を含む内部環境が考慮されていますか？

a) 全くそう思わない b) あまりそう思わない c) どちらでもない d) そう思う e) 非常にそう思う

9. リスク

9.1 エンタープライズリスク評価では、IT 関連のリスクを非常に考慮していますか？

a) 全くそう思わない b) あまりそう思わない c) どちらでもない d) そう思う e) 非常にそう思う

9.2 リスク選好（リスクアペタイト）に対するリスク許容レベルは明確に表されていますか？

a) 全くそう思わない b) あまりそう思わない c) どちらでもない d) そう思う e) 非常にそう思う

9.3 リスクコミュニケーション計画が明確に定義されており、すべての利害関係者を網羅していますか？

a) 全くそう思わない b) あまりそう思わない c) どちらでもない d) そう思う e) 非常にそう思う

9.4 貴校には、リスクの変化に迅速に対応し、エスカレーションの合意された原則（報告対象、時期、場所、方法）に裏付けられた適切なレベルの管理者に直ちに報告するための適切なメカニズムがありますか？

a) 全くそう思わない b) あまりそう思わない c) どちらでもない d) そう思う e) 非常にそう思う

9.5 貴校では、どれくらいの頻度で下記の出来事が起きますか。

ID	出来事	a) 頻々と	b) 頻繁に	c) たまに	d) 滅多に	a) 一切起きない
9.5.1	データ機密インシデント					
9.5.2	データ整合性インシデント					
9.5.3	データ可用性インシデント					
9.5.4	リスク評価で特定されなかった IT インシデント					
9.5.5	IT 関連ポリシーの違反					
9.5.6	法律および法律の違反					
9.5.7	プロジェクトの失敗					
9.5.8	アプリケーションエラー					

9.6 貴校には、機密情報と専有情報/ビジネス秘密を保護するために、情報セキュリティ制御（暗号化システムなど）が実施されていますか？

a) 全くそう思わない b) あまりそう思わない c) どちらでもない d) そう思う e) 非常にそう思う

9.7 貴校には、従業員は情報セキュリティのプロトコル、規範、規制に従いますか？

a) 全くそう思わない b) あまりそう思わない c) どちらでもない d) そう思う e) 非常にそう思う

9.8 IT ガバナンスは、スタッフのバックアップやクロストレーニングの要件などの役割を定義する際に、エンタープライズおよび IT サービスの継続性を考慮しますか？

a) 全くそう思わない b) あまりそう思わない c) どちらでもない d) そう思う e) 非常にそう思う

10. 情報

10.1 貴校の学部で作成されたレポート（報告書）の品質をどのように評価しますか。

a）非常に悪い b）悪い c）適切 d）良い e）非常に良い

10.2 貴校の管理部で作成されたレポート（報告書）の品質をどのように評価しますか。

a）非常に悪い b）悪い c）適切 d）良い e）非常に良い

10.3貴校では、学部に依頼されたレポート（報告書）は適切な時間内に提出されていると思いますか。

a) 全くそう思わない　b) あまりそう思わない　c) どちらでもない　d) そう思う　e) 非常にそう思う

10.4貴校では、管理部に依頼されたレポート（報告書）は適切な時間内に提出されていると思いますか。

a) 全くそう思わない　b) あまりそう思わない　c) どちらでもない　d) そう思う　e) 非常にそう思う

10.5貴校では、さまざまなプロセスと担当者間の情報の流れをよく理解され、対応するポリシーと手順に明確に記述されていますか？

a) 全くそう思わない　b) あまりそう思わない　c) どちらでもない　d) そう思う　e) 非常にそう思う

10.6貴校には、所有者、カストディアン、および分類のリストを含む情報（システムおよびデータ）の包括的なインベントリがありますか？ 本質問項目に、外部委託されたシステムも所有権が企業内に留めるべきシステムも含まれます。

a) 全くそう思わない　b) あまりそう思わない　c) どちらでもない　d) そう思う　e) 非常にそう思う

10.7貴校の「情報」の取り扱い・役割について

ID	基準	a) 全くそう思わない	b) あまりそう思わない	c) どちらでもない	d) そう思う	e) 非常にそう思う
10.7.1	明確に定義されている					
10.7.2	分類されている					
10.7.3	適切なポリシーと手順を管理し、制御され、および保護されている					
10.7.4	アクセス制御メカニズムにより、不適切なアクセス、変更、または配布から保護されている					
10.7.5	適切にバックアップがとっている					

ID	基準	a) 全くそう思わない	b) あまりそう思わない	c) どちらでもない	d) そう思う	e) 非常にそう思う
10.7.6	意思決定において重要とされている					
10.7.7	すぐに利用ができ、収集と分析が容易である					
10.7.8	一元化されている					

11. 人、スキル、能力

11.1貴校では、現在の IT 人材の数で大学のすべてのプロセスをカバーできますか？

a) 全くそう思わない b) あまりそう思わない c) どちらでもない d) そう思う e) 非常にそう思う

11.2貴校では、IT の人材に関する適切な分析と評価が実施されていますか？

a) 全くそう思わない b) あまりそう思わない c) どちらでもない d) そう思う e) 非常にそう思う

11.3の全 IT スタッフのあり方について答えてください

ID	基準	a) ほとんどない	b) 時々ある	c) 約半分の場合ある	d) あることが多い	a) ほとんどの場合ある
11.3.10	明確な役割と責任範囲が施されていますか？					
11.3.11	明確な報告ルートがありますか？					
11.3.12	業務に必要なスキルを持っていますか？					

ID	基準	a) ほとんどない	b) 時々ある	c) 約半分の場合ある	d) あることが多い	a) ほとんどの場合ある
11.3.13	専門的なトレーニングと開発プログラムがありますか？					
11.3.14	パフォーマンスを向上させるための適切なインセンティブがありますか？					
11.3.15	具体的な目標と目標がありますか？					
11.3.16	それぞれのスタッフの明確な決定権が決められていますか？					
11.3.17	適切なパフォーマンスの監視と評価が行われていますか？					
11.3.18	説明責任明細書（ステートメント）の使用が行われていますか？					

11.4貴校では、クロストレーニングプログラムを実施して、ビジネスパーソンに IT についてトレーニングしていますか？あるいは、IT パーソンにビジネスについてトレーニングしますか？

a) 全くそう思わない　b) あまりそう思わない　c) どちらでもない　d) そう思う　e) 非常にそう思う

12. 監視、評価、報告

12.1貴校では、IT 評価と監視が非常に重要であり、下記のプロセスは異なるレベルで実行されますか？

ID	プロセス	a) 全くそう思わない	b) あまりそう思わない	c) どちらでもない	d) そう思う	e) 非常にそう思う
12.1.1	評価結果は従業員の昇進に反映されていますか。					
12.1.2	自己評価					
12.1.3	内部監査					
12.1.4	外部の第三者による監査					
12.1.5	文部科学省が割り当てた監査役					
12.1.6	バランススコアカード、KPI などのベストプラクティスフレームワーク（組織体系）を使用してパフォーマンスを測定しますか？					

12.2貴校では、IT パフォーマンスの定期的な測定とレポートを設けていますか？

a) 全くそう思わない　b) あまりそう思わない　c) どちらでもない　d) そう思う　e) 非常にそう思う

12.3優先度の高いイニシアチブのパフォーマンスを報告することに対する貴校の姿勢を最もよく表している選択肢を選んでください。

d) パフォーマンスの報告は、予算配分プロセスに密接に関連する重要なアクティビティである。

e) パフォーマンスの報告は、重要なアクティビティであるが、予算配分プロセスに密接に関連されていない。

f) パフォーマンスの報告はあまり重要視されていない。（重点に置いていない）

12.4 貴校では、IT の現在および将来の使用に関する適切な分析、評価を実施しますか？

a) 全くそう思わない　b) あまりそう思わない　c) どちらでもない　d) そう思う　e) 非常にそう思う

13. おわりに

13.1 ご回答に関する補助的確認または詳細の説明をいただくため、電話あるいは電子メールでご連絡してもよろしいでしょうか？

a) はい　　b) いいえ

13.2 ご連絡しても良い場合、下記のスペースにご連絡先をご記入ください 。

ID	情報	
13. 2.1	ご氏名	
13. 2.2	電話番号	
13. 2.3	電子メールアドレス	

13.3 本研究の主な結果まとめの受信を希望されますか。

a) はい　　b) いいえ

13.4 IT ガバナンスについて他に何かのコメントやご意見がある場合は、ぜひ教えてください。

_____

_____

_____

アンケートが終了しました。お疲れ様です。

ご協力ありがとうございました

ご質問、不明な点がございましたら、下記のメールまでにお尋ねください**<fabdulrasool.85@gmail.com>**

コメントを大歓迎いたします

APPENDIX I: ALUMNI SERVICES IN JAPANESE NATIONAL UNIVERSITIES (NUC) - SURVEY QUESTIONNAIRE -

Universities worldwide have recognized the strategic value of bonding strong ties with their alumni to face the unprecedented environmental challenges embodied in privatization, shrinking budgets, and the intensified competition in the marketplace. Therefore, several actions and measures under the name of "Alumni Services" have been taken by universities to build a life-long relation with their alumni. Innovative embracement and utilization of alumni services programs could bring an array of benefits to both parties, alumni, and the university. It may open up a new avenue for universities to attract students, elevate its reputation and image, and increase financial income. In returns, universities may provide considerable benefits and services to their alumni for example social networking platforms and events, professional support, discounts, free services, and physical and logical access to university resources and facilities.

Alumni services programs relies heavily on information technology resources to connect and communicate with their alumni; exchange and publish information; collect, store, and analyze information; and automating certain activities, for instance money donations. The governance and the quality of technologies used may positively or negatively affect alumni programs performance. In addition, it may pose new challenges especially service continuity and data management issues that include but not limited to information security, privacy, and ownership.

Despite the international elevated attention towards the benefits of alumni services programs, the research in this field at Japanese universities is scarce, the only available study in this field was conducted by Okawa et al., (2015) where the survey data were collected in March 2013. [7] After eight years, we would like to pay our gratitude to the first runner researchers, i.e., Okawa, Yamashita, & Junro), who took the initiative to survey alumni services status at Japanese universities by conducting a follow up study. Considering the escalated environmental crises exhibited in the wide spread of the novel corona virus and forcing universities to shift their

[7] Okawa, K., Shimada, T., Yamashita, Y., & Junro, N. (2015). Alumni Services at Japanese Universities: The Present State and Issues Based on a Nationwide Survey. University Review, 47, 185 - 200.

entire activities to online platform, new elements that investigate the impact of Information Technology Governance on the effectiveness of "Alumni Services" has been included.

1. Identification

University name: _____

Participant age group: a) 21 - 40 b) 41 - 50 c) Above 50

Participant job title: _____

2. General Information

2.1 To which position(s) do you report? (Check all that apply)

a) University President
b) Provost/academic VP
c) Chief financial officer (CFO)
d) Chief administrative officer
e) Executive VP/COO
f) Dean
g) Other, please specify_____

2.2 At your institution, what is the estimated number of students?

a) Less than 1,000
b) Between 1,000 and 5,000
c) Between 5,000 and 10,000
d) Between 10,000 and 15,000
e) More than 15,000

2.3 At your institution, the main financial resource to cover administrative expenses is:

a) Governmental subsidies
b) Student tuition fees
c) Alumni donations
d) Donations from other community members (parents, associations, etc...)
e) Others

3. Alumni Engagement Goals and Objectives

3.1 At your institution, what are the medium-term goals and plans pertaining to "Alumni Services".

_____
_____
_____

3.2 At your institution, what is the purpose of implementing "alumni services"? (Check all that apply)

a) Increase alumni Interest in their alma mater
b) Maintaining the relationship with the alumni
c) Formation of university network
d) Fundraising
e) Helping students and alumni in recruitment and job-hunting
f) Responding to the needs of graduates
g) Uplifting the love of the university
h) Activation of research activities at the university
i) Revitalization of educational activities at universities

j) Improving the social reputation of the university
k) University responsibilities to the alumni
l) Securing and increasing university applicants
m) Part of social contribution and community outreach activities
n) Revitalization of the area where the university is located
o) Enhancing university management
p) Improving the social status of graduates
q) Improving the "quality of life" of graduates
r) Connecting with researchers and educators
s) Mentoring and providing career advice for students
t) Improving university internationalization status (recruitment of international students, exchanges with overseas universities, and dispatch of Japanese students to study abroad)
f) Others, please specify

3.3 From the list in the previous question (), rank the three most important sough-for benefits of implementing "alumni services" at your institution.
1.
2.
3.

4. Current Status of Alumni Services

4.1 At your institution, what is the percentage of “Inactive” alumni, who held no connection or contribution of any type?
a) Less than 5%
b) Around 25%
c) Around 50%
d) Around 75%
e) More than 95%

4.2 At your institution, what is the percentage of “Volunteer” alumni, who donate their time and effort to support their university and do not provide any kind of financial support?
a) Less than 5%
b) Around 25%
c) Around 50%
d) Around 75%
e) More than 95%

4.3 At your institution, what is the percentage of “Donor” alumni, who provide only financial support to the university.
a) Less than 5%
b) Around 25%
c) Around 50%
d) Around 75%
e) More than 95%

4.4 At your institution, what is the percentage of “Supporter” alumni, who provide their full support by sacrificing their time, effort, and money.

a) Less than 5%
b) Around 25%
c) Around 50%
d) Around 75%
e) More than 95%

4.5 At your institution, what factors have been studied to elevate Alumni Services" programs?

a) Individual donor characteristics
b) Alumni professional and personal connections
c) Fundraising practices
d) External environment
e) Institutional characteristics

4.6 At your institution, the emotional attachment between university academic and administration staff, and alumni during their studies has been identified as a key success factor for the "Alumni Services" program.

a) Strongly disagree b) Disagree c) Neither agree nor disagree d) Agree e) Strongly agree

4.7 In your opinion, do you feel that there is a need for implementation "Alumni Services"?

a) Strongly disagree b) Disagree c) Neither agree nor disagree d) Agree e) Strongly agree

4.8 At your institution, the implementation of "alumni services" is of great importance.

a) Strongly disagree b) Disagree c) Neither agree nor disagree d) Agree e) Strongly agree

4.9 At your institution, the implemented "alumni services" fulfill the alumni needs and expectations.

a) Strongly disagree b) Disagree c) Neither agree nor disagree d) Agree e) Strongly agree

4.10 At your institution, the impact of the technologies used in student satisfaction has been evaluated.

a) Strongly disagree b) Disagree c) Neither agree nor disagree d) Agree e) Strongly agree

4.11 At your institution, the impact of the technologies used in alumni satisfaction has been evaluated.

a) Strongly disagree b) Disagree c) Neither agree nor disagree d) Agree e) Strongly agree

4.12 How would you rate the quality of alumni data?

a) Very Poor b) Poor c) Fair d) Good e) Excellent

4.13 How would you rate the quality of alumni reports?

a) Very Poor b) Poor c) Fair d) Good e) Excellent

4.14 In your opinion, your institution has fully achieved the stated goals of "Alumni Services" programs.

a) Strongly disagree b) Disagree c) Neither agree nor disagree d) Agree e) Strongly agree

4.15 In your opinion, the novel corona virus pandemic affects the institution ability to conduct "Alumni Services" programs.

a) Strongly disagree b) Disagree c) Neither agree nor disagree d) Agree e) Strongly agree

4.16 At your institution, the available IT structure and solutions are effective in handling the shift from in-person "Alumni Services" to online platforms.

a) Strongly disagree b) Disagree c) Neither agree nor disagree d) Agree e) Strongly agree

4.17 How would you characterize the alumni financial support in the past year?

g) Decreasing
h) Flat (stable)
i) Increasing

5. Alumni and Alumni Services Tools

5.1 At your institution, what are the strategies adopted to enhance "alumni services" programs?

a) Dissemination of university Information
b) Social activities and events
c) Alumni portals
d) Alumni networks
e) Homecoming days
f) Alumni database
g) Trips
h) Alumni Feedback surveys
i) Student-faculty interrelation
j) Employment and career support
k) Granting discount on products, services, or courses
l) Establishing and supporting overseas alumni associations
m) Providing an online access to the digital library and periodicals
n) Access to the university facilities such as fitness centre
o) Providing counselling services for alumni family, relatives, and partners.
p) Providing several consultation services (legal, financial, and academic)
q) Health promotion support

5.2 At your institution, how is your alumni portal implemented?

a) Mobile Application
b) Website
c) Facebook

5.3 At your institution, what are the functionalities of alumni portal?

a) Mentoring between alumni and other university stakeholders (current students, faculty, staff, and guests)
b) Providing alumni with information about the university and university events
c) Provides a functionality to donate money to the university
d) Connecting alumni with their fellow classmates, professors and university personnel to share professional or personal advice; explore mutual interests; and finding new opportunities.
e) Others, please specify

5.4 At your institution, what are the channels utilized to disseminate information to alumni?

a) University websites
b) University publications newsletters, magazines, brochures, etc.
c) Emails
d) Social media accounts
e) Alumni portals
f) Social activities and events
g) Others, please specify

5.5 At your institution, which kind of employment support is provided?

a) Employment support for fresh graduates (Early career counselling, recruitment, and job-hunting)
b) Employment support for undecided alumni
c) Establishment of employment guidance room
d) Career advancement support for medical workers
e) Teachers training seminars and workshops
f) Providing ongoing professional support, consultation, and opportunities
g) Others, please specify

6. Alumni Engagement Struggles

6.1 At your institution, what are the issues or problems affect an effective of "Alumni Services"? (Check all that apply)

a) Alumni information management
b) Alumni information security
c) Increasing burden on university staff
d) Locating and connecting with alumni
e) Lack of clerical and administrative staff
f) Implementation and operating expenses
g) Correspondence with alumni association organization
h) Few participants in planning
i) Lack of university-wide unity (university-wide awareness)
j) Installation of on-campus consent
k) Increased burden on indifferent faculty members of graduates
l) University location conditions
m) Formulation and implementation of Alumni Services" programs
n) Volatile nature of alumni/university relation
o) Alumni buy-in and support
p) Short-sighted vision and strategies
q) The focused mainly on university gains
r) Lack of top management buy-in and support
s) IT capabilities

6.2 At your institution, "Alumni Services" is strategically developed, implemented, monitored, and updated regularly to address any change in the internal and external environment.

a) Strongly disagree b) Disagree c) Neither agree nor disagree d) Agree e) Strongly agree

7. IT/Business Alignment and Collaboration

7.1 At your institution, IT capabilities and requirement are always considered in any strategical change related to "Alumni Services"?

a) Strongly disagree b) Disagree c) Neither agree nor disagree d) Agree e) Strongly agree

7.2 To what extent does the implemented technologies help the university in improving the "Alumni Services" programs?

a) Very Poor b) Poor c) Fair d) Good e) Excellent

7.3 At your institution, data mining techniques has been utilized to enrich "Alumni Services" programs.
a) Strongly disagree b) Disagree c) Neither agree nor disagree d) Agree e) Strongly agree

7.4 At your institution, student affairs, academic affairs, and alumni services has been of integrated and directed towards shared goals to enhance organizational image and students experience.
a) Strongly disagree b) Disagree c) Neither agree nor disagree d) Agree e) Strongly agree

8. Organizational Structure

8.1 At your institution, there is a centralized "Alumni Services" federation that governs and manages all independent "Alumni Services" associations of each Faculty.
a) Yes b) No

If your answer is “No”, please skip the following three questions (8.1.1, 8.1.2 & 8.1.3)

8.1.1. where is it located in the university organizational structure (e.g., under the deanship of student affairs, student services, etc.)

8.1.2. In which year, the "Alumni Services" federation was established?

8.1.3. At your institution, the university president is the honorary president of the "Alumni Services" federation.
a) Yes b) No

8.2 At your institution, which of the following positions or structures are implemented? (Check all that apply)
a) Chief Information Officer
b) Data Specialist
c) Chief Information Security Officer (CISO)
d) Chief Data Officer (CDO)
e) Chief Technology Officer
f) Privacy Officer (Data Protection Officer)

8.3 At your institution, which of the following positions or structures are members of "Alumni Services" committee? (Check all that apply)
a) Chief Information Officer
b) Data specialist
c) Chief information security officer (CISO)
d) Chief Data Officer (CDO) focus mainly on Data Governance.
e) Chief Technology Officer
f) Privacy Officer (Data Protection Officer)
g) Relationship Manager
h) Student affairs
i) Chief Financial Officer

9. Information Security

9.1 At your institution, what strategies have been implemented to improve security landscape? (Check all that apply)

a) Effective strategies, and guiding policies and procedures
b) IT/Business collaboration and alignment
c) Information security awareness programs
d) Advanced security technologies
e) Organizational structure with clear roles and responsibilities
f) Ongoing monitoring and evaluation
g) Data management
h) RACI (Responsible-Accountable-Consulted-Informed) matrix
i) Adopting security management best-practices standards such as ISO27001
j) Others, please specify

9.2 At your institution, what are the major alumni data security concerns?

a) Access rights
b) Ethical use of alumni data
c) Security awareness
d) Availability of guiding policies and procedures,
e) Data ownership
f) Compliance with internal and external laws and legislations.
g) Others, please specify

10. Conclusion

10.1 May we contact you by phone or e-mail to obtain further insights or clarifications on your responses?

a) Yes b) No

10.2 If yes, fill out the following table.

ID	Information	
13. 2.4	Name	
13. 2.5	Phone number	
13. 2.6	Email	

10.3 Do you wish to receive a copy of the key findings from this study?

a) Yes b) No

10.4 If you have any other comments or insights about IT Governance, please share them with us

_____
_____
_____

<u>You have reached the end of the survey. Thank you!</u>

If you have any questions or concerns, please e-mail <fabdulrasool.85@gmail.com>

All comments are welcome and will be considered.

APPENDIX J: 国立大学法人（NUC）における「卒業生サービス」アンケート調査

現在全世界の大学では、市場上での競争的環境の激化　法人化・民営化、予算削減など環境による大学経営を取り巻く諸問題と向き合うため卒業生との絆を強めることの方略的価値が認識されています。つまり、卒業生との長い関係を気づくために複数のアクションと対策が施されていると言えます。このような卒業生向けのサービス・プログラム（以下卒業生サービス）のイノベーションを含んだ前向きな導入および使用は、大学と卒業生両者に多くのプラスの要素をもたらせると思われます。大学には学生を見つけるための新しい方法になり、名声とイメージを向上し、金銭的な収支を増やすことも可能でしょう。一方、大学は卒業生に対して複数の有益な手当てやサービスを与えられる。例えば、人脈づくりの場やイベント、キャリアーのサポート、有料なサービスでの割引、無料サービス使用、そして大学の資源と施設への物理的アクセス・論理的アクセスなどが考えられます。

卒業生サービスは、情報技術資源（IT リソース）を基盤にするものであり、そのリソースにより連絡ができるようになり卒業生とコミュニケーションをとり、情報交換あるいは情報を投稿します。そして、いくつかの操作（例えば寄附）がオートメーション化されます。使用される技術の品質とガバナンスそのものは、卒業生サービスのパフォーマンスに良い影響あるいは悪影響を及ぼすことも考えられます。尚、新たなるチャレンジが現れることも予想できます。特に、サービス継続性と、情報保護、プライバシー、所有権などのデータマネジメントの問題が考えられる。

卒業生サービスは国際的に注目を浴びている話題でありながら、日本の大学でのこのテーマに対しての研究が少ないと思われます。卒業生サービスを取り扱っている研究は大川・西出・山下（2015）1 であり、そのデータ収集が行われたのは 2013 年 3 月になります。8 年後の今は、日本の大学での卒業生サー8ビスのアンケートを行われた先駆者の大川先生、西出先生、山下先生の三方の研究チームに敬意と感謝の念を表し、フォローアップの研究を実施したいと思う所存です。新型コロナウィルスのパンデミックによる環境的な問題のエスカレーションを見込み、大学は全ての活動をオンライン化になっていることも視野に入れ、情報ガバナンスの卒業生サービスへの影響を探るための新しい調査項目を用意しています。

ご協力に感謝いたします。

よろしくお願い申し上げます。

[8] Okawa, K., Shimada, T., Yamashita, Y., & Nishide, J. (2015). Alumni Services at Japanese Universities: the Present State and Issues Based on a Nationwide Survey. *University Review, 47*, 185 - 200.

1. 基本情報

大学名:_____

実験協力者の年齢層: _____

参加者の方のご役職名: _____

2. フェースシート

2.1 上司にあたる職名の選択肢を選んでください （当てはまるものは全て選んでください）。

a) 学長
b) 学園長 / 副学長
c) 最高財務責任者 (CFO)
d) 最高総務責任者 (CAO)
e) 最高執行責任者（COO）
f) 学部長
g) その他(職名をご記入ください)

2.2 貴校の想定されている学生の人数を選んでください。

a) 1,000 人未満
b) 1,000 人以上 5,000 人未満
c) 5,000 人以上 10,000 人未満
d) 10,000 人以上 15,000 人未満
e) 15,000 を超える

2.3 本項では、管理費の主な金銭的なリソースは。

a) 政府からの補助金
b) 学生の学費
c) 卒業生の寄附金
d) その他のコミュニティの一員からの寄附金（学生の保護者、協会など）
e) その他

3. 卒業生とのエンゲージメント（取り込み）の目標と目的

3.1 貴校での中期規模の卒業生サービス実施目的目標・計画をご記入ください。

_____
_____
_____

3.2 本項での卒業生サービスの導入の実施する目的をお答えください。該当するものすべてにチェックマークを付けてください 。

a) 卒業生の母校への関心を高めること
b) 大学と卒業生の「関係」維持
c) 大学人脈（ネットワーク）の形成
d) 大学への寄附・寄附金の増加
e) 学生と卒業生のリクルートメント・就職活動の手助け
f) 卒業生からのニーズへの対応
g) 愛校心の高揚
h) 大学における研究活動の活性化
i) 大学における教育活動の活性化
j) 大学の社会的評価の向上
k) 卒業生への大学の責務
l) 大学志願者の確保・増加
m) 社会貢献活動（コミュニティ・アウトリーチ）の一環
n) 大学が所在する地域の活性化
o) 大学経営の安定
p) 卒業生の社会的地位の向上
q) 卒業生の「生活の質」（クォリティー・オブ・ライフ(QOL)）の向上
r) 研究者と教育者つながりを作ること
s) 大学生の指導（メントリング）とキャリアー・アドバイス
t) 大学の国際化を向上させること（留学生の募集、海外の大学との交換留学を行い、日本人大学生の海外へ送り出す）
u) その他（ご記入ください）

3.3 前記の 3.2 質問で選択された項目の中から、卒業生サービス導入による最も重要と思われる 3 つのメリット要素の順番をご記入ください。

1.
2.
3.

4. 卒業生サービスの現状

4.1 貴校の「非活動」（繋がりも一切の貢献もしていない）卒業生のパーセンテージを教えてください。

a) 5%未満
b) おおよそ 25%
c) おおよそ 50%
d) おおよそ 75%
e) 95%を超える

4.2 貴校の「ボランティア」卒業生のパーセンテジを教えてください（自分の時間と労力で大学を支援し、金銭的な補助はしない）。

a) 5%未満
b) おおよそ 25%
c) おおよそ 50%
d) おおよそ 75%
e) 95%を超える

4.3 貴校の「寄贈者」卒業生のパーセンテジを教えてください（大学に金銭的な補助のみを提供する）。

a) 5%未満
b) おおよそ 25%
c) おおよそ 50%
d) おおよそ 75%
e) 95%を超える

4.4 貴校の「支援者」卒業生のパーセンテジを教えてください（自分の時間と労力で大学を支援し、金銭的な補助もする）。

a) 5%未満
b) おおよそ 25%
c) おおよそ 50%
d) おおよそ 75%
e) 95%を超える

4.5 本校では、卒業生サービス・プログラム向上のどのような要因が研究されていますか。

a) 寄贈者の個人としての特徴
b) 卒業生の職業・個人としての繋がり
c) 資金調達の措置
d) 外部的環境
e) 機関の特徴

4.6 貴校では、卒業生の学生機関での管理スタッフ・教員スタッフとの「思い入れ」が、卒業生サービスの「成功の鍵」（KSF）要因として、判明されています。

a) 全くそう思わない
b) あまりそう思わない
c) どちらでもない
d) そう思う
e) 非常にそう思う

4.7 卒業生サービスの導入が必要だと思いますか。ご自分の意見を教えてください。

a) 全くそう思わない
b) あまりそう思わない
c) どちらでもない
d) そう思う
e) 非常にそう思う

4.8 貴校では、卒業生サービスの導入が重要だとされていますか。

a) 全くそう思わない
b) あまりそう思わない
c) どちらでもない
d) そう思う
e) 非常にそう思う

4.9 貴校では、導入された卒業生サービスは卒業生のニーズと期待を満たしている。

a) 全くそう思わない
b) あまりそう思わない
c) どちらでもない
d) そう思う
e) 非常にそう思う

4.10 貴校では、大学生の満足度のために使用されている技術の評価が行われている。

a) 全くそう思わない
b) あまりそう思わない
c) どちらでもない
d) そう思う
e) 非常にそう思う

4.11　　貴校では、卒業生の満足度のために使用されている技術の評価が行われている。

a) 全くそう思わない
b) あまりそう思わない
c) どちらでもない
d) そう思う
e) 非常にそう思う

4.12　　あなたは卒業生データの品質をどう評価しますか。

a) 非常に悪い
b) 悪い
c) 適切
d) 良い
e) 非常に良い

4.13　　あなたは卒業生報告書の品質をどう評価しますか。

a) 非常に悪い
b) 悪い
c) 適切
d) 良い
e) 非常に良い

4.14　　貴校では、卒業生サービス・プログラムの目標を達成していると思いますか。

a) 全くそう思わない
b) あまりそう思わない
c) どちらでもない
d) そう思う
e) 非常にそう思う

4.15　　貴校では、新型コロナウイルスの全世界流行は影響をしていると思いますか。

a) 全くそう思わない
b) あまりそう思わない
c) どちらでもない
d) そう思う
e) 非常にそう思う

4.16　　貴校での IT インフラと IT ソリューションは対面から オンラインプラットフォーム（リモート）の切り替えを有効的にこなせていますか。

a) 全くそう思わない
b) あまりそう思わない
c) どちらでもない
d) そう思う
e) 非常にそう思う

4.17　　去年の卒業生の金銭的な補助はどう特徴づけますか。

a) 予算の削減
b) 予算額安定
c) 予算の増額

5. 卒業生と卒業生サービスのツール

5.1 貴校で、卒業生サービスを改良するためにどのような方略（ストラテジー）を使用していますか。該当するものすべてにチェックマークを付けてください。

a) 大学の情報拡散
b) 社会的活動とイベント
c) 卒業生のポータルサイト
d) 卒業生のネットワーク（人脈）
e) ホームカミングデー
f) 卒業生のデータベース
g) 旅行
h) 卒業生フィードバックのアンケート
i) 大学生・教員間の関係
j) 就職活動とキャリアのサポート
k) 製品・サービス・講座に対しての割引を与える
l) 海外での卒業生協会の設立・支援
m) デジタル図書館・雑誌へのオンラインアクセスを提供デジタル図書館・雑誌へのオンラインアクセスを提供
n) 大学のフィトネスセンターなどの施設へのアクセス
o) 卒業生の家族・親戚・配偶者などのためのカウンセリングの提供
p) （法律・金融・アカデミックなど）カウンセリングの提供
q) 健康づくりサポート（支援）

5.2 貴校では、卒業生のポータルサイトはどのように導入されていますか。

a) モバイルアプリケーション
b) ウエブサイト
c) フェイスブック

5.3 貴校での卒業生ポータルサイトの機能を教えてください 該当するものすべてにチェックマークを付けてください。

a) 卒業生とその他の大学関係者（現役大学生、教員、スタッフ、客など）の間のメントリング
b) 卒業生に大学の情報と大学のイベントの情報を提供
c) 大学に金銭的な補助を寄付する機能がある
d) キャリアやプライベートに関するアドバイスがもらえるようにして、共同の興味・趣味が探求でき、新たな機会・きっかけが見つけられるよう卒業生とその元同級生・同期生、教員、大学のスタッフの繋がりを作る。
e) その他(ご記入ください)

5.4 貴校では、どのようなルートで情報を卒業生に提供しますか。該当するものすべてにチェックマークを付けてください 。

a) 大学のウエブサイト
b) 学報のニュースレター、雑誌、パンフレットなど
c) 電子メール
d) SNS のアカウント
e) 卒業生のポータルサイト
f) 社会的活動とイベント
g) その他(ご記入ください)

5.5 貴校では、どのような就職の支援を行なっていますか。該当するものすべてにチェックマークを付けてください 。

a) 新卒の就職サポート（初期のキャリア・カウンセリング、就職活動支援）
b) 就職していない卒業生の就職サポート
c) 就職ガイダンスの設立
d) 医療従事者のキャリア・アップ（昇進）の支援
e) 教員の研修セミナー、ワークショップ
f) 継続的キャリアサポート、キャリア・コンサルティング、転職チャンスの情報を提供
g) その他(ご記入ください)

6. 卒業生サービスの諸問題

6.1 貴校での卒業生サービスの問題と課題を教えてください。該当するものすべてにチェックマークを付けてください。

a) 卒業生情報の管理
b) 卒業生情報のセキュリティ
c) 大学職員の負担増
d) 卒業生を所在の把握
e) 事務・運営スタッフの確保
f) 実施・運営経費の確保
g) 同窓会組織との対応

h) 画参加者の少なさ
i) 全学一体感（全学意識）の欠如)
j) 学内同意の取り付け
k) 卒業生の無関心
l) 教員の負担増
m) 大学の立地条件
n) 卒業生サービス・プログラムの企画作成と導入
o) 卒業生と大学の関係が浅い・繋がりが弱いこと
p) 卒業生の支持と支援
q) ビジョンと方略は単眼的である
r) 主に大学の利益に集中
s) トップ・マネジメントの支持と支援が不足している
t) IT ケイパビリティ（情報技術・組織的能力）

6.2 貴校では「卒業生サービス」は方略的に計画され、導入され、監視され、更新される。そうすることによって、内的・外的環境の変化に対応できます。

a) 全くそう思わない
b) あまりそう思わない
c) どちらでもない
d) そう思う
e) 非常にそう思う

7. IT課とビジネス課の同調・協力

7.1 貴校では、IT ケイパビリティ（情報技術・組織的能力）と要求は常に考えて、卒業生サービスの方略への変更を行いますか。

a) 全くそう思わない
b) あまりそう思わない
c) どちらでもない
d) そう思う
e) 非常にそう思う

7.2 導入された技術はどこまで大学の卒業生サービスの改善・改良に役立ちますか。

a) 非常に悪い
b) 悪い
c) 適切
d) 良い
e) 非常に良い

7.3 貴校では、データマイニング技術は卒業生サービスの強化のために使用されますか。

a) 全くそう思わない
b) あまりそう思わない
c) どちらでもない
d) そう思う
e) 非常にそう思う

7.4 貴校では、組織のイメージと学生の体験を強化させるために学生関係事務室、教員・学術事務室・卒業生サービスは、一貫され、共有できる目標に向けて統一しましたか。

a) 全くそう思わない
b) あまりそう思わない
c) どちらでもない
d) そう思う
e) 非常にそう思う

8. 組織図

8.1 貴校では集中管理されている「卒業生サービス」機能が存在しますか。

a) はい
b) いいえ

「いいえ」と答えた場合、8.1.1、 8.1.2、 8.1.3 の 3 項目に答えを記入しないでください。

8.1.1. 「卒業生サービス」の組織図での「位置」を教えてください。（事例：学生関係事務室の直属、など）

8.1.2. 集中管理されている卒業生サービスは何年に設立されましたか。

8.1.3. 貴校では、学長は集中管理されている卒業生サービス名誉会長ですか。

a) はい
b) いいえ

8.2 貴校では、下記の職名・組織が導入されていますか。該当するものすべてにチェックマークを付けてください。

a) Chief Information Officer （CIO）最高情報責任者
b) データスペシャリスト（情報管理の専門家）
c) Chief information security officer (CISO) 最高情報セキュリティ責任者
d) データガバナンスに専攻しているチーフ・データ・オフィサー(CDO)
e) Chief Technology Officer 最高技術責任者
f) Privacy Officer (データ保護オフィサー)

8.3 貴校では、下記のどの職名・組織は「卒業生サービス」委員会に入っていますか。該当するものすべてにチェックマークを付けてください。

a) Chief Information Officer （CIO）最高情報責任者
b) データスペシャリスト（情報管理の専門家）
c) Chief information security officer (CISO) 最高情報セキュリティ責任者
d) データガバナンスに専攻しているチーフ・データ・オフィサー(CDO)
e) Chief Technology Officer 最高技術責任者
f) Privacy Officer (データ保護オフィサー)
g) リレーションシップ・マネジャー(RM)
h) 学生関係事務室
i) Chief Financial Officer (CFO)最高財務責任者

9. 情報セキュリティ

9.1 貴校では、情報セキュリティを向上させるため、どの方略を導入されていますか。該当するものすべてにチェックマークを付けてください。

a) 有効は方略、ガイドライン・ポリシー、手順。
b) IT 課・ビジネス課の協力と同調
c) 情報セキュリティ意識化プログラム
d) 高レベル情報セキュリティ技術
e) 明確な役割および責任が決まってある組織図
f) 継続的な監視と評価
g) データ管理（データマネジメント）
h) RACI 図(Responsible-Accountable-Consulted-Informed)
i) ISO27001 のような情報セキュリティのベストプラクティスの導入
j) その他(ご記入ください)

9.2 貴校での主な情報セキュリティの懸念点を教えてください。

a) アクセス権
b) 卒業生データの倫理的使用
c) セキュリティ意識
d) ガイドライン・ポリシー、手順のアベイラビリティ（可用性）
e) データ所有権（データ親子関係）
f) 内的・外的な法令遵守
g) その他(ご記入ください)

10. おわりに

10.1 ご回答に関する補助的確認または詳細の説明をいただくため、電話あるいは電子メールでご連絡してもよろしいでしょうか？

a) **はい**
b) **いいえ**

10.2 ご連絡しても良い場合、下記のスペースにご連絡先をご記入ください。

ID	Information	
10. 2.1	**ご氏名**	
10. 2.2	**電話番号**	
10. 2.3	**電子メールアドレス**	

10.3 本研究の主な結果まとめの受信を希望されますか。

a) **はい**
b) **いいえ**

10.4 IT ガバナンスについて他に何かのコメントやご意見がある場合は、ぜひ教えてください。

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_____
_____

アンケートが終了しました。お疲れ様です。

ご協力ありがとうございました

ご質問、不明な点がございましたら、下記のメールまでにお尋ねください
fabdulrasool.85@gmail.com, <s1930144@s.tsukuba.ac.jp>, <turnbull.stephen.fw@u.tsukuba.ac.jp>
コメントを大歓迎いたします