IT GOVERNANCE AND INNOVATION:

Driving Innovation in Higher Education

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Gratitude and Acknowledgements

This work marks the culmination of an academic career made possible by the relentless support of family, dear friends, and inspiring teachers. These loved ones allowed me to stand on their shoulders so that I might see the beauty and purpose of my life. In an era of unprecedented life challenges, I drew on their strength and words of encouragement to continue my work. All have played a role in this achievement and deserve equal recognition and praise for their contributions.

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Executive Summary

Newman University was founded in 1933 based on traditional Catholic principles but welcomes all religions. The institution's continued growth coupled with the increased focus on innovation by college officials have stretched the capabilities of Newman's Information Technology (IT) department and highlighted the need for a more robust Information Technology Governance (ITG) function that identifies opportunities to leverage newer technologies, better manage the university's application portfolio and increase innovation throughout the university. According to the IT Governance institute, "IT governance is the responsibility of executives and the board of directors, and consists of the leadership, organizational structures and processes that ensure that the enterprise's IT sustains and extends the organization's strategies and objectives" (IT Governance Institute, 2007, p. 5).

This study examined the role ITG played in encouraging or hindering innovation at Newman University. Effective ITG is a key step in transforming universities and colleges steeped in tradition to one that proactively looks for ways to increase innovation and stay ahead of the technology curve. The questions that guided the study were adapted from a previous study conducted by Deborah Carraway (2015a) at the University of North Carolina at Greensboro (UNCG):

1. *RQ1: How do ITG maturity and effectiveness impact technology innovation in higher education?*
2. *RQ2: Under what circumstances does ITG help, or hinder, technology innovation in higher education?*

A mixed-methods case study was the chosen design for this study. The key benefit offered by a case study is the ability to evaluate multiple data sources and develop a comprehensive understanding of a situation. Case research allows the researcher to examine several factors and relationships in a small number of instances (Easton, 2010). The data from a single case can provide a thorough understanding into the nature of a phenomenon. The study used a survey instrument to gather primary data. Prior to developing the survey, the researcher met with individuals from a wide variety of university departments to contextualize the survey instrument adopted from the Carraway (2015a) study. Interviews were held in-person on Newman's main campus in Wichita, KS and lasted for approximately 30 minutes. Some of the individuals

interviewed also participated in the survey. The final survey included 16 control questions intended only for the CIO and 38 questions for all other respondents. The first question was added to facilitate display logic (i.e., only the CIO saw the first 16 questions) making a total of 55 questions. The CIO questions covered four areas: (1) institutional demographics; (2) IT governance and innovation; (3) adoption of new technologies; and (4) recent innovations.

Data from the survey were analyzed in three ways. First, the researcher performed a descriptive, statistical analysis to generate summary and frequency tables of responses for each survey question. This data was used to rate the dimensions of the appropriate construct and generate institutional profiles for ITG maturity, ITG effectiveness, and innovation. Second, the researcher performed an inferential statistical analysis to identify any relationships that existed, first between characteristics within the same construct, and then between constructs. Finally, the researcher performed a qualitative analysis of open-ended survey responses. Seven survey respondents provided answers to the open-ended survey questions, which were designed to add context to the quantitative data generated from the survey. Open-ended responses were hand-coded using Microsoft (MS) Word and placed into categories that provided the basis for the findings. The researcher also conducted a thorough review of secondary data sources received from Newman.

Academic institutions can adapt the survey instrument, constructs, and rubrics from this study to assess the state of the ITG function and deepen their understanding of the institutional mechanisms that facilitate or hinder innovation. The data generated from the study can be used to create an implementation roadmap for developing a customized ITG model that conduces innovation within the context of their institution. The study also lays the foundation for future research into ITG mechanisms that support technology adoption and innovation in academic settings. A summary of findings and recommendations from the Newman study follows:

Finding 1. Positive Relationships Between ITG Effectiveness and Innovation Exist

This finding was generated from statistical analysis of survey data. Multiple correlations were statistically significant between the ITG Effectiveness and Innovation scales. The overarching finding is that there were positive associations between the total ITG Effectiveness and Total Innovation. The key takeaway was that there was a significant relationship between Total ITG Effectiveness and Total Innovation. In

addition, a series of correlations were run to examine the subscales. Total ITG Effectiveness was significantly correlated to Innovative Culture and Incremental Innovation. Executive Leadership Engagement was significantly correlated to Innovative Culture. Faculty Engagement was significantly correlated to Total Innovation, Innovative Activity and Incremental Innovation. Decision Making was significantly correlated to Innovative Culture and Incremental Innovation. Each correlation was positive suggesting, a direct relationship between each of the significant pairs of variables.

Finding 2. Confusion Surrounding Governance Committee

This finding was generated from the codes *lack of meetings* and *unaware of committee membership* and supported the maturity profile of "Initial" generated from the quantitative survey data. ITG committee members were largely unaware that the committee existed. As Participant 17 explained, "I wasn't aware of the IT group or that I was a member until a couple of months ago." This was consistent with other committee members, like Participant 11, who noted, "Until you visited, most of us had no idea we were actually on this IT governance committee." Participant 5 reported that the committee "does not meet," and that, "until recently, I was not aware that I was on the committee." Without meetings, it was difficult for committee members to know that they were on the committee, despite that these participants were all identified as committee members.

Finding 3. Unvetted Systems Have Negative Consequences

Finding 3 came from the code *consequences of unvetted systems* and provides supporting evidence for the "Developing" rating given to the "Decision Making" dimension of the ITG effectiveness construct. Specifically, survey data found that Newman needs to broaden the audience included in the vetting process to better evaluate and assess the appropriateness of software applications before they are procured. Participants made clear that software systems were often purchased before they were thoroughly vetted. Without such vetting, time and money are wasted.

Finding 4. Unclear Processes and Procedures

This finding was developed from the codes *no consequences of not following procedures* and *unclear processes for IT problems*. Processes and procedures surrounding ITG and the handling of IT problems were unclear, and when they were not followed, there did not appear to be consequences. This finding supported quantitative results from the survey, showing that there was no effort dedicated to managing the ITG process, hence the rating of "Not Present" for the "ITG Management" dimension of the ITG effectiveness construct. The finding also supported Newman's ITG maturity rating of "Initial" where processes were undefined and there was little awareness of the ITG function.

Finding 5. Impacts to Innovation

Participants identified both positive and negative ways that IT innovation was impacted at NU. This finding was generated from the codes *new staff brings innovation*, *financial concerns hinder innovation*, *not keeping up with innovation trends*, *new employees are uncomfortable with innovation*, and *financially driven decisions*. Most participants suggested that innovation was stagnant and identified different reasons for this.

Finding 6. Decisions about Innovations Appear to be Budget Driven

This finding was generated from a review of secondary data and supported by the statistical analyses. A review of Newman's 3-year IT plan revealed that the majority of Newman's budget was dedicated to maintenance type activities designed to replace or repair IT appliances and portions of the infrastructure. This spending was necessary for the institution to continue operating without disruption but left little opportunity for Newman to invest in leading edge technologies or explore ideas about "what could be". The Pearson correlation performed on the innovation construct showed a strong correlation between innovation activity and incremental innovation. This suggested that innovative activities at Newman were in large part due to ongoing maintenance activities. Finally, Newman's 2012 IT Report also stated that both academic and administrative IT decisions were budget driven.

Findings Applied to Research Questions

RQ1: How do IT governance maturity and effectiveness impact technology innovation in higher education?

Findings 1, 3, 4 and 5, addressed *RQ1, how do IT governance maturity and effectiveness impact technology innovation in higher education?* Qualitative survey responses indicated a lack of maturity and effectiveness in IT governance. This was evidenced by the lack of meetings that participants described, and that participants were unaware they were on the governance committee. Also demonstrating the lack of maturity and effectiveness of ITG, was that software systems appeared to be purchased with little rhyme or reason, and without thorough vetting. As a result, systems that were purchased were perhaps not only not innovative but took time and money for the IT department to learn and understand. Finally, processes and procedures not only of the governance committee but also the IT department were not always clear or followed, and there were no consequences for failing to follow procedures, highlighting the lack of effectiveness of the governance committee. Without this maturity and effectiveness of the governance committee, there appeared to be a lack of technology innovation.

RQ2: Under what circumstances does IT governance help, or hinder, technology innovation in higher education?

Findings 2, 5, and 6 addressed *RQ2, under what circumstances does IT governance help, or hinder, technology innovation in higher education?* Certainly, in the absence of regular committee meetings, and when committee members are unaware that they sit on the governance committee, this could hinder technology innovation that may be discussed or developed during meetings. It appeared that in some cases, when new employees joined the committee, they brought new and innovative ideas. However, this opinion was not shared by all participants. Another participant felt that new committee members hindered innovation. Finally, the failure of the governance committee to keep up with current trends in technology hindered innovation.

Recommendation 1. Define and Communicate the ITG Value Proposition

The study found several instances where improperly vetted systems created wasted effort and diverted resources away from more worthwhile tasks. ITG can minimize the occurrence of these mishaps by focusing efforts on those activities that maximize the value to the institution. This requires in-depth knowledge of Newman's value chain. Aligning the value chain with the technology that supports it will highlight the functions and processes that pose the most risks to the university and the value proposition of investing in ITG will become evident. Communicating the ITG value proposition can be accomplished using multiple platforms, including social media, intranet sites, and school newsletters. An integrated communication approach that encompasses multiple platforms and media types will be most effective in reaching a broad cross-section of the Newman community.

Recommendation 2. Define ITG Roles and Responsibilities

ITG structures are the entities that define roles and responsibilities (Bianchi & Sousa, 2016). A structure comprises the people or groups that have decision-making authority in the ITG committee. Newman's ITG charter stated that the committee will be chaired by the CIO or designee appointed by the provost and will elect a vice-chair from its members. Upon appointing a vice-chair, this initial structure must develop a comprehensive list of committee roles and responsibilities. The leadership structure must communicate those responsibilities to all members of the ITG committee and stakeholder population. Finally, the leadership structure can determine whether to amend the ITG charter to include roles and responsibilities or create a separate artifact.

Recommendation 3. Increase Representation at ITG Meetings

Software systems were not properly vetted and created inefficiencies due to learning curves experienced by the IT team as they strove to maintain the systems. Lack of meeting participation and awareness of the ITG function provided a partial explanation. Affected end-users must have representation when systems are upgraded or replaced. Having a clearly articulated ITG value proposition will reinforce the importance of end-user participation in the process. Additionally, ITG meetings must occur at a regular cadence that allows committee members to organize their schedules and minimize absenteeism. Initially, Newman

should consider a bi-weekly cadence until foundational elements (i.e., processes, agenda, format) have been established and then change the cadence to monthly.

Recommendation 4. Define ITG Processes

The quantitative and qualitative data from the survey suggested that processes were undefined and inconsistent. ITG members were also unaware of existing processes and resorted to ad-hoc processes for system support. The ITG committee would benefit from joint process development sessions to create ITG processes that are consistent and support all relevant stakeholders. A 2008 study by Yanosky and Caruso (2008) found that Academic institutions that actively design ITG processes have more successful outcomes. However, defining ITG processes cannot occur in a vacuum and must be integrated with existing institutional processes.

Recommendation 5. Build Relationships

The ITG leadership campaign will benefit from building relationships throughout the institution. To accomplish this, institutional relationship mechanisms must be explored and capitalized on. ITG relational mechanisms refer to the interactions between IT and the business (Bianchi & Sousa, 2016). A grass-roots marketing campaign is a good place to start. The campaign can introduce the ITG committee to various Newman departments and share information about the purpose of the committee, the value proposition, and how to engage the committee. The campaign will go a long way toward building much needed relationships with department heads and growing trust throughout the institution.

Organizational Context

Figure 1. Early Newman University Classroom (*About Newman*, n.d.)

Newman University, whose main campus is located in Wichita Kansas, is a Catholic university with an undergraduate enrollment of 2,764 students and total enrollment of 3,371(*About Newman*, n.d.). The university was founded in 1933 based on traditional Catholic principles but welcomes all religions. Its history can be traced back to Italy when Maria De Mattias founded the Adorers of the Blood of Christ (ASC). Originally named Sacred Heart Junior College, it was a two-year, female institution, whose mission was to train Catholic sisters and laywomen in teacher education, nursing, secretarial science, and home economics (*About Newman*, n.d.).

Despite the economic challenges faced by the school during the height of the great depression, Sacred

Heart continued to grow and expanded their curriculum. The school became a four-year college in the 1950s and started admitting men in 1958. However, men could only attend evening and summer sessions (*About Newman*, n.d.). It was not until 1965 that Sacred Heart became coeducational. The institution honored 19th century theologian and scholar, John Henry Newman, by renaming the school to Kansas Newman college.

Figure 2. *St. John Henry Newman (About Newman, n.d.)*

Due to the institution's continued growth and program expansion, it was again renamed to Newman University in July of 1998. Today, Newman has a network of seven campuses throughout the Midwest including Southeast Kansas, Western Kansas, Colorado Springs, Colorado, Little Rock, Arkansas and Tulsa and Oklahoma City, Oklahoma.

According to U.S. New and World Report's 2020 rankings of midwestern regional universities, Newman ranks 105th overall (U.S. News & World Report L.P, 2020). Five years ago, U.S. News began ranking the most innovative colleges and universities across all regions and classifications (i.e., regional, national) using a peer assessment survey. The most recent assessment was conducted in 2019. The survey asked college presidents, provosts, and administrative deans to nominate up to 15 colleges or universities they thought were the most innovative schools across five dimensions: curriculum, faculty, students, campus life, technology or facilities. The results were used to generate rankings of the 15 most innovative schools based on the number of nominations each received. The rankings are used by college officials to identify schools to watch for their on-campus innovations. Schools that make the top 15 most innovative list are not necessarily ranked highly overall in their respective categories. Coincidently, the school on the most innovative list with the lowest overall ranking in the Midwest was tied with Newman at 105th. However, more than 50% of midwestern schools on the most innovative list ranked among the top ten overall, and 73% were in the top twenty, suggesting that innovative schools tend to achieve higher rankings than more traditional institutions. U.S. News' relatively new ranking of innovative schools highlights the increasing importance placed on innovation by today's top college officials and underscores the need for institutions of higher learning to strengthen their focus on innovation to remain competitive.

Problem of Practice

Newman's continued growth coupled with the increased focus on innovation by college officials has stretched the capabilities of its Information Technology (IT) department and highlighted the need for a more robust Information Technology Governance (ITG) function that identifies opportunities to leverage newer technologies, better manage the university's application portfolio and increase innovation throughout the university. According to the IT Governance institute, "IT governance is the responsibility of executives and the board of directors, and consists of the leadership, organizational structures and processes that ensure that the enterprise's IT sustains and extends the organization's strategies and

objectives" (IT Governance Institute, 2007, p. 5). In 2017, Newman created an ITG charter that was approved by the President's cabinet. The charter formed a committee comprised of faculty members and other pertinent university staff. The document outlines the scope and responsibilities of participating members and reporting structure. The committee's stated purpose is:

> The IT governance committee is a Cabinet-delegated powers body at Newman University representing the major information technology users that oversees the strategic, operational, and technical decision-making process for information technology. The IT governance committee provides strategic leadership, has the authority to direct campus-wide IT priorities and policies, and is responsible for recommending major activities and information technology expenditures at the university that furthers the university's strategic plan (Newman University, 2017, p. 1).

Newman's governance committee is still in operation, but the university continues to experience a diverse array of technological and operational challenges that restrict the university's ability to innovate and expose the university to various types of institutional risks. Specific challenges included but are not limited to departments circumventing the ITG process to procure software, antiquated technologies that are no longer supported by the vendor, inadequate staffing and application knowledge, and a burgeoning application portfolio that is costly to maintain. As a result, Newman spends an inordinate amount of time performing system maintenance and is unable to focus on innovation or migrate to newer technologies when they become available. The ITG committee must look for ways to break this cycle and provide Newman with mechanisms and supporting processes to stimulate innovation and respond to technological advancements in the marketplace.

This study examined the role ITG played in encouraging or hindering innovation at Newman University. Effective ITG is a key step in transforming universities and colleges steeped in tradition to one that proactively looks for ways to increase innovation and stay ahead of the technology curve. Academic institutions can adapt the survey instrument, constructs, and rubrics from this study to assess the state of the ITG function and deepen their understanding of the institutional mechanisms that facilitate or hinder innovation. The data generated from the study can be used to create an implementation roadmap and develop a customized ITG model that conduces innovation within the context of their institution. The

study also provides the foundation for future research into ITG mechanisms that support technology adoption and innovation in academic settings.

Literature Review

This literature review examined research surrounding ITG frameworks and their relevance to innovation in higher education. The review begins with a discussion on what is considered innovation and is followed by a brief history of the role played by institutions of higher education to advance innovation. It then explores the relationship between ITG and innovation and reviews several maturity models available to assess an organization's ITG maturity. Finally, the literature review discusses the characteristics of effective ITG in an academic setting.

Innovation Explained

The term innovation has become so pervasive that it often leads to confusion as to its meaning and could potentially explain why some organizations find innovation so elusive (Kahn, 2018). The belief that innovation describes something radically different is a common misunderstanding. This type of innovation is very challenging to achieve and often requires organizations to assume substantial risk (Kahn, 2018). The definition is also problematic as it creates a binary descriptor of innovation that marginalizes the significance of incremental innovation. Kahn (2018) posits that successful organizations understand that innovation falls along a continuum, ranging from incremental changes to radical innovations. Beck, Lopes-Bento, and Schenker-Wicki (2016) maintain that both types of innovation are important. Incremental innovations ensure small improvements to existing products that can improve an organization's competitive position over time. This type of innovation also ensures that products continue to evolve as customers demand new and enhanced features. Radical innovation can allow firms to enter new markets and displace incumbents by introducing new products or services.

Another point of confusion with innovation is the tendency to incorrectly use the terms innovativeness and innovative as synonyms. Innovativeness is a noun that describes an organization's capacity for innovation, whereas innovative is an adjective describing something new or different (Kahn, 2018). Merriam-Webster (2020) offers two definitions of innovation: (1) "a new idea, method, or device", (2) "the introduction of something new." The first definition describes innovation as an outcome, whereas the

second describes innovation as a process, an important distinction for organizations to note. Kahn (2018) posits that innovation must include a balanced focus on outcomes and process. Organizations who focus more on outcomes will generate inefficiencies if supporting processes are immature or poorly defined. On the other hand, organizations who focus more on process may create bureaucracies that inadvertently discourage innovation or stifle innovative activities, making it difficult to achieve desired outcomes. Finally, Kahn (2018) identifies mindset as an additional consideration of innovation. Mindset describes the state of organizational beliefs around innovation and addresses what beliefs must be instilled to foster innovation. **Table 1** below summarizes Kahn's elements of innovation and the questions they address.

Table 1. Elements of Innovation (Kahn, 2018)

Element	Strategic focus	Strategic question	Consideration
Innovation is an outcome	Ends	What do you want to happen?	— Product innovation — Process innovation — Marketing innovation — Business model innovation — Supply chain innovation — Organizational innovation
Innovation is a process	Ways and Means	How will you make it happen?	— Innovation process — Product development process
Innovation is a mindset	State	What should be instilled and ingrained to prepare for the what and the how?	— Individual mindset — Organization culture

Rogers' (2010) Diffusion of Innovation (DoI) theory offers a more adopter-centric definition of innovation as an idea, practice or object that is perceived as new by an individual or another unit of adoption (i.e. an organization). However, Rogers' also emphasizes the role that process plays in diffusing innovation. He posits that DoI is a social process whereby subjectively perceived information about a new idea is transmitted from person to person. Therefore, perceived innovative outcomes are co-constructed by members of the adoption community. Rogers identifies several characteristics of organizational innovativeness that overlap with some elements included in Kahn's model. Characteristics included in Rogers' model address leadership, internal organizational structure, and external organizational characteristics. **Figure 3** summarizes Rogers' model of organizational innovativeness. The items marked by (-) are those characteristics that could potentially hinder innovation and those marked by (+) are characteristics that positively affect organizational innovativeness.

Figure 3. *Independent Variables Related to Organizational Innovativeness (Rogers, 2010)*
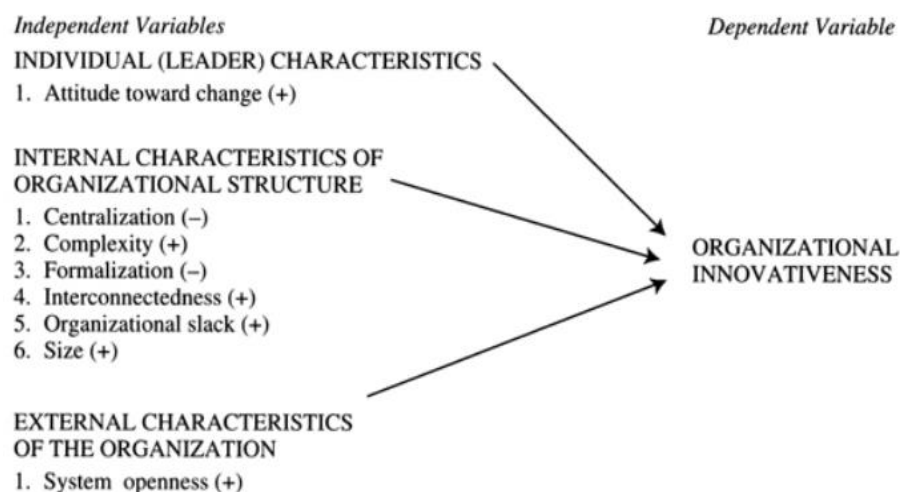
Noteworthy, is that in Rogers' model of organizational innovativeness, formalization, the degree to which rules and procedures are enforced inhibits the consideration of innovation but encourages the implementation of innovation. This may imply that bureaucratic organizations focus more on innovation as a process, not an outcome. This phenomenon is consistent with Kahn's assertion that organizations that focus more on process tend to create bureaucracies that stifle innovation.

Driving Innovation in Higher Education

Whether process or outcome, innovations eventually make their way into institutions of higher learning, an evolutionary phenomenon that cannot be ignored. A multi-case study conducted by Barber et al. (2013) examined ten institutions of higher learning from five European countries and found that innovations in global economies drive innovation in higher education systems. This globalization, together with information technology progress, is forcing universities to rethink their teaching strategies and distinguish themselves from other higher education providers (Barber et al., 2013; Blass et al., 2012). Blass and Hayward (2014) posited that universities now have innovation strategies that are as robust and well thought-out as their research and teaching. Findings from the Barber et al. (2013) study suggested that graduates should be prepared to enter the current labor market armed with the knowledge needed to commercialize new products and services. The findings also highlighted that institutions have become

increasingly competitive due to increased research collaboration and the continued growth of the international student population (Barber et al., 2013; Shields, 2013). To remain competitive, universities and colleges must raise the quality of services offered through innovative practices. The European Commission (2014) stated that institutions can increase quality and competitiveness through new modes of delivery, such as blended degrees or massive open online courses (MOOCs), and student-centered learning. However, learning activities must consider organizational context to be effective (Arciénaga Morales et al., 2018). Institutions that fail to adapt and adopt, risk losing future students and valuable research agendas.

Pressure from public and private benefactors, as well as future students are also forcing institutions of higher learning to innovate (Blass & Hayward, 2014). Evidence from the US suggest that the academic research that is most valued by corporate practitioners is publicly funded (Arciénaga Morales et al., 2018). Furthermore, it is no longer acceptable for institutions to stop at the point of invention (i.e., a new idea), the invention must be applied and produce new outcomes to be considered innovation. Dosi (2005) posited that useful academic research is good academic research. Arciénaga Morales, Nielsen, Bacarini, Martinelli, Kofuji and García Díaz (2018) acknowledged the gap between academic research and its transformation into useful products, tools, and resources, even as developed and developing countries promote innovation. In Europe, this is referred to as the European Paradox, the failure to translate scientific advances into marketable innovation.

Globalization and pressure from benefactors are not the only innovation drivers of higher education, there are institutional factors that must be considered as well. Institutions with a high culture of responsibility have greater institutional consciousness that shape the skills necessary to transform and contribute to the development of a modern society (Urbanovic & Tauginiene, 2013). This culture is rooted in the societal values brought to the university by students and faculty, responsible for creating the academic environment that builds institutional responsibility. Higher education leaders and policy makers are also instrumental in setting the direction of the institution. A study on successful adoption of blended learning approaches found that clear institutional policies for innovation, supportive organizational structures, and a strategic approach to innovation selection and evaluation, are essential (Garrison & Kanuka, 2004). To promote acceptance of new ideas and innovation, leaders must also have buy-in from academic staff and

students (Carey, 2013; MacKeogh & Fox, 2009). Students' engagement plays an important role in strengthening bottom-up innovation strategies. In a study of students' experiences participating in curriculum innovation, Carey (2013) found that student engagement must be systematic and longitudinal. Students must believe that their suggestions are included in the decision-making process.

The Importance of ITG for Innovation

The relationship between ITG and innovation must be explored to determine the circumstances under which, ITG facilitates innovation. Information technology (IT) is a key driver of technological innovations and a necessary ingredient of organizational evolution (Liang et al., 2010). Existing literature on IT stresses how important it is to the survival of modern day enterprises (Hicks et al., 2010; National Sun Yat-Sen University et al., 2015). The value of IT is not realized by the IT department, it is seen and measured by the value created in the business (Afzali et al., 2010; Khther & Othman, 2013; Knahl, 2013). Knahl (2013) identified three domains of IT management activities: IT Service Management, IT Platforms & Infrastructure Management, and ITG. The effective use of IT is heavily reliant upon proper ITG, the governing body that defines and implements processes, structures and relational mechanisms to keep the business and IT organizations aligned (De Haes & Van Grembergen, 2013). The 2002 Sarbanes-Oxley act passed in response to Enron's 2001 bankruptcy and other financial scandals by publicly traded companies in the 2000s are notable examples of what can occur when corporate governance and IT are misaligned (National Sun Yat-Sen University et al., 2015). Prior research on ITG suggest that proper alignment can only be achieved with the right combination of people, processes, and structures (Ko & Fink, 2010). The issue of alignment with the enterprise is further complicated when organizations outsource their IT services. Prior studies have shown that interorganizational structures with similar strategies and resource characteristics help firms achieve superior performance (Park et al., 2017).

Using resource-based theory (RBT), Héroux and Fortin (2018) predicted that the dynamic capabilities of ITG and IT competence of board of directors would lead to competitive advantage through innovation and that IT-business alignment moderates the impact on innovation. Findings from the study supported predictions that both IT governance and executive management IT competence positively effect innovation. Héroux and Fortin (2018) posited that strategic IT planning that reflects the business plan and includes executive management with functional IT experience has a positive impact on innovation. The

implications for organizations trying to innovate is that executive management should include executives with IT backgrounds to ensure IT and business strategies are consistent. The study also found support for the proposition that IT alignment with the business moderates the relationship between executive management IT competence and innovation. However, not all Héroux and Fortin's predictions were supported as the study found no relationship between board of directors' IT competence and innovation, nor did IT-business alignment moderate the relationship between ITG and board of director's IT competence and innovation. To summarize the finding from Héroux and Fortin's (2018) study, "highly developed IT governance structures, processes and relational mechanisms, and greater executive management IT-related functional experience reinforced by IT-business alignment can drive innovation" (p. 113).

ITG Maturity Models

ITG maturity modelling is an effective way to identify and demonstrate gaps in capability to management (IT Governance Institute, 2007). Furthermore, models can facilitate the development of action plans to improve processes. There are several popular maturity models that have been applied to evaluate ITG process maturity. The Control Objectives for Information and related Technology 4.1 (COBIT 4.1) maturity model establishes practices across a domain and process framework that represent the consensus of experts (IT Governance Institute, 2007). The framework contains 34 processes grouped into four domains: plan and organize (PO), acquire and implement (AI), deliver and support (DS), and monitor and evaluate (ME)(Dirgahayu & Setiyowati, 2018). The ITG maturity matrix is included in COBIT 4.1's ME domain. The model has a strong focus on control and is less concerned with execution. The practices outlined by COBIT 4.1 aim to optimize IT-enabled investments, improve service delivery, and provide a gauge to measure inefficiency or waste against. COBIT maturity models are essential tools in evaluating process capability of ITG implementations. The ITG focus areas of COBIT 4.1 include strategic alignment, value delivery, resource management, risk management, and performance measurement. The COBIT 4.1 maturity model includes six levels of maturity ranging from processes that are non-existent to processes that are optimized.

The COBIT 5 framework is an evolution of COBIT 4.1 and offers a more comprehensive model for measuring ITG maturity. The COBIT 5 capability model is based on the internationally recognized

ISO/IEC 15504 Software Engineering Process Assessment standard. This model also provides a means to measure ITG processes and identify areas for improvement. However, COBIT 5 models differ from COBIT 4.1 maturity model in its design and use (ISACA, 2012). **Table 2** below compares the Maturity Levels of COBIT 4.1 and Process Capability Levels of COBIT 5.

**Table 2**. *COBIT 4.1 to COBIT 5 Mapping (ISACA, 2012)*

COBIT 4.1 Maturity Model Level	Process Capability Based on ISO/IEC 15504	Context
5 Optimised—Processes have been refined to a level of good practice, based on the results of continuous improvement and maturity modelling with other enterprises. IT is used in an integrated way to automate the workflow, providing tools to improve quality and effectiveness, making the enterprise quick to adapt.	**Level 5: Optimising process**—The level 4 predictable process is continuously improved to meet relevant current and projected business goals.	**Enterprise View—Corporate Knowledge**
4 Managed and measurable—Management monitors and measures compliance with procedures and takes action where processes appear not to be working effectively. Processes are under constant improvement and provide good practice. Automation and tools are used in a limited or fragmented way.	**Level 4: Predictable process**—The level 3 established process now operates within defined limits to achieve its process outcomes.	
3 Defined process—Procedures have been standardised and documented, and communicated through training. It is mandated that these processes should be followed; however, it is unlikely that deviations will be detected. The procedures themselves are not sophisticated, but are the formalisation of existing practices.	**Level 3: Established process**—The level 2 managed process is now implemented using a defined process that is capable of achieving its process outcomes.	
	Level 2: Managed process—The level 1 performed process is now implemented in a managed fashion (planned, monitored and adjusted) and its work products are appropriately established, controlled and maintained.	**Instance View—Individual Knowledge**
2 Repeatable but intuitive—Processes have developed to the stage where similar procedures are followed by different people undertaking the same task. There is no formal training or communication of standard procedures, and responsibility is left to the individual. There is a high degree of reliance on the knowledge of individuals and, therefore, errors are likely.	**Level 1: Performed process**—The implemented process achieves its process purpose. **Remark: It is possible that some classified as Maturity Model 1 will be classified as 15504 0, if the process outcomes are not achieved.**	
1 Initial/ Ad hoc—There is evidence that the enterprise has recognised that the issues exist and need to be addressed. There are, however, no standardised processes; instead, there are ad hoc approaches that tend to be applied on an individual or case-by-case basis. The overall approach to management is disorganised.		
0 Non-existent—Complete lack of any recognisable processes. The enterprise has not even recognised that there is an issue to be addressed.	**Level 0: Incomplete process**—The process is not implemented or fails to achieve its purpose.	

The most important differences between ISO/IEC 15504-based process capability assessments and COBIT 4.1 maturity model assessments are the naming and meaning of the ISO/IEC 15504-defined

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capability levels are different from COBIT 4.1 maturity levels. Secondly, ISO/IEC 15504, capability levels include nine process attributes that have some overlap with COBIT 4.1 maturity attributes, but with certain nuances. The practical implications are that organizations could receive lower scores using COBIT 5 process capability models. For example, it is possible for an organization to receive a level 1 or 2 rating without achieving all process objectives using the COBIT 4.1 maturity model, but receive a 0 or 1 ratings using the COBIT 5 capability model(ISACA, 2012).

Capability Maturity Models (CMMs) developed by Carnegie Mellon University (CMU) also provide a way to evaluate the efficacy of processes across a wide range of knowledge domains (SEI, 2002). In 2002 CMU's CMM models evolved into Capability Maturity Model Integrated (CMMI) models to provide organizations with a single framework to evaluate processes across multiple disciplines. **Figure 4** shows the components of a CMMI model and their relationship to each other.

Figure 4. *CMMI Model Components (Software Engineering Institute, 2002)*
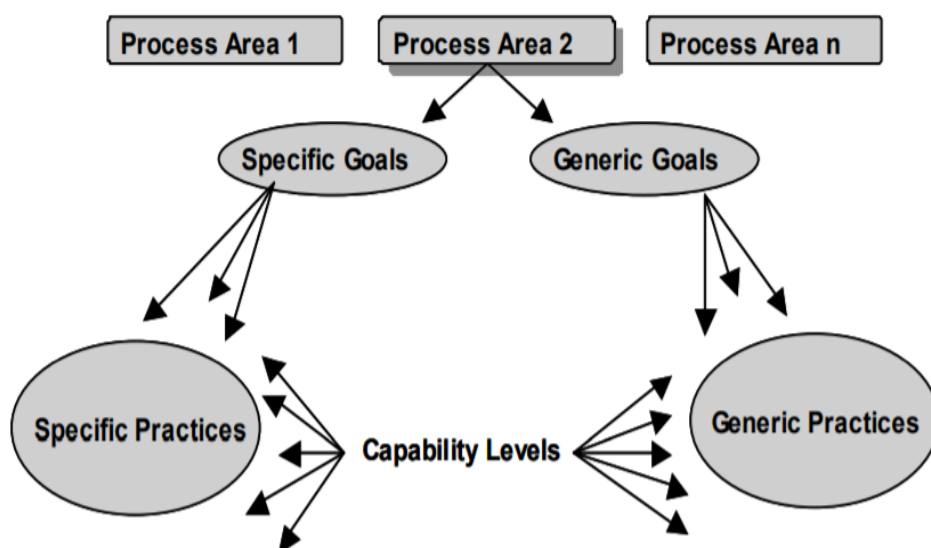
CMMI maturity levels are like COBIT levels but may vary depending on the type of CMMI model chosen by the organization. For example, organizations that prefer to select the order of improvements that provide more value to the business or reduce institutional risk may opt for the CMMI continuous model, whereas organizations more interested in pursuing a proven sequence of improvements would opt for the staged CMMI model (SEI, 2002). **Table 3** and **Table 4** summarize the maturity levels associated with each type of CMMI model. The most well-known representation of CMMI is the staged representation (Staples et al., 2007). Today CMMI models are administered by the CMMI institute, a subsidiary of ISACA (*Businesswire.Com*, 2016).

Table 3. CMMI Continuous Model Maturity Levels (SEI, 2002)

Capability Level	Continuous Representation Capability Levels
0	Incomplete
1	Performed
2	Managed
3	Defined
4	Quantitatively Managed
5	Optimizing

Table 4. CMMI Staged Model Maturity Levels (SEI, 2002)

Maturity Level	Staged Representation Maturity Levels
1	Initial
2	Managed
3	Defined
4	Quantitatively Managed
5	Optimizing

ITG Effectiveness

Universities and colleges are unique institutions that require a variety of information technologies that span organizational boundaries, creating complex management structures (Coen & Kelly, 2007). A typical application portfolio for institutions of higher learning may include support for student enrollment, remote learning, academic research, alumni and advancement support, and financial aid. Further complicating matters is the use of third-party vendors and cloud resources. The broad variety of systems and providers makes it difficult for management to determine the value created by investments in IT. Effective ITG addresses this challenge by optimizing how IT resources are applied to maximize the value brought to the organization (Weill & Ross, 2005). In contrast, lack of effective ITG in higher education could affect multiple aspects of academic operations including teaching quality, research, and other internal processes (Bianchi & Sousa, 2016).

Ulsch (2006) posited that effective ITG must have both breadth and depth. It starts with a vision that addresses a wide array of threats, mitigating factors and strategies. ITG requires a knowledgeable team that can create and champion the system. Schlosser, Wagner, and Coltman (2012) suggested that an effective ITG structure has three comprehensive dimensions; human, social, and intellectual. The human dimension focuses on the personal attributes such as technical skills and knowledge of IT executives. The social dimension focuses on relationships and the informal structures that exist in the organization. The intellectual dimension focuses on alignment across multiple layers of the organization (i.e., infrastructure alignment, IT services alignment, and IT project portfolio alignment). Kurti, Barolli, and Sevrani (2014) elaborated on Schlosser's work and identified critical success factors for effective ITG for each of Schlosser's dimension, summarized in **Table 5**.

Table 5. *ITG Focus Areas by Dimensions (Kurti et al., 2014)*

Dimension / ITG Focus Area	Human	Social	Intellectual
Strategic Alignment	IT Leadership to understand business goals and IT contribution and bring it to management attention	Encourage and support IT/Business communication and partnership	Define and align IT strategies to corporate strategies and cascading them down in an organization
	Involve and get support of senior management	Engage key stakeholders	Consolidate IT structures that ensure responsiveness and accountability
Value Delivery & Risk Management			Consolidate, communicate and enforce policies and guidelines for cost-effective acquisition and use of IT across the organization
Resource Management	Providing IT governance awareness and training for optimal use of IT		Consolidate, standardize and manage IT Infrastructure and applications to optimize costs, responsiveness and information flow across the organization
	Attract, develop and retain competitive IT professionals supported		
Performance Measurement			Consolidate performance measures and benchmarks to track and demonstrate success

A common thread in the literature on effective ITG is the need for it to be embedded in the organization. One of the stated goals of the COBIT 5 framework is to embed ITG in the enterprise with accompanying metrics, well-defined roles and responsibilities, and jurisdiction to effect and enforce change (ISACA, 2012). Furthermore, individuals participating in IT Governance must have intimate knowledge of governance processes and IT best practices. Weill and Ross (2005) posited that effective ITG reflects the value of services IT delivers to the business. This value is realized through the cost-effective use of IT, optimized asset utilization, organizational growth, and business flexibility. Lunardi et al. (2017) suggested that organizations can gauge the effectiveness of ITG by examining five domains: IT strategic alignment (SA), IT value delivery (VD), IT risk management (RK), IT resource management (RM), and IT performance management (PM). A study of almost 300 firms across the globe made it abundantly clear that effective ITG does not happen by accident (Weill & Ross, 2005). In top-performing enterprises, ITG is carefully designed and managers at all levels throughout the enterprise apply the design as they make daily decisions about the use of IT. The study also found that senior management's awareness of ITG is the single best indicator of effectiveness, with 60% to 80% having a clear understanding of their ITG in top-performing firms.

Theoretical Framework

The conceptual framework integrated in this study was adapted from Borja, Kim, Yoon, and Hwang's (2018b) study on the effects of ITG effectiveness and relevant ITG knowledge on Innovation. Borja et al. hypothesized that ITG effectiveness and ITG relevant knowledge positively influence innovation. **Figure 5** summarizes the conceptual framework for this study. The researcher hypothesized that (H1) ITG effectiveness and (H2) ITG maturity positively effect innovation. The Newman University study adapted the framework to examine the influence that ITG effectiveness and ITG maturity have on innovation.

Figure 5. *Conceptual Framework*
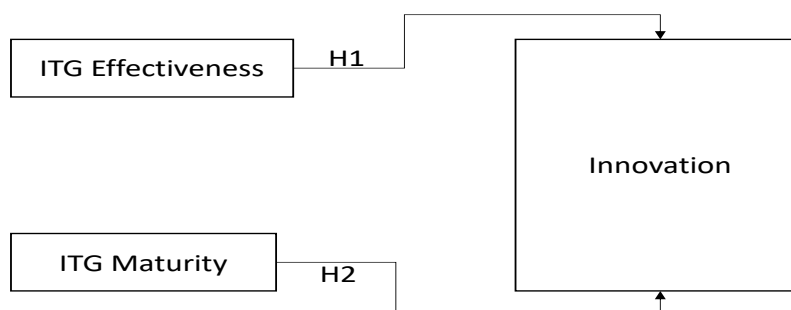
The questions that guided the study were adapted from the Carraway study (Carraway, 2015):

1. *RQ1: How do ITG maturity and effectiveness impact technology innovation in higher education?*

2. *RQ2: Under what circumstances does ITG help, or hinder, technology innovation in higher education?*

RQ1 was modified to include "effectiveness," and RQ2 was used in its original form. The three constructs and rubrics used were adapted from Carraway's (2015) study; ITG maturity, ITG effectiveness, and innovation. The following sections describe each construct in more detail.

ITG Maturity Construct

The constructs for this study were adapted from Carraway's (2015) study on the effects of ITG on innovation in academia. Carraway examined the impact of ITG maturity and effectiveness on innovation at five U.S. universities, including the University of North Carolina at Greensboro (UNCAG), her employer. The universities included in Carraway's (2015) study were all four-year, doctoral institutions and have a Carnegie classification as research universities with very high research activity. Carraway used a combination of multiple constructs including COBIT 4.1, COBIT 5.0, and ECAR[1] to assess ITG maturity (Carraway, 2015). The researcher received express permission from Deborah Carraway on October 29th, 2019 to adapt or adopt the constructs and survey instruments for the Newman University study. The Newman study measured ITG maturity using a single construct, taken in its original form from the Carraway study. The construct was developed by ECAR and is a simplified version of the COBIT 4.1 maturity model. **Table 6** summarizes the construct and rubric used to assess ITG maturity in this study.

Table 6. *ITG Maturity Construct* (*Carraway, 2015*)

Maturity Level	Characteristics of ITG Maturity
Non-existent	ITG processes are not applied, and the institution has not recognized the need for them.

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[1] EDUCAUSE Center for Analysis and Research (ECAR). EDUCAUSE actively engages with colleges and universities, corporations, foundations, government, and other nonprofit organizations to further the mission of transforming higher education through the use of information technology(Educause, 2019)

Table 6. *Continued*

Initial	ITG processes are informal and uncoordinated.
Repeatable	ITG Processes follow a regular pattern.
Defined	ITG processes are documented and communicated.
Managed	ITG processes are Processes are monitored and measured.
Optimized	ITG best practices are followed, and there are provisions for amending processes.

As with the COBIT 4.1 maturity model, the ITG maturity construct contains six maturity levels ranging from non-existing, where there is no formal ITG in place to optimizing, the most mature level where the goal is continuous improvement. Each ITG maturity level has a corresponding process characteristic that is typical for that level of maturity.

ITG Effectiveness Construct

To measure ITG effectiveness, the researcher used a construct and rubric adapted from Carraway (2015) containing seven dimensions of ITG effectiveness, each containing at least one qualifying characteristic. **Table 7** summarizes each dimension, along with its corresponding characteristic(s).

Table 7. *ITG Effectiveness Construct*

Dimension	Characteristics of ITG Effectiveness
Executive leadership engagement	1. IT matters are regularly on the agenda of the executive board. 2. Department VPs are active participants in the IT governance process. 3. The CIO is included in all IT related matters and software/hardware procurement decisions.
Business unit engagement	1. Business units and business process owners have input into IT priorities and decision-making.
Faculty engagement	1. Faculty have input into IT priorities and decision-making.
Student engagement	1. Students have input into IT priorities and decision-making.
Decision-making	1. Decision-making roles are clearly defined. 2. A broad set of stakeholders have input into the decision-making process. 3. Executive leaders have input into all IT decisions. 4. People involved in IT governance are at the right level to make decisions and recommendations.

Table 7. *Continued*

ITG adoption by the institution	1. Managers understand the ITG process. 2. ITG principles are reflected in decision-making. 3. Roles, responsibilities, and authority are well-defined.
ITG management	1. Staff effort is specifically devoted to managing the ITG process. 2. ITG process is regularly reviewed and assessed for effectiveness. 3. ITG process is stable with one or fewer major changes per year.

The ITG effectiveness construct used in Carraway's original study included two additional dimensions; utilization of IT governance process; project prioritization and portfolio management. The characteristics associated with both dimensions were specific to project governance and prioritization. However, the dimensions were deemed inappropriate for a nascent ITG function with insufficient experience to assign meaningful rankings. A dimension received a rating of "Not Present" if all characteristics were missing, "Developing" if there was evidence supporting at least one characteristic, and "Mature" if all characteristics were evidenced.

Innovation Construct

The researcher adapted the innovation construct and rubric from the Carraway (2015) study. Minor modifications were made to innovation characteristics only when necessary for contextualization. The construct included eight dimensions, each containing at least one qualifying characteristic. **Table 8** lists each dimension and associated characteristic(s).

Table 8. *Innovation Construct*

Dimension	Characteristics of Innovation
Innovative Activity	1. New IT initiatives are introduced to the organization. 2. New ideas are developed and implemented by people who are engaged with others in the context of the institution. 3. Sources identified multiple technology innovations that have been implemented at the institution within the past five years.
Innovation Culture	1. Mechanisms exist for identifying and developing new ideas. Input from external groups or people is regularly sought out. 2. CIO agrees technology innovation is part of the mission. IT mission and strategy emphasize new initiatives and new ideas. 3. Innovation is explicitly funded

Table 8. *Continued*

Incremental Innovation	1. New products, services and processes are implemented that are new to the organization 2. Innovative projects are focused on meeting near-term business needs.
Radical Innovation	1. New products, services or processes are implemented that are new to higher education or to outside industry and represent a large departure from existing practices. 2. Organization makes presentations or publishes articles on technology innovations developed or implemented within the institution at EDUCAUSE or publishes articles on such innovations in peer-reviewed journals. 3. Institution is an early adopter or contributor to the development of new technologies. 4. Leadership sponsors projects but does not closely manage them. The focus of innovative projects is on exploring what is possible.

The innovation construct contained both process and outcome characteristics that captured a broad range of innovative activities. Additionally, the construct contained cultural characteristics that shed light on the institution's willingness and readiness to accept change. Each dimension received a rating of "Not Present" if all characteristics were missing, "Emerging" if there was partial support for at least one characteristic, or "Integrated" if all characteristics were evidenced.

Methods

A mixed-methods case study was the chosen design for this study. A case study is qualitative research that relies on data from multiple sources including, participant and direct observations, surveys, interviews, tests, protocols, examinations of past records, and collections of samples (Moffatt, 2015). Easton (2010) defines a case study as a "research method that involves investigating one or a small number of social entities or situations about which data are collected using multiple sources of data and developing a holistic description through an iterative research process " (p. 119). The key benefit offered by a case study is the ability to evaluate multiple data sources and develop a comprehensive understanding of a situation. Case research allows the researcher to examine several factors and relationships in a small number of instances (Easton, 2010). The data from a single case can provide a thorough understanding into the nature of a phenomenon.

Survey Development

This study integrated a survey instrument to gather primary data. The survey, included in Appendix A – Survey Instrument, was created and administered using Qualtrics' Experience Management (XM) platform. Qualtrics is a global technology company used by over 11,000 well-known brands (Qualtrics, 2020). Prior to developing the survey, the researcher met with individuals from a wide variety of university departments to contextualize the survey instrument taken from the Carraway (2015a) study. Interviews, conducted to contextualize the survey, were held in-person on Newman's main campus in Wichita, KS and lasted for approximately 30 minutes. Some of the individuals interviewed also participated in the survey. However, these individuals had no knowledge of the contents of the survey or visibility to the final survey questions. The survey was contextualized by reviewing interview notes from participants describing their role in the university and experience with innovation at Newman. Through these discussions, the researcher was able to determine the suitability of characteristics contained in each construct, as well as the language used in the instrument.

The final survey included 16 control questions intended only for the CIO and 38 questions for all other respondents. The first question was added to facilitate display logic (i.e., only the CIO saw the first 16 questions) making a total of 55 questions. The CIO questions covered four areas: (1) institutional demographics; (2) IT governance and innovation; (3) adoption of new technologies; and (4) recent innovations. Questions for the general audience were organized by constructs in the theoretical framework; ITG Maturity, ITG Effective, and Innovation. ITG effectiveness and innovation questions were derived from the characteristics listed for each dimension in the respective construct and had three choices to choose from; Agree; Disagree; and Neutral. Questions for both constructs included an open-ended question asking respondents to add any additional information they would like to share. Responses for these questions provided qualitative data for coding and analysis. For the ITG maturity construct, participants were asked to select the maturity level from the construct that most closely represented the ITG function at the university.

Data Collection

Surveys were distributed to individuals identified by the provost and the interim president of the university. A total of 24 surveys were distributed, 19 surveys were started, and 19 surveys were completed for a response rate of 79%, and a completion rate of 100%. The first survey distribution occurred on January 6, 2020 and was scheduled to close on January 24, 2020. However, on January 23, 2020 the researcher was informed by the CIO that a significant number of surveys were quarantined due to e-mail security rules and were never delivered to the intended recipient. The deadline to complete the survey was then extended for another week, until January 31, 2020.

The researcher also collected secondary data that included publicly available documents and confidential, institutional documents received from authorized university personnel throughout the duration of the project. Some data were provided and reviewed prior to conducting interviews. Secondary data sources included:

1. Information Technology Governance Charter 12.19.2017
2. Newman University Network topology diagrams
3. Newman University Three Year Technology Plan First Draft BOT 01.31.2018
4. IT Staffing data and resumes
5. IT 3-year 2017 budget forecast provided by Provost (includes hardware and software costs, application inventory, classroom technology costs, software support costs, software services costs, and software expenses).
6. Newman 2012 Information Technology Review and Recommendations Report
7. Newman University Fact Sheet 2019
8. Newman University IPEDS[2] Data Feedback Report 2018
9. Newman University – KS- Assurance Argument 1A, 3C, 3D – 9/23/2019 (Accreditation)
10. EM Software spreadsheet

Secondary data not publicly available was not shared with or disclosed to any third parties.

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[2] Integrated Postsecondary Education Data System (IPEDS) collects institution-level data on student enrollment, graduation rates, student charges, program completions, faculty, staff, and finances (National Center for Education Statistics, 2018).

Data Analysis and Coding

Data from the survey were analyzed in four ways. First, the researcher performed a descriptive statistical analysis to generate summary and frequency tables of responses for each survey question. This data was used to rate the dimensions of the appropriate construct and generate institutional profiles for ITG maturity, ITG effectiveness, and innovation. Second, the researcher performed an inferential statistical analysis using statistical scales developed for the ITG effectiveness and innovation constructs to identify any relationships that existed, first between characteristics within the same construct, and then between constructs. Third, the researcher performed a qualitative analysis of open-ended survey responses. Seven survey respondents provided answers to the open-ended survey questions, which were designed to add context to the quantitative data generated from the survey. Open-ended responses were hand-coded using Microsoft (MS) Word and placed into categories of emergent themes. Analyzing this data began by downloading participants' responses to the open-ended survey and copying them into a Word document for hand coding. The researcher organized responses in Word by participant and then by survey question. Coding followed the guidelines provided by (Saldaña, 2013), who elaborated the process of moving from codes to larger categories, or patterns, in the data. Finally, the researcher conducted a thorough review of secondary data sources received from Newman. The following sections detail the results from the analyses conducted for this study.

ITG Profile Development

The following sections presents the ITG profiles generated from the survey results. Calculations were performed automatically as a standard feature of the Qualtrics platform. The researcher rounded percentages to the nearest whole number. Where appropriate, the generated profiles include the number of responses chosen for each survey option along with the total number of responses used in the percentage calculation.

ITG Maturity Profile

The survey data for ITG maturity showed that most survey respondents believed Newman's ITG maturity level is "Initial". Seventy-nine percent of survey respondents selected "Initial" as best describing

Newman's ITG. Over 84% of respondents agreed that Newman's ITG maturity level is initial or below. The control questions from the survey provided additional context about Newman's ITG maturity. The survey showed that the university's IT budget was projected to be between $1 million and $5 million with a staff of less than ten people. This information was also confirmed by an examination of the secondary data sources provided to the researcher. Control survey questions also showed neutrality with respect to the influence that ITG has on innovation but agreement that innovation was a part of the institution's mission. There was strong disagreement that ITG only applied to the IT organization, suggesting that all departments are subjected to the same governance processes. Additionally, the results showed agreement that innovations often come from groups outside the IT organization but remained neutral about whether innovations often bypass the university's ITG processes. Finally, the data showed that the institution tends to be a late adopter of various technologies. **Table 9** summarizes Newman's pattern of technology adoption for several widely available technologies according to the survey results.

Table 9. *NU Technology Adoption*

Technology	Adoption Category
Cloud computing	Late Adopter
Mobile computing	Mainstream Adopter
Social computing	Late Adopter
Data analytics/business intelligence	Late Adopter
Enterprise identity and access management	Mainstream Adopter

Roger's (2003) technology adoption curve shows a typical adoption lifecycle with mainstream adoption occurring to the right of the mean. The results from Newman's survey placed the university within the late majority and laggards' groups. These results provided the organizational context and input for assessing ITG maturity and effectiveness as depicted in **Figure 6**.
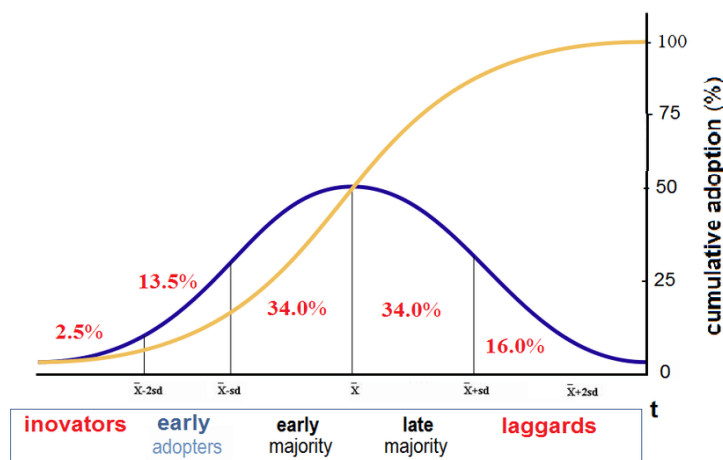
Figure 6. Technology Adoption Curve (Rogers, 2003)

ITG Effectiveness Profile

The researcher analyzed data for the ITG effectiveness construct and created a specific profile of the university. To confirm the presence of a characteristic, the survey data collected must indicate majority agreement (i.e. greater than 50%) that the characteristic currently exists at the university. A dimension received a rating of "Not Present" if the majority disagreed on all characteristics, "Developing" if there was agreement supporting at least one characteristic, and "Mature" if there was agreement on all characteristics. The researcher did not include neutral responses in percentage calculations when building the profile. **Table 10** details the ITG effectiveness profile that was developed for Newman using the results of the survey.

Table 10. *ITG Effectiveness Profile*

Dimension	Characteristic	Agree	Count	Disagree	Count	Total	Rating
Executive Leadership	• It matters are regularly on the agenda of NU's cabinet	50%	6	50%	6	12	Not Present
	• Department VPs are active participants in the ITG process	36%	4	64%	7	11	
	• The CIO is included in all IT related matters and software/hardware procurement decisions	36%	5	64%	9	14	
Business Unit Engagement	• Business Units and business process owners have input into IT priorities and decision-making.	64%	7	36%	4	11	Mature
Faculty Engagement	• Faculty have input into IT priorities and decision-making.	56%	5	44%	4	9	Mature
Student Engagement	• Students have input into IT priorities and decision-making.	8%	1	92%	12	13	Not Present

Table 10. *Continued*

Decision Making	• Decision-making roles are clearly defined	0%	0	100%	12	12	Developing
	• A broad set of stakeholders have input into the decision-making process.	27%	3	73%	8	11	
	• Executive leaders have input into all IT decisions.	67%	8	33%	4	12	
	• People involve in ITG are at the right level to make decisions and recommendations.	43%	6	57%	8	14	
ITG Adoption by the Institution	• Managers understand the ITG process.	0%	0	100%	15	15	Not Present
	• IG principles are reflected in decision-making.	8%	1	92%	12	13	
	• Roles, responsibilities, and authority are well-defined.	7%	1	93%	13	14	
ITG Management	• Staff effort is specifically devoted to managing the ITG process.	8%	1	92%	12	13	Not Present
	• ITG process is regularly reviewed and assessed for effectiveness.	0%	0	100%	13	13	
	• ITG process is stable with one or fewer major changes per year.	29%	4	71%	10	14	

Questions on the ITG effectiveness construct received an average of 12.5 responses for each characteristic. Only two dimensions in the ITG effectiveness construct received a mature rating. However, it is important to note that applying the rubric to those dimensions can only yield a rating of mature or not present, since both dimensions only contain a single characteristic. The same holds true for the "Student Engagement" dimension, that received a rating of "Not Present." Nevertheless, the results suggested that business units and faculty members have input into IT priorities and decisions, whereas students have no voice at all. The "Decision Making" dimension was the only dimension with a rating of "Developing," but only one characteristic received majority agreement from survey participants. Results for dimension showed that Executives have input into IT decisions, but there is room for improvement with respect to role definition, member inclusion, and authority levels.

Innovation Profile

As was done for the ITG effectiveness construct, the researcher analyzed data for the Innovation construct and created a specific profile of the university. Innovation characteristics were verified using the same rubric for ITG effectiveness characteristics (i.e. the presence of an innovation characteristic was confirmed only if the survey data collected indicated majority agreement). An Innovation dimension received a rating of "Not Present" if the majority disagreed on all characteristics, "Emerging" if there was agreement supporting at least one characteristic, and "Integrated" if there was agreement on all characteristics. The researcher did not include neutral responses in percentage calculations when building the profile. **Table 11** details the ITG effectiveness profile that was developed for Newman using the results of the survey.

Table 11. *Innovation Profile*

Dimension	Characteristic	Agree	Count	Disagree	Count	Total	Rating
Innovative Activity	• New initiatives are introduced to the organization.	50%	6	50%	6	12	Not Present
	• New ideas are developed and implemented by people who are engaged with others in context of the institution.	45%	5	55%	6	11	
	• Sources identify multiple technology innovations that have been developed or implemented at the institution within the past five years.	50%	5	50%	5	10	
Innovation Culture	• Mechanisms exist for identifying and developing new ideas. Input from external groups or people is regularly sought out.	30%	3	70%	7	10	Not Present
	• CIO agrees technology innovation is part of the mission. IT mission and strategy emphasize new initiatives and new ideas.	43%	6	57%	8	14	
	• Innovation is explicitly funded.	15%	2	85%	11	13	

Table 11. *Continued*

Incremental Innovation	• New products, services or processes are implemented that are new to the organization.	79%	11	21%	3	14	Emerging
	• Innovative projects are focused on meeting near-term business needs.	46%	6	54%	7	13	
Radical Innovation	• New products, services or processes are implemented that are new to higher education or to industry and represent a large departure from existing practices.	27%	3	73%	8	11	Not Present
	• Organization makes presentations or publishes articles on technology innovations developed or implemented within the institution at EDUCAUSE or publishes articles on such innovations in peer-reviewed journals.	8%	1	92%	11	12	
	• Institution sells information technology products, services or processes that were developed in-house.	6%	1	94%	15	16	
	• Institution is an early adopter or contributor to the development of new technologies.	0%	0	100%	13	13	
	• Leadership sponsors projects but does not closely manage them. The focus of innovative projects is on exploring what is possible.	20%	2	80%	8	10	

Questions on the Innovation construct received an average of 12.2 responses for each characteristic. Only one of four dimensions received a rating other than "Not Present". The data showed evidence of some incremental innovation activities, specifically the implementation of new products, services, or processes were the key factors contributing to an "Emerging" rating for the incremental innovation dimension. The data also showed some evidence of innovative activity, with two of the three characteristics receiving 50%

agreement and 50% disagreement. However, strict application of the rubric yielded a "Not Present" rating for the dimension.

Analysis

The following sections discuss the analyses conducted for this study. Data sources analyzed included survey responses and secondary data sources. Close-ended responses from the survey were analyzed using descriptive and inferential statistics and open-ended questions were hand-coded and categorized.

Descriptive Statistics

Frequencies and Percentages for Individual Survey Items

Most participants identified IT governance at Newman University at the Initial maturity level ($n = 15$, 78.95%). Frequencies and percentages are presented in **Table 12**.

Table 12. *Frequency Table for ITG Maturity*

Variable	n	%
Which of the following best describes IT governance at Newman University?		
Non-existent	1	5.26
Initial	15	78.95
Repeatable	2	10.53
Defined	1	5.26

The results for ITG Effectiveness items are presented in **Table 13**.

Table 13. *Frequency Table for ITG Effectiveness Items*

Variable	n	%
Executive Leadership Engagement - IT matters are regularly on the agenda of NU's cabinet.		
Agree	6	31.58
Disagree	6	31.58
No response	7	36.84

Table 13. *Continued*

Executive Leadership Engagement - Department VPs are active participants in the IT governance process.		
Agree	4	21.05
Disagree	7	36.84
No response	8	42.11
Executive Leadership Engagement - The CIO is included in all IT related matters and software/hardware procurement decisions.		
Agree	5	26.32
Disagree	9	47.37
No response	5	26.32
Business Unit Engagement - Business units and business process owners have input into IT priorities and decision-making.		
Agree	7	36.84
Disagree	4	21.05
No response	8	42.11
Faculty Engagement - Faculty have input into IT priorities and decision-making.		
Agree	5	26.32
Disagree	4	21.05
No response	10	52.63
Student Engagement - Students have input into IT priorities and decision-making.		
Agree	1	5.26
Disagree	12	63.16
No response	6	31.58
Decision-Making - Decision-making roles are clearly defined.		
Disagree	12	63.16
No response	7	36.84
Decision-Making - A broad set of stakeholders have input into the decision-making process.		
Agree	3	15.79
Disagree	8	42.11
No response	8	42.11
Decision-Making - Executive leaders have input into all IT decisions.		
Agree	8	42.11
Disagree	4	21.05
No response	7	36.84
Decision-Making - People involved in IT governance are at the right level to make decisions and recommendations.		
Agree	6	31.58
Disagree	8	42.11
No response	5	26.32

Table 13. *Continued*

IT governance adoption by the institution - Managers understand the IT governance process.		
Disagree	15	78.95
No response	4	21.05
IT governance adoption by the institution - IT governance principles are reflected in decision-making.		
Agree	1	5.26
Disagree	11	57.89
No response	7	36.84
IT governance adoption by the institution - Roles, responsibilities, and authority are well-defined.		
Agree	1	5.26
Disagree	13	68.42
No response	5	26.32
IT governance management - Staff effort is specifically devoted to managing the IT governance process.		
Agree	1	5.26
Disagree	12	63.16
No response	6	31.58
IT governance management - IT governance process is regularly reviewed and assessed for effectiveness.		
Disagree	13	68.42
No response	6	31.58
IT governance management - IT governance process is stable with one or fewer major changes per year.		
Agree	4	21.05
Disagree	10	52.63
No response	5	26.32

The results for Innovation items are presented in **Table 14**.

Table 14. *Frequency Table for Innovation Items*

Variable	*n*	*%*
Innovative Activity - New IT initiatives are introduced to the organization.		
Agree	6	31.58
Disagree	6	31.58
No response	7	36.84

Table 14. *Continued*

Innovative Activity - New ideas are developed and implemented by people who are engaged with others in context of the institution.		
Agree	5	26.32
Disagree	6	31.58
No response	8	42.11
Innovative Activity - Sources identify multiple technology innovations that have been developed or implemented at the institution within the past five years.		
Agree	5	26.32
Disagree	5	26.32
No response	9	47.37
Innovation Culture - Mechanisms exist for identifying and developing new ideas. Input from external groups or people is regularly sought out.		
Agree	3	15.79
Disagree	7	36.84
No response	9	47.37
Innovation Culture - CIO agrees technology innovation is part of the mission. IT mission and strategy emphasize new initiatives and new ideas.		
Agree	6	31.58
Disagree	8	42.11
No response	5	26.32
Innovation Culture - Innovation is explicitly funded.		
Agree	2	10.53
Disagree	11	57.89
No response	6	31.58
Incremental Innovation - New products, services or processes are implemented that are new to the organization.		
Agree	11	57.89
Disagree	3	15.79
No response	5	26.32
Incremental Innovation - Innovative projects are focused on meeting near-term business needs.		
Agree	6	31.58
Disagree	7	36.84
No response	6	31.58
Radical Innovation - New products, services or processes are implemented that are new to higher education or to outside industry and represent a large departure from existing practices.		
Agree	3	15.79
Disagree	8	42.11
No response	8	42.11

Table 14. *Continued*

Radical Innovation - Organization makes presentations or publishes articles on technology innovations developed or implemented within the institution at EDUCAUSE or publishes articles on such innovations in peer-reviewed journals.		
Agree	1	5.26
Disagree	11	57.89
No response	7	36.84
Radical Innovation - Institution sells information technology products, services or processes that were developed in-house.		
Agree	1	5.26
Disagree	15	78.95
No response	3	15.79
Radical Innovation - Institution is an early adopter or contributor to the development of new technologies.		
Disagree	13	68.42
No response	6	31.58
Radical Innovation - Leadership sponsors projects but does not closely manage them. The focus of innovative projects is on exploring what is possible.		
Agree	2	10.53
Disagree	8	42.11
No response	9	47.37

Descriptive Statistics for Scales. The individual survey items on the ITG Effectiveness and Innovation components on the questionnaire were coded with 1 = Agree and 0 = Disagree. Composite scores were generated on the ITG Effectiveness and Innovation scales through a series of averages on the respective items comprising each construct.

ITG Effectiveness. The ITG Effectiveness scale with the highest average score corresponded to Business Unit Engagement ($M = 0.64$, $SD = 0.50$). The ITG Effectiveness scales with the lowest average scores corresponded to Student Engagement ($M = 0.08$, $SD = 0.26$) and Governance Adoption ($M = 0.08$, $SD = 0.26$). Total ITG Effectiveness scores ranged from 0.00 to 0.75, with $M = 0.28$ and $SD = 0.24$. The average score for Total ITG Effectiveness ($M = 0.28 => 28\%$) indicates that participants "agreed" to approximately four of the 16 items comprising ITG Effectiveness. **Table 15** presents the descriptive statistics for the ITG Effectiveness scales.

Table 15. *Summary Statistics for ITG Effectiveness Scales*

Variable	*n* (sample size)	Number of survey items	Min	Max	*M*	*SD*
Total ITG Effectiveness	18	16	0.00	0.75	0.28	0.24
Executive Leadership Engagement	16	3	0.00	1.00	0.43	0.45
Business Unit Engagement	11	1	0.00	1.00	0.64	0.50
Faculty Engagement	9	1	0.00	1.00	0.56	0.53
Student Engagement	13	1	0.00	1.00	0.08	0.28
Decision Making	17	4	0.00	1.00	0.38	0.37
Governance Adoption	18	3	0.00	1.00	0.08	0.26
Governance Management	17	3	0.00	1.00	0.16	0.34

Innovation. The Innovation scale with the highest average score corresponded to Incremental Innovation ($M = 0.66$, $SD = 0.44$). The Innovation scale with the lowest average score corresponded to Radical Innovation ($M = 0.15$, $SD = 0.28$). Total Innovation scores ranged from 0.00 to 1.00, with $M = 0.37$ and $SD = 0.32$. The average score for Total Innovation ($M = 0.37 => 37\%$) indicates that participants "agreed" to approximately five of the 13 items comprising Innovation. **Table 16** presents the descriptive statistics for the ITG Effectiveness scales.

Table 16. *Summary Statistics for Innovation Scales*

Variable	*n* (sample size)	Number of survey items	Min	Max	*M*	*SD*
Total Innovation	17	13	0.00	1.00	0.37	0.32
Innovative Activity	15	3	0.00	1.00	0.53	0.48
Innovative Culture	17	3	0.00	1.00	0.32	0.40
Incremental Innovation	16	2	0.00	1.00	0.66	0.44
Radical Innovation	16	5	0.00	1.00	0.15	0.28

Descriptive statistics were utilized to examine the scales of ITG Maturity. A heavy majority of participants identified ITG at Newman University at the Initial stage of maturity. Therefore, it is difficult to draw direct comparisons between ITG Maturity with ITG Effectiveness and Innovation. Total ITG Effectiveness scores ($M = 0.75$) were highest in the "Defined" maturity group. In addition, the "Defined" maturity group had highest scores for Executive Leadership Engagement ($M = 1.00$), Decision Making ($M = 0.67$), Governance Adoption ($M = 1.00$), and Governance Management ($M = 1.00$).

Total Innovation scores (*M* = 0.42) were highest in the "Repeatable" maturity group. In addition, the "Repeatable" maturity group had highest scores Business Unit Management (*M* = 1.00), Student Engagement (*M* = 0.50), Incremental Innovation (*M* = 0.75), and Radical Innovation (*M* = 0.20).

The "Initial" maturity group had highest scores for Faculty Engagement (*M* = 0.67) and Innovative Activity (*M* = 0.64).

Both the "Repeatable" and "Defined" maturity groups had the highest and equal scores for Innovative Culture (*M* = 0.50). The "Non-Existent" maturity group consisted of one participant, who indicated "Disagree" for every item – which justifies the score of "0" for every scale. **Table 17** presents the averages of subscales by ITG Maturity.

Table 17. *Summary Statistics for ITG Effectiveness and Innovation by ITG Maturity*

Variable	ITG Maturity							
	Non-Existent		Initial		Repeatable		Defined	
	n	*M*	*n*	*M*	*n*	*M*	*n*	*M*
Total ITG Effectiveness	1	0.00	14	0.25	2	0.43	1	0.75
Executive Leadership Engagement	1	0.00	13	0.45	1	0.00	1	1.00
Business Unit Engagement	1	0.00	8	0.63	2	1.00	0	-
Faculty Engagement	1	0.00	6	0.67	2	0.50	0	-
Student Engagement	1	0.00	9	0.00	2	0.50	1	0.00
Decision Making	1	0.00	13	0.35	2	0.63	1	0.67
Governance Adoption	1	0.00	14	0.00	2	0.25	1	1.00
Governance Management	1	0.00	13	0.08	2	0.33	1	1.00
Total Innovation	1	0.00	13	0.40	2	0.42	1	0.14
Innovative Activity	1	0.00	11	0.64	2	0.50	1	0.00
Innovative Culture	1	0.00	13	0.31	2	0.50	1	0.50
Incremental Innovation	1	0.00	13	0.69	2	0.75	0	-
Radical Innovation	1	0.00	12	0.17	2	0.20	1	0.00

Inferential Statistics

Pearson Correlations. A series of Pearson correlations were conducted to examine the two-way associations between the scales. A Pearson correlation is appropriate when testing the two-way association between continuous level variables (Pallant, 2013). First, a correlation matrix is presented to

examine the associations between ITG Effectiveness Scales. Second, a correlation matrix is presented to examine the associations between the Innovation Scales. Third, a correlation matrix is presented to examine the associations between ITG Effectiveness and Innovation scales.

ITG Effectiveness Scales. Three correlations were statistically significant among the ITG Effectiveness scales. Student Engagement was significantly correlated to Faculty Engagement ($r = .99$, $p < .001$). Governance Management was significantly correlated to Decision Making ($r = .52$, $p = .039$) and Governance Adoption ($r = .66$, $p = .004$). All three correlations had positive correlation coefficients indicating that as one variable increased in value, the second variable also tended to increase in value. **Table 18** presents the Pearson correlations between the ITG Effectiveness scales.

Table 18. *Pearson Correlations Between ITG Effectiveness Scales*

Variable	Exec Leadership Eng.	Bus Unit Eng.	Faculty Eng.	Student Eng.	Decision Making	Governance Adoption	Governance Management
Exec Leadership Eng.	1.00						
Bus Unit Eng.	.28	1.00					
Faculty Eng.	.49	.73	1.00				
Student Eng.	-.27	.38	.99**	1.00			
Decision Making	.35	.43	.54	.16	1.00		
Governance Adoption	.20	.24	.32	.39	.22	1.00	
Governance Management	.44	-.25	-.06	.09	.52*	.66*	1.00

Note. Values in table correspond to Pearson correlation coefficient.
*Denotes correlation is significant at .05 significance threshold. **Denotes correlation is significant at .01 significance threshold.

Innovation Scales. Three correlations were statistically significant among the Innovation scales. Incremental Innovation was significantly correlated to Innovative Activity ($r = .77$, $p = .001$) and Innovative Culture ($r = .58$, $p = .018$). Radical Innovation was significantly correlated to Innovative Culture ($r = .71$, $p = .002$). All three correlations had positive correlation coefficients indicating that as one variable increased in value, the second variable also tended to increase in value. **Table 19** presents the Pearson correlations between Innovation scales.

Table 19. *Pearson Correlations Between Innovation Scales*

Variable	Innovative Activity	Innovative Culture	Incremental Innovation	Radical Innovation
Innovative Activity	1.00			
Innovative Culture	.27	1.00		
Incremental Innovation	.77**	.58*	1.00	
Radical Innovation	.06	.71**	.43	1.00

Note. Values in table correspond to Pearson correlation coefficient.
*Denotes correlation is significant at .05 significance threshold. **Denotes correlation is significant at .01 significance threshold.

ITG Effectiveness and Innovation Scales. Multiple correlations were statistically significant between the ITG Effectiveness and Innovation scales. There was a significant relationship between Total ITG Effectiveness and Total Innovation ($r = .55$, $p = .021$). In addition, Total ITG Effectiveness was significantly correlated to Innovative Culture ($r = .79$, $p < .001$) and Incremental Innovation ($r = .69$, $p = .003$). Executive Leadership Engagement was significantly correlated to Innovative Culture ($r = .75$, $p = .001$). Faculty Engagement was significantly correlated to Total Innovation ($r = .81$, $p = .015$), Innovative Activity ($r = .99$, $p < .001$) and Incremental Innovation ($r = .91$, $p = .002$). Decision Making was significantly correlated to Innovative Culture ($r = .53$, $p = .034$) and Incremental Innovation ($r = .65$, $p = .009$). Each correlation was positive suggesting, a direct relationship between each of the significant pairs of variables. **Table 20** presents the Pearson correlations between the ITG Effectiveness and Innovation scales.

Table 20. *Pearson Correlations Between ITG Effectiveness and Innovation Scales*

Variable	Total Innovation	Innovative Activity	Innovative Culture	Incremental Innovation	Radical Innovation
Total ITG Effectiveness	.55*	.14	.79**	.69**	.39
Exec Leadership Engagement	.51	-.03	.75**	.36	.32
Business Unit Engagement	.24	.39	.21	.15	-.36
Faculty Engagement	.81*	.99**	.41	.91**	.38
Student Engagement	.33	.39	.28	.32	.25
Decision Making	.46	.22	.53*	.65**	.20
Governance Adoption	-.04	-.16	.21	.21	-.02
Governance Management	.10	-.44	.48	.26	.50

Note. Values in table correspond to Pearson correlation coefficient.
*Denotes correlation is significant at .05 significance threshold. **Denotes correlation is significant at .01 significance threshold.

Coding Frequency

Using the highlighting function in Microsoft Word, the researcher coded passages of text that offered insight into ITG and innovation. A color was assigned to each code to see how many passages were coded with yellow or green, for example. Then, the researcher tallied the codes for each color. The coding system, and number of times they appeared, is presented in **Table 21**.

Table 21. *Coding Results and Color Scheme System*

Color	Code	Code Tallies
Yellow	Lack of meetings	1
Green	Unaware of committee membership	3
Blue	Financially driven decisions	1
Pink	Consequences of unvetted systems	4
Grey	New staff brings innovation	1
Light grey	Financial concerns hinder innovation	1
Red	No consequences of not following procedures	4
Teal	Not keeping up with innovation trends	2
Olive	New employees are uncomfortable innovating	1
Underline	Unclear processes for IT problems	2

Once all data from the surveys were coded, the researcher created categories from the codes by exploring similarities between codes and sorting them into categories, like physical piles of data. The researcher noted that the yellow code, *lack of meetings*, was related to the green code, *unaware of committee membership*. The relationship between these two codes had to do with the lack of organization and communication of the committee and its meetings, to the extent that committee members were unaware that they were even on the ITG committee. These two codes were placed into the same category based on this relationship. This process was repeated until all codes were placed into these larger categories with an associated list of passages of text from survey responses. This process yielded four categories, which are the basis of the findings presented in the next section.

Secondary Data Analysis

A thorough review of secondary data sources provided valuable insights into Newman's IT operations. According to the 3-year IT plan the researcher received on September 13th, 2019, Newman's capital expenditures (CapEx) were estimated to be $699,276 for the 2019-2020 period. Note that the CapEx plan reviewed by the researcher was a living document updated on an ongoing basis to accommodate the shifting needs of the university. Upgrading or replacing ailing infrastructure and classroom equipment accounted for more than 60% of expenditures, with the remaining expenditures earmarked for incremental improvements and implementing new technologies. The CapEx plan also showed a software portfolio of approximately 96 applications. Furthermore, a review of the EM Software spreadsheet detailing Newman's use of software as a service (SaaS) provider identified 27 additional applications, increasing the software portfolio to a total of 123 applications. The researcher confirmed through the appropriate university source that the SaaS applications were not vetted by the ITG committee. The 2017-2018 Integrated Postsecondary Education Data System (IPEDS) report contained indicators the researcher used to compare Newman to 15 similar universities (National Center for Education Statistics, 2018). The DFR establishes institutional context for examining data submitted to IPEDS. The purpose of this report is to provide institutional executives with a useful resource to help improve the quality and comparability of IPEDS data.

The report showed in **Figure 7** that between 2014 and 2017 the average net price of attendance for full-time, first-time, degree/certificate-seeking undergraduate students at Newman was consistently less than similar schools, suggesting that institution spends more money on grants and scholarships. **Figure 8** provided
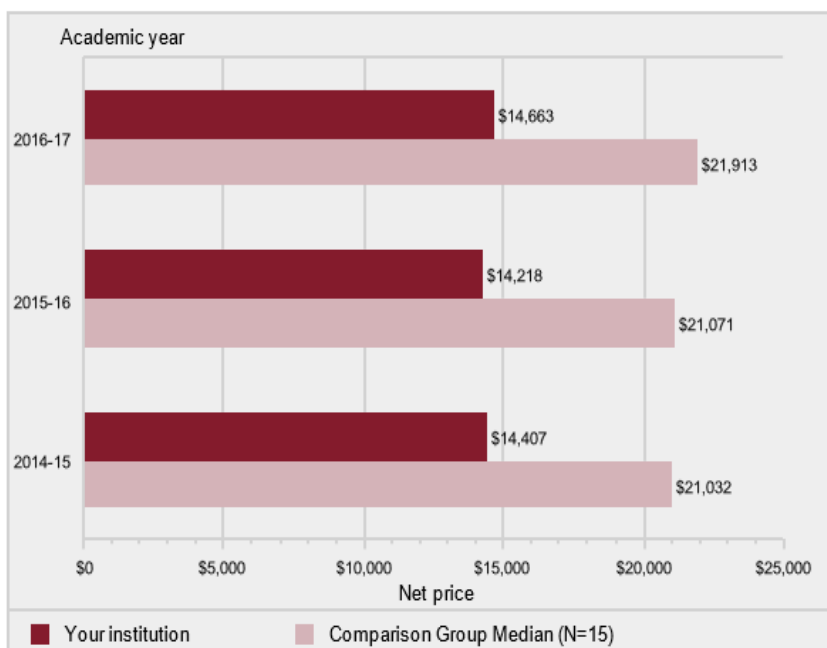

Figure 7. *Avg Net Price of Attendance (NU IPEDS DFR, 2018)*

additional evidence of Newman's generous giving as seen in the historically larger amount of institutional grants given to students. The IPEDS report also showed in **Figure 9** that Newman's University's non-teaching, computer, engineering, and science FTE staff is approximately half that of comparable schools, not including graduate students. Furthermore, a review of IT staff resumes showed that in some cases, skillsets were misaligned with roles and training was essential for professional development. However, though Newman's 2012 IT report also confirmed the need for professional development, it also highlighted a lack of participation in training due to budget exigencies (Benson et al., 2012). The report described Newman's IT staff as a group that evolved over time, without the necessary development of training and professionalism.
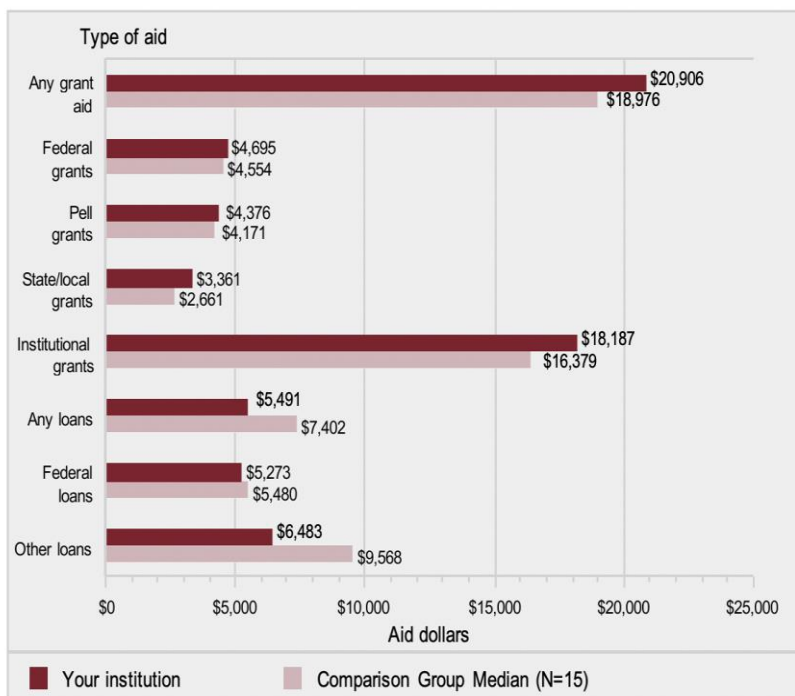

Figure 8. *Avg amounts of awards and scholarships (NU IPEDS DFR, 2018)*
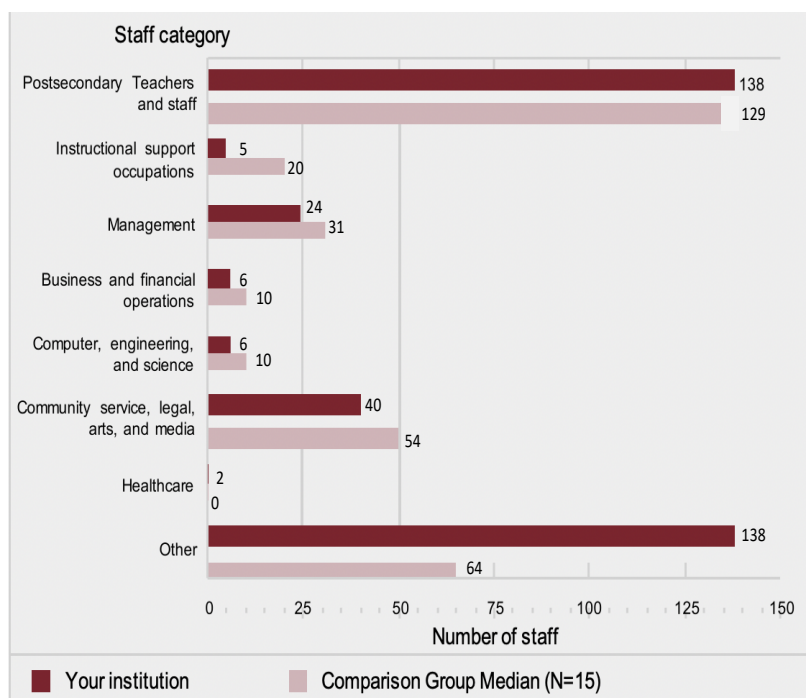

Figure 9. *FTE Staff by Occupation (NU IPEDS DFR, 2018)*

Findings

This study was designed to address two research questions:

1. *RQ1: How do IT governance maturity and effectiveness impact technology innovation in higher education?*
2. *RQ2: Under what circumstances does IT governance help, or hinder, technology innovation in higher education?*

The following section details the overall findings from the study and is followed by a discussion that integrates the literature review and analyses.

Finding 1. Positive Relationships Between ITG Effectiveness and Innovation Exist

This finding was generated from statistical analysis of survey data. Multiple correlations were statistically significant between the ITG Effectiveness and Innovation scales. The overarching finding was that there were positive associations between the total ITG Effectiveness and Total Innovation. The key takeaway was that there was a significant relationship between Total ITG Effectiveness and Total Innovation. In addition, a series of correlations were run to examine the subscales. Total ITG Effectiveness was significantly correlated to Innovative Culture and Incremental Innovation. Executive Leadership Engagement was significantly correlated to Innovative Culture. Faculty Engagement was significantly correlated to Total Innovation, Innovative Activity and Incremental Innovation. Decision Making was significantly correlated to Innovative Culture and Incremental Innovation. Each correlation was positive suggesting, a direct relationship between each of the significant pairs of variables.

Finding 2. Confusion Surrounding Governance Committee

This finding was generated from the codes *lack of meetings* and *unaware of committee membership* and supported the maturity profile of "Initial" generated from the survey data. ITG committee members were largely unaware that the committee existed. As Participant 17 said, "I wasn't aware of the IT group or that I was a member until a couple of months ago." This was consistent with other committee members, like Participant 11, who said, "Until you visited, most of us had no idea we were actually on this IT governance committee." Participant 5 reported that the committee "does not meet," and that, "until recently, I was not

aware that I was on the committee." Without meetings, it was difficult for committee members to know that they were on the committee, despite that these participants were all identified as committee members.

Finding 3. Unvetted Systems Have Negative Consequences

Finding 3 came from the code *consequences of unvetted systems* and provided supporting evidence for the "Developing" rating given to the "Decision Making" dimension of the ITG effectiveness construct. Specifically, the survey found that Newman needs to broaden the audience included in the vetting process to better evaluate and assess the appropriateness of software applications before they are procured. Participants made clear that software systems were often purchased before they were thoroughly vetted. Without such vetting, time and money are wasted. Participant 5 said, "Many of our software systems were not vetted appropriately and now, our IT department spends the majority of their time trying to determine and/or learn how to support said systems." This quote offered a partial explanation as to why Newman remains to the right of the technology adoption curve discussed in the ITG Maturity Profile section. Participant 6 said,

> The implementation of Canvas has been an absolute mess! It was set up and is managed by someone who does not have the know-how to do so. When a system is properly set up, it is able to function well. However, Canvas is not being used as it should be because of poor management.

The quote highlighted the problems with lack of planning in purchasing and implementing this system. For Participant 20, the problem had to do with lack of communication about purchasing software systems. "We have cabinet level members that do not talk to IT about department IT purchases until they can't get whatever it is, they bought to work. Then they inform us," said Participant 20, who was not on the governance committee. Similarly, Participant 11 reported that "people just ordered things without permission, or some would go to their VP. Rarely did the IT CIO know what was going on." Lack of communication about the purchase of software systems likely led to a lack of proper vetting of these systems. The lack of vetting impacted end users and the IT department in terms of wasted time and money, and confusion surrounding systems implementation.

Finding 4. Unclear Processes and Procedures

This finding was developed from the codes *no consequences of not following procedures* and *unclear processes for IT problems*. Processes and procedures surrounding ITG and the handling of IT problems were unclear, and when they were not followed, there did not appear to be consequences. This finding supports results from the survey, showing that there is no effort dedicated to managing the ITG process, hence the rating of "Not Present" for the "ITG Management" dimension of ITG effectiveness construct. IT also supports Newman's ITG maturity rating of "Initial" where processes are undefined and there is little awareness of the ITG function. Participant 18 shared:

> The governance process is not followed. If the executives decide they want a change, they get around policy and do not include all those involved in purchasing new products, which has caused multiple purchases of similar products, and also products that are not conducive to seamless or compatible products.

This quote from Participant 18 not only highlighted the problems associated with not following the governance process, but also connected to Finding 2 in that when processes were not followed, this impacted proper vetting of systems purchases. When the governance processes were not followed, there were "no consequences," according to Participant 14. Failure to follow processes also impacted end users, and with no consequences for doing this, would likely continue to do so. Participant 6 explained,

> IT policies are not clearly defined. There are not clear processes in place to report or track issues…For example, when connecting to remote classes, classrooms are not opened for students and/or equipment is not set up or turned off. This happens on a weekly basis. There is not typically someone who answers the ITV Help Desk number even though there is someone supposedly always on call. This makes for a frustrating situation for students and is bad customer service on NU's end.

There were consequences of not following these procedures, even though the consequences were not disciplinary in nature from people above. Instead, they impacted students and professors, those who should benefit from processes that were clearly defined and followed.

Finding 5. Impacts to Innovation

Participants identified both positive and negative ways that IT innovation was impacted at NU. This finding was generated from the codes *new staff brings innovation*, *financial concerns hinder innovation*, *not keeping up with innovation trends*, *new employees are uncomfortable with innovation*, and *financially driven decisions*. Most participants suggested that innovation was stagnant and identified different reasons for this. Participant 6 said that, as an end user, "Our IT department is lacking knowledge of best practices and do not seem to be forward thinkers," which hindered innovation. This was similar to Participant 17, who suggested that innovation was "behind the trends" when it came to innovation, providing additional evidence to Newman's laggardly profile on adopting newer technologies.

Finances and budget were also barriers. Participant 11 suggested that when employees identified new, helpful technology, "our budget doesn't allow for many new innovated ideas or products." Interestingly, there were different opinions about how new employees impacted the state of innovation. Participant 18 suggested that new employees negatively impacted innovation:

> New employees are comfortable with what they have used in their prior positions and will convince others that it is the best way to improve our processes WITHOUT [emphasis in original] attempting to even use the current products to see what is available.

However, Participant 5 had a different experience of new employees and innovation. She said, "The little bit of innovation that has occurred in my time at NU has been solely brought forth by new employees." This statement also suggested that there was very little innovation to begin with but presented a different perspective from that of Participant 18, who believed new employees were stuck in their old ways.

Finding 6. Decisions about Innovations Appear to be Budget Driven

This finding was generated from a review of secondary data and supported by the statistical analyses. A review of Newman's 3-year IT plan revealed that the majority of Newman's budget was dedicated to maintenance type activities designed to replace or repair IT appliances and portions of the infrastructure. This spending was necessary for the institution to continue operating without disruption but left little opportunity for Newman to invest in leading edge technologies or explore ideas about "what could be".

The Pearson correlation performed on the innovation construct showed a strong correlation between innovation activity and incremental innovation. This suggested that innovative activities at Newman were in large part due to ongoing maintenance activities. Finally, Newman's 2012 IT Report also stated that both academic and administrative IT decisions were budget driven.

Findings Applied to Research Questions

Findings 1, 3, 4 and 5, addressed *RQ1, how do IT governance maturity and effectiveness impact technology innovation in higher education?* Qualitative survey responses indicated a lack of maturity and effectiveness in IT governance. This was evidenced by the lack of meetings that participants described, and that participants were unaware they were on the governance committee. Also demonstrating the lack of maturity and effectiveness of ITG, was that software systems appeared to be purchased with little rhyme or reason, and with no thorough vetting. As a result, systems that were purchased were perhaps not only not innovative but took time and money for the IT department to learn and understand. Finally, processes and procedures not only of the governance committee but also the IT department were not always clear or followed, and there were no consequences for failing to follow procedures, highlighting the lack of effectiveness of the governance committee. Without this maturity and effectiveness of the governance committee, there appeared to be a lack of technology innovation.

Findings 2, 5, and 6 addressed *RQ2, under what circumstances does IT governance help, or hinder, technology innovation in higher education?* Certainly, in the absence of regular committee meetings, and when committee members were unaware that they sit on the governance committee, this could hinder technology innovation that might be discussed or developed during meetings. It appeared that in some cases, when new employees joined the committee, they brought new and innovative ideas. However, this opinion was not shared by all participants. Another participant felt that new committee members hindered innovation. Finally, the failure of the governance committee to keep up with current trends in technology hindered innovation.

To summarize, findings from this study showed an unorganized and underdeveloped ITG process wherein committee members had no knowledge of being on the governing committee. This was consistent with the quantitative finding that ITG processes were informal and uncoordinated. Participants, including those

who were managers in their areas of the university, described a lack of clear processes and procedures, which was also congruent with the survey findings showing that the majority of respondents disagreed with statements affirming the effectiveness of committee processes. In terms of innovation, qualitative survey responses indicated that there is a lack of innovation due to several barriers, like funding and failure to stay current on trends in IT, which was also consistent with quantitative survey findings. Statistical analyses also confirmed that IT decisions are budget driven. A mature ITG function would influence the way financial resources are used to implement innovations that bring the most value to the institutions. The lack of ITG maturity hinders innovations by preventing much needed funding and prioritization discussions from occurring. Furthermore, ITG committee members may be aware of funding sources or have available budget to contribute to innovations but remain untapped due to an inactive ITG function.

Discussion and Limitations

The literature confirmed that ITG maturity modelling provides management with data to develop action plans designed to increase maturity level. Newman's leadership can use the findings from this study to develop a roadmap for creating more consistent and repeatable ITG processes.
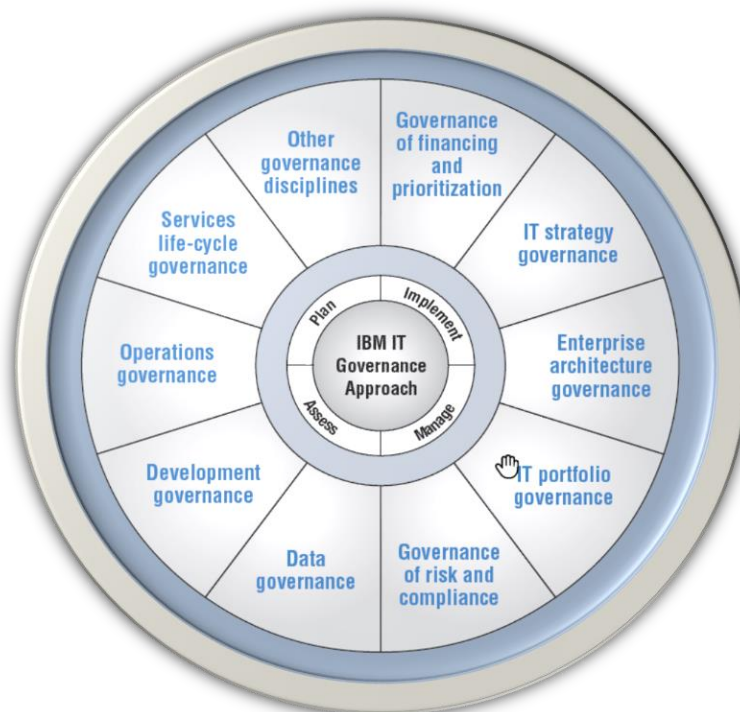

Figure 10. ITG Disciplines (IBM, 2008)

Now that the university has taken the initial step of chartering an ITG committee, it must take the next step to establish the context of the ITG solution. ITG concerns the entire organization, not just the IT department (IBM, 2008). An ITG solution without the full context of the organization is likely to produce a solution that is poorly designed to support its strategic objectives. University leaders must consider the entire value chain when designing a solution. Failure to do so can bring unexpected harm to the institution by neglecting much needed services or business functions. IBM posits that effective ITG integrates multiple disciplines as shown in **Figure 10**.

The university can use the COBIT 4.1 or 5.0 frameworks to launch initiatives intended to improve process maturity. The staged representation of the COBIT 5.0 framework relies on a proven sequence of improvements, but the university may opt to use a hybrid of multiple models that focus on the immediate risks to the university. A blended set of capabilities is more likely to produce successful business outcomes, as oppose to an arbitrary level of maturity (Morris, 2019). The best approach to ITG maturity is an incremental one that follows a roadmap and has well-defined success metrics. It is also important to assess the process and adjust course based on lessons learned (IBM, 2008). Maturity models are not without their challenges and Newman must be careful to avoid the danger of defining a final state of maturity and adopt a continuous improvement approach (Morris, 2019). ITG is a journey – not a destination. Furthermore, what is considered mature today may be obsolete tomorrow due to the speed of technological advancements. Finally, university leaders must not fall into the trap of celebrating the attainment of the next maturity level. Instead, leaders must focus on producing the outcomes they seek to achieve.

Ulsch (2006) posited that effective ITG must have both breadth and depth that incorporates the human, social, and intellectual dimensions. The human dimension focuses on the personal attributes such as technical skills and knowledge of IT executives. The social dimension focuses on relationships and the informal structures that exist in the organization. The intellectual dimension focuses on alignment across multiple layers of the organization. Newman's ITG effectiveness profile renders the institution lacking on all dimensions. The study found that there was no time dedicated to managing the ITG process. Furthermore, several members of the ITG committee were unaware that they were even on the committee. Those members who are aware of their membership on the ITG committee were forced to navigate

undefined processes or rely on relationships (i.e., the social dimension) throughout the organization as means to an end. These behaviors went unpunished as there was no standard (i.e., intellectual dimension) that defined acceptable behaviors. Leaders on the ITG committee and university must support the ITG function by creating awareness of the ITG function across all layers of the leadership hierarchy (i.e. human dimension) and providing training on the use of IT. In short, the ITG function must assume a more prominent role throughout the university and proactively seek out talented IT leaders to staff the ITG committee.

The literature describes innovation as a continuum, ranging from incremental changes to radical innovations, both types being important determinants for the success of a firm. This study found that most innovative activities at Newman fell into the incremental innovation category. Furthermore, the lack of innovation was fed by a nascent ITG function, enabling the procurement of unvetted systems that must be maintained by staff, who lacked knowledge of the system. Therefore, Newman's IT staff and department heads spent an inordinate amount of time performing maintenance tasks that were necessary to keep the institution operating, instead of generating new ideas of what could be. While incremental innovations are crucial to ensuring small improvements to existing products and processes and help to maintain or improve an organization's competitive position over time, they may not be enough to affect the type of change necessary to produce operating efficiencies or attract talented students and faculty. Furthermore, innovations were not explicitly funded, and decisions were often budget driven. Therefore, it is imperative that Newman make procurement decisions that maximize the value realized by the organization. The literature is clear that ITG is a critical component to maximizing the value of IT investments. All things considered; Newman has done well to continue operations with limited staff supporting a wide variety of software systems.

The constructs used to measure ITG maturity, ITG effectiveness, and Innovation were adapted from a previous study. The Institutions included in the previous study were four-year, doctoral institutions with a Carnegie classification as research universities. Additionally, the ITG structure for each institution differed. These contextual elements potentially affected the characteristics chosen for the dimensions included in each construct. As a result, the previous study used multiple ITG maturity, ITG effectiveness, and innovation constructs to generate profiles. Though, the researcher adapted the construct for the

Newman study, there may have been other contextual elements and characteristics that were not included. Adding these elements potentially could have a positive or negative impact on the profiles generated by the study. Finally, the sample sizes used to perform statistical analyses on the ITG constructs were small and though significance was found for several relationships, caution must be used when interpreting the results or making comparisons to other institutions of higher learning.

Recommendations

The following sections outline recommendations that are grounded in the data collected from this study and ITG best practices. The recommendations offer Newman a way forward for achieving a higher level of ITG Maturity.

Recommendation 1. Define and Communicate Newman's ITG Value Proposition

The study found several instances where improperly vetted systems created wasted effort and diverted resources away from more worthwhile tasks. ITG can minimize the occurrence of these mishaps by focusing efforts on those activities that maximize the value to the institution. This requires in-depth knowledge of Newman's value chain. Aligning the value chain with the technology that supports it will highlight the functions and processes that pose the most risks to the university and the value proposition of investing in ITG will become evident. Communicating the ITG value proposition can be accomplished using multiple platforms, including social media, intranet sites, and school newsletters. An integrated communication approach that encompasses multiple platforms and media types will be most effective in reaching a broad cross-section of the Newman community.

Recommendation 2. Define ITG Committee Roles and Responsibilities

ITG structures are the entities that define roles and responsibilities (Bianchi & Sousa, 2016). A structure comprises the people or groups that have decision-making authority in the ITG committee. **Table 22** includes a list of potential ITG structures available to Newman for decision-making support.

Table 22. *Sample ITG Structures (Bianchi & Sousa, 2016)*

ITG Structures
- IT organization structure   - ITG function / officer   - CIO reporting to CEO and/or COO   - Security / compliance / risk officer   - Business/IT relationship managers   - Integration of governance/alignment tasks in roles& Responsibilities   - IT steering committee   - IT expertise at level of board   - IT security steering committee   - IT project steering committee   - IT strategy committee   - IT audit committee at level of board of directors   - Architecture steering committee   - IT councils   - CIO on board   - IT investment committee   - IT leadership councils

Newman's ITG charter stated that the committee will be chaired by the CIO or designee appointed by the provost and will elect a vice-chair from its members. Upon appointing a vice-chair, this initial structure must develop a comprehensive list of committee roles and responsibilities. At a minimum, the roles and responsibilities document should include:

1. Summary of the ITG Committee's purpose (taken from the ITG Committee Charter)

2. Member name and Role on the committee

3. University Department

4. Role description

5. Responsibilities

6. Attendance and required participation

The leadership structure must communicate those responsibilities to all members of the ITG committee and stakeholder population. Finally, the leadership structure can determine whether to amend the ITG charter to include roles and responsibilities or create a separate artifact.

Recommendation 3. Increase Representation at ITG Meetings

Software systems are not properly vetted and create inefficiencies due to learning curves experienced by the IT team as they strive to maintain the systems. Lack of meeting participation and awareness of the ITG function provide a partial explanation. Newman's ITG committee has existed largely on paper since its inception in 2017. Several committee members did not know they were on the committee and the committee has not met consistently to date. End-users must have representation at ITG meetings when systems are upgraded or replaced. Additionally, the study found varying perspectives on whether newer employees stimulate innovation at the institution. Having participation from newer employees, as well as seasoned employees will provide a more holistic perspective and encourage critical thinking on where and when it makes sense. This recommendation is related to recommendation 1, as a deeper understanding on Newman's value chain will identify the stakeholders affected by software systems. Furthermore, these end-users must be keenly aware of the ITG function and encouraged to raise their concerns or ideas to the committee. Having a clearly articulated ITG value proposition will reinforce the importance of their participation in the process. Finally, ITG meetings must occur at a regular cadence that allows committee members to organize their schedules and minimize absenteeism. Initially, Newman should consider a bi-weekly cadence until foundational elements (i.e., processes, agenda, format) have been established and then change the cadence to monthly.

Recommendation 4. Define ITG Processes

The quantitative and qualitative data from the survey both suggest that processes were undefined and inconsistent. ITG members were also unaware of existing processes and resorted to ad-hoc processes for system support. The ITG committee would benefit from joint process development sessions to create ITG processes that are consistent and support all relevant stakeholders. A 2008 study by Yanosky and Caruso (2008) found that academic institutions that actively design ITG processes have more successful outcomes. However, defining ITG processes cannot occur in a vacuum. ITG processes must be integrated with other university processes to ensure proper alignment with the business. **Table 23** contains a list of ITG processes that should be considered.

Table 23. *Sample ITG Processes (Bianchi & Sousa, 2016)*

Processes
- Demand management   - Strategic information systems planning   - Portfolio management   - ITG assurance and self-assessment   - Charge back   - Project governance / management methodologies   - IT performance measurement (BSC)   - Frameworks ITG   - IT budget control and reporting   - Service level agreements   - Project Tracking   - Benefits management and reporting   - Business/IT alignment model   - Architectural Exception Process   - ITG Maturity Models CMM

The ITG leadership structure should prioritize the processes that are a source of confusion for committee members. The data suggests that ITG committee prioritize the portfolio management, strategic information systems planning, and the business/IT alignment processes.

Recommendation 5. Build Relationships

The ITG leadership campaign will benefit from building relationships with throughout the institution. To accomplish this, institutional relationship mechanisms must be explored and capitalized on. ITG relational mechanisms refer to the interactions between IT and the business (Bianchi & Sousa, 2016). **Table 24** contains a sample of relational mechanism that Newman's ITG leadership could potentially leverage.

Table 24. *Sample ITG Relational Mechanisms (Bianchi & Sousa, 2016)*

Relational Mechanisms
- Office of CIO or ITG   - Knowledge management (On ITG)   - Informal meetings between business and IT executive/ senior management   - Corporate internal communication Addressing IT on a regular basis   - Shared understanding of business/IT objectives   - IT leadership   - Co-location Business/IT

Table 24. *Continued*

- Cross-training
- Senior management announcements
- Executive / senior management giving the good example
- ITG awareness campaigns
- Business/IT account management
- Job-rotation
- Partnership rewards and incentives

A grass-roots marketing campaign is a good place to start. The campaign can introduce the ITG committee to various Newman departments and share information about the purpose of the committee, the value proposition, and how to engage the committee. The campaign will go a long way toward building much needed relationships with department heads and growing trust throughout the institution.

Conclusions

This case study uncovered symptoms of a nascent ITG committee, whose operations have been sporadic at best. Collectively, the findings suggest that Newman's ITG committee must play a more prominent role in university operations. The pressure to innovate will only increase as the pace of technological advancements continues to accelerate. Furthermore, the literature review confirmed that effective use of IT is a critical success factor in delivering positive business outcomes. Though the study found that Newman lags in adopting newer technologies, there are clear steps that Newman can take to improve the level of innovation and increase the attractiveness of the institution to prospective students and faculty. However, time is of the essence and the university must make ITG a priority agenda item at the highest levels of the leadership structure.

References

About Newman. (n.d.). Retrieved September 22, 2019, from https://newmanu.edu/about-newman

Afzali, P., Nassiri, R., Azmayandeh, E., & Shabgahi, G. L. (2010). Effective governance through
simultaneous use of COBIT and Val IT. *2010 International Conference on Education and
Management Technology*, 46–50. https://doi.org/10.1109/ICEMT.2010.5657549

Arciénaga Morales, A., Nielsen, J., Bacarini, H., Martinelli, S., Kofuji, S., & García Díaz, J. (2018).
Technology and innovation management in higher education—Cases from Latin America and
Europe. *Administrative Sciences*, *8*(2), 11. https://doi.org/10.3390/admsci8020011

Barber, M., Donnelly, K., Pearson, Rizvi, S., & Pearson. (2013). An avalanche is coming. Higher
education and the revolution ahead. *Voprosy Obrazovaniya / Educational Studies. Moscow*, *3*,
152–229. https://doi.org/10.17323/1814-9545-2013-3-152-229

Beck, M., Lopes-Bento, C., & Schenker-Wicki, A. (2016). Radical or incremental: Where does R&D
policy hit? *Research Policy*, *45*(4), 869–883. https://doi.org/10.1016/j.respol.2016.01.010

Benson, B., Hoagland, C., & Dreiling, B. (2012). *Newman report v 2.6.docx*. Newman University.

Bianchi, I. S., & Sousa, R. D. (2016). IT governance mechanisms in higher education. *Procedia
Computer Science*, *100*, 941–946. https://doi.org/10.1016/j.procs.2016.09.253

Blass, E., & Hayward, P. (2014). Innovation in higher education; will there be a role for "the
academe/university" in 2025? *European Journal of Futures Research*, *2*(1), 41.
https://doi.org/10.1007/s40309-014-0041-x

Blass, E., Jasman, A., & Shelley, S. (2012). Postgraduate research students: You are the future of the
academy. *Futures*, *44*(2), 166–173. https://doi.org/10.1016/j.futures.2011.09.009

Borja, S., Kim, K., Yoon, H., & Hwang, J. (2018a). IT governance effectiveness and its influence on

    innovation product and process. *Journal of Strategic Innovation and Sustainability; West Palm*

    Beach, *13*(5), 43–57.

    http://search.proquest.com/docview/2209456802/abstract/488636EA64E34863PQ/1

Businesswire.com. (2016, March 3). ISACA acquires global capability maturity leader CMMI®

    Institute. https://www.businesswire.com/news/home/20160303005950/en/ISACA-Acquires-

    Global-Capability-Maturity-Leader-CMMI%C2%AE-Institute

Carey, P. (2013). Student as co-producer in a marketised higher education system: A case study of

    students' experience of participation in curriculum design. *Innovations in Education and*

    Teaching International, *50*(3), 250–260. https://doi.org/10.1080/14703297.2013.796714

Carraway, D. (2015). *Information technology governance maturity and technology innovation in*

    higher education: Factors in effectiveness (dissertation). University of North Carolina at

    Greensboro.

Coen, M., & Kelly, U. (2007). *Information management and governance in UK higher education*

    institutions. 6.

De Haes, S., & Van Grembergen, W. (2013). Improving enterprise governance of IT in a major airline:

    A teaching case. *Journal of Information Technology Teaching Cases; London*, *3*(2), 60–69.

    http://dx.doi.org.proxy.library.vanderbilt.edu/10.1057/jittc.2013.7

Dirgahayu, T., & Setiyowati. (2018). On the improvement of IT process maturity: Assessment,

    recommendation and validation. *MATEC Web of Conferences*, *154*, 03017.

    https://doi.org/10.1051/matecconf/201815403017

Dosi, G., Llerena, P., & Labini, M. S. (2005). Science technology industry links and the "European

   paradox." Some notes on the dynamics of scientific and technological research in Europe.

   Laboratory of Economics and Management, *2005*(02), 50.

Easton, G. (2010). *Critical realism in case study research | Elsevier Enhanced Reader*.

   https://doi.org/10.1016/j.indmarman.2008.06.004

Educause. (2019). *Roots of EDUCAUSE*. https://www.educause.edu/about/mission-and-

   organization/roots-educause

Garrison, D. R., & Kanuka, H. (2004). Blended learning: Uncovering its transformative potential in

   higher education. *The Internet and Higher Education*, *7*(2), 95–105.

   https://doi.org/10.1016/j.iheduc.2004.02.001

Héroux, S., & Fortin, A. (2018). The moderating role of IT-business alignment in the relationship

   between IT governance, IT competence, and innovation. *Information Systems Management*,

   35(2), 98–123. https://doi.org/10.1080/10580530.2018.1440729

Hicks, M., Pervan, G., & Perrin, B. (2010). A case study of improving information technology

   governance in a university context. In J. Pries-Heje, J. Venable, D. Bunker, N. L. Russo, & J. I.

   DeGross (Eds.), *Human benefit through the diffusion of information systems design science

   research* (Vol. 318, pp. 89–107). Springer Berlin Heidelberg. https://doi.org/10.1007/978-3-

   642-12113-5_6

IBM. (2008). *Improving IT governance maturity: Key considerations*. IBM Corporation.

Innovation | Definition of Innovation by Merriam-Webster. (2020). https://www.merriam-

   webster.com/dictionary/innovation

ISACA. (2012). *COBIT 5: A business framework for the governance and management of enterprise

   IT: an ISACA® framework*. ISACA.

IT Governance Institute. (2007). *COBIT 4.1: Framework, control objectives, management guidelines,*

 maturity models. IT Governance Institute.

Kahn, K., B. (2018). *Understanding innovation | Elsevier Enhanced Reader*.

 https://doi.org/10.1016/j.bushor.2018.01.011

Khther, R. A., & Othman, M. (2013). *Developing a framework to improve and enhance IT services at*

 one Malaysian private university. *4*(1), 6.

Knahl, M. H. (2013). Application of IT management frameworks in higher education institutions.

 Advanced Information Systems Engineering Workshops, *148*, 124–133.

 https://doi.org/10.1007/978-3-642-38490-5_10

Ko, D., & Fink, D. (2010). Information technology governance: An evaluation of the theory-practice

 gap. *Corporate Governance: The International Journal of Business in Society*, *10*(5), 662–674.

 https://doi.org/10.1108/14720701011085616

Kurti, I., Barolli, E., & Sevrani, K. (2014). Effective IT governance in the Albanian public sector. A

 critical success factors approach. *The Electronic Journal of Information Systems in Developing*

 Countries, *63*(1), 1–22. https://doi.org/10.1002/j.1681-4835.2014.tb00451.x

Liang, T., You, J., & Liu, C. (2010). A resource-based perspective on information technology and firm

 performance: A meta-analysis. *Industrial Management & Data Systems*, *110*(8), 1138–1158.

 https://doi.org/10.1108/02635571011077807

Lunardi, G. L., Gastaud Maçada, A. C., Becker, J. o L., & Van Grembergen, W. (2017). Antecedents

 of IT governance effectiveness: An empirical examination in Brazilian firms. *Journal of*

 Information Systems, *31*(1), 41–57. https://doi.org/10.2308/isys-51626

MacKeogh, K., & Fox, S. (2009). Strategies for embedding e-learning in traditional universities:

 Drivers and barriers. *Electronic Journal of E-Learning*, *7*(2), 147–154.

Moffatt, S. (2015). Contextualizing Scientific Research Methodologies. *IOSR Journal of Research & Method in Education*, *5*(6), 52–57. www.iosrjournals.org

Morris, B. (2019). *The case against maturity models*. https://www.ben-morris.com/the-case-against-maturity-models/

National Center for Education Statistics. (2018). *Integrated postsecondary education data system*. https://nces.ed.gov/ipeds/datacenter/InstitutionProfile.aspx?unitId=acb0b0aeaeb0

National Sun Yat-Sen University, Wu, S. P.J., Straub, D. W., Temple University, Korea University Business School, Liang, T.P., & National Chengchi University. (2015). How information technology governance mechanisms and strategic alignment influence organizational performance: Insights from a matched survey of business and it managers. *MIS Quarterly*, *39*(2), 497–518. https://doi.org/10.25300/MISQ/2015/39.2.10

Newman University. (2017). *Information Technology Governance Charter 12 19 2017.docx*. Newman University.

Park, J., Lee, J., Lee, O. D., & Koo, Y. (2017). Alignment between internal and external IT governance and its effects on distinctive firm performance: An extended resource-based view. *IEEE Transactions on Engineering Management*, *64*(3), 351–364. https://doi.org/10.1109/TEM.2017.2678485

Qualtrics. (2020). *Who is Qualtrics? Experience management is here*. Qualtrics. https://www.qualtrics.com/about/

Rogers, E. M. (2003). *Diffusion of Innovations, 5th Edition*. Simon and Schuster.

Rogers, E. M. (2010). *Diffusion of innovations, 4th Edition*. Simon and Schuster.

Saldaña, J. (2013). *The coding manual for qualitative researchers* (2nd ed). SAGE.

Schlosser, F., Wagner, H.T., & Coltman, T. (2012). Reconsidering the dimensions of business-IT

alignment. *2012 45th Hawaii International Conference on System Sciences*, *50*,53–5061.

https://doi.org/10.1109/HICSS.2012.497

SEI. (2002). *Capability maturity model integration (CMMI) version 1.1*. Carnegie Mellon University.

Shields, R. (2013). *Globalization and International Education*. A&C Black.

Staples, M., Niazi, M., Jeffery, R., Abrahams, A., Byatt, P., & Murphy, R. (2007). An exploratory

study of why organizations do not adopt CMMI. *Journal of Systems and Software*, *80*(6), 883–

895. https://doi.org/10.1016/j.jss.2006.09.008

Ulsch, M. (2006). Sound IT governance requires breadth and depth. *Financial Executive*, *22*(2), 54–56.

Urbanovic, J., & Tauginiene, L. (2013). *Institutional responsibility vs individual responsibility: Ethical

issues in the management of research performance*.

https://doi.org/10.1016/j.sbspro.2013.06.390

U.S. News & World Report L.P. (2020). *U.S. news and world report*. US News.

https://www.usnews.com/best-colleges/newman-university-1939

Weill, P., & Ross, J. (2005). A matrixed approach to designing IT governance. *MIT Sloan

Management Review; Cambridge*, *46*(2), 26.

http://search.proquest.com/docview/224976041/abstract/E8589139B75843DEPQ/1

Yanosky, R., & Caruso, J. B. (2008). *Process and politics: IT governance in higher education*.

Appendix A – Survey Instrument

Survey Instructions

Dear Respondent,

I am contacting you on behalf of Vanderbilt University because you are a member of the Newman University (NU) IT community. This improvement study seeks to understand the role that IT Governance (ITG) plays in innovation at Newman University and what are the barriers that may be impeding innovative activities. Please respond to the following questions to the best of your ability and select the response that most closely aligns with your understanding and/or experience with IT governance processes at Newman.

Note that IT governance can be both formal and informal. An example of a formal IT governance process may be an established committee that meets regularly to discuss and review IT policies and/or vet proposals to procure and implement new technologies. An example of an informal IT governance process may be a suggestion to move to a newer technology that is presented to your Director, who agrees and shares it with the department VP, who then submits it to NU's cabinet for approval.

The results from this survey will provide much needed insights about the current state of Newman's IT governance processes and can be used by the University to make informed decisions about how to create an IT governance structure that invites innovation. Exploring this data will also help Newman better leverage technology to improve the university experience for students, faculty, and administrators alike.

If you have any questions about the study, please contact the Principal Investigator, Damico Nicome, via email at damico.nicome@vanderbilt.edu or my faculty advisor, Dr. Tracey Armstrong at tracey.m.armstrong@vanderbilt.edu. **Your response by Friday, January 17th is much appreciated.**

Thank you for your support!

Are you the CIO of Newman University?

☐ Yes

☐ No

ITG Maturity

What is the IT budget for the entire institution?

In millions of dollars:

○ Less than 1

○ Between 1 and 5

☐ Between 5 and 10

☐ More than 10

What is the IT staff size for entire Institution?

☐ 1 to 10

☐ 11 to 20

○ 21 to 40
☐ More than 40

How long has your IT governance structure been in place in its current form?

☐ 0 to 1 years

☐ 2 to 3 years

○ 4 to 5 years

○ More than 5 years

IT governance facilitates technology innovation.

Strongly Disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree	Don't know
○	○	○	○	○	○

Technology innovation is a part of our mission.

Strongly Disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree	Don't know
○	○	○	○	○	○

IT governance processes apply only to IT.

Strongly Disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree	Don't know
○	○	○	○	○	○

Significant technology innovations often come from groups outside of IT.

Strongly Disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree	Don't know
○	○	○	○	○	○

Successful technology innovations often bypass our formal governance process.

Strongly Disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree	Don't know
■	○	○	■	■	■

Cloud computing

Participated in development of the technology	Early Adopter	Mainstream Adopter	Late Adopter	Plan to adopt	No plans
■	○	○	■	■	■

Mobile computing

Participated in development of the technology	Early Adopter	Mainstream Adopter	Late Adopter	Plan to adopt	No plans
■	○	○	■	■	■

Social computing

Participated in development of the technology	Early Adopter	Mainstream Adopter	Late Adopter	Plan to adopt	No plans
○	○	○	○	○	○

Data analytics/business intelligence

Participated in development of the technology	Early Adopter	Mainstream Adopter	Late Adopter	Plan to adopt	No plans
○	○	○	○	○	○

Enterprise identity and access management.

Participated in development of the technology	Early Adopter	Mainstream Adopter	Late Adopter	Plan to adopt	No plans
■	○	○	■	■	■

Has NU made technology changes during the last five years that were perceived to be new for the institution, but which have previously been used by other institutions, within the following areas?

	Agree	Disagree	Neutral
New Services	■	■	○
New Products	■	■	○
New Processes	○	○	○

Has NU made technology changes during the last five years that were perceived to be new to industries other than higher education?

	Agree	Disagree	Neutral
New Services	■	■	○
New Products	○	○	○
New Processes	■	■	○

If any, list one to five of these changes that have had the most impact.

1) at this institution
2) in higher education
3) in industries other than higher education

TG Maturity

Which of the following best describes IT governance at Newman University?

○ Non-Existent: IT governance processes are not applied, and the institution has not recognized the need for them.

■ Initial: IT governance processes are informal and uncoordinated.

■ Repeatable: IT governance processes follow a regular pattern.

■ Defined: IT governance processes are documented and communicated.

○ Managed: IT governance processes are monitored and measured.

■ Optimized: IT governance best practices are followed, and there are provisions for amending processes.

ITG Effectiveness

Executive Leadership Engagement

	Agree	Disagree	Neutral
IT matters are regularly on the agenda of NU's cabinet.	○	○	■
Department VPs are active participants in the IT governance process.	○	○	■
The CIO is included in all IT related matters and software/hardware procurement decisions.	○	○	○

Business Unit Engagement

	Agree	Disagree	Neutral
Business units and business process owners have input into IT priorities and decision-making.	○	○	■

Faculty Engagement

	Agree	Disagree	Neutral
Faculty have input into IT priorities and decision-making.	○	○	■

Student Engagement

	Agree	Disagree	Neutral
Students have input into IT priorities and decision-making.	○	■	■

Decision-Making

	Agree	Disagree	Neutral
Decision-making roles are clearly defined.	■	■	○
A broad set of stakeholders have input into the decision-making process.	○	○	○
Executive leaders have input into all IT decisions.	■	■	○
People involved in IT governance are at the right level to make decisions and recommendations.	■	■	○

IT governance adoption by the institution

	Agree	Disagree	Neutral
Managers understand the IT governance process.	○	○	○
IT governance principles are reflected in decision-making.	■	■	○
Roles, responsibilities, and authority are well-defined.	■	■	○

IT governance management

	Agree	Disagree	Neutral
Staff effort is specifically devoted to managing the IT governance process.	○	○	○
IT governance process is regularly reviewed and assessed for effectiveness.	■	■	○
IT governance process is stable with one or fewer major changes per year.	■	■	○

Are there any additional comments or clarifications you would like to share about the effectiveness of NU's IT governance processes?

Innovation

Innovative Activity

	Agree	Disagree	Neutral
New IT initiatives are introduced to the organization.	■	■	○
New ideas are developed and implemented by people who are engaged with others in context of the institution.	■	■	○
Sources identify multiple technology innovations that have been developed or implemented at the institution within the past five years.	■	■	○

Innovation Culture

	Agree	Disagree	Neutral
Mechanisms exist for identifying and developing new ideas. Input from external groups or people is regularly sought out.	■	■	○
CIO agrees technology innovation is part of the mission. IT mission and strategy emphasize new initiatives and new ideas.	■	■	○
Innovation is explicitly funded.	○	○	○

Incremental Innovation

	Agree	Disagree	Neutral
New products, services or processes are implemented that are new to the organization.	■	■	○
Innovative projects are focused on meeting near-term business needs.	■	■	○

Radical Innovation

	Agree	Disagree	Neutral
New products, services or processes are implemented that are new to higher education or to outside industry and represent a large departure from existing practices	■	■	○

	Agree	Disagree	Neutral
Organization makes presentations or publishes articles on technology innovations developed or implemented within the institution at EDUCAUSE or publishes articles on such innovations in peer-reviewed journals.	○	○	○
Institution sells information technology products, services or processes that were developed in-house.	○	○	○
Institution is an early adopter or contributor to the development of new technologies.	■	■	○
Leadership sponsors projects but does not closely manage them. The focus of innovative projects is on exploring what is possible.	■	■	○

Are there any additional comments or clarifications you would like to share about the current state of innovation at NU?

Appendix B – Survey Results

Q2 - Are you the CIO of Newman University?

#	Answer	%	Count
1	Yes	4.76%	1
2	No	95.24%	20
	Total	100%	21

Q3 - What is the IT budget for the entire institution? In millions of dollars:

#	Answer	%	Count
2	Between 1 and 5	100.00%	1
3	Between 5 and 10	0.00%	0
4	More than 10	0.00%	0
	Total	100%	1

Q4 - What is the IT staff size for entire Institution?

#	Answer	%	Count
1	1 to 10	100.00%	1
2	11 to 20	0.00%	0
3	21 to 40	0.00%	0
4	More than 40	0.00%	0
	Total	100%	1

Q5 - How long has your IT governance structure been in place in its current form?

#	Answer	%	Count
1	0 to 1 years	0.00%	0
2	2 to 3 years	100.00%	1
3	4 to 5 years	0.00%	0
4	More than 5 years	0.00%	0
	Total	100%	1

Q6 - IT governance facilitates technology innovation.

#	Answer	%	Count
1	Strongly Disagree	0.00%	0
2	Disagree	0.00%	0
3	Neither agree nor disagree	100.00%	1
4	Agree	0.00%	0
5	Strongly agree	0.00%	0
	Total	100%	1

Q7 - Technology innovation is a part of our mission.

#	Answer	%	Count
1	Strongly Disagree	0.00%	0
2	Disagree	0.00%	0
3	Neither agree nor disagree	0.00%	0
4	Agree	100.00%	1
5	Strongly agree	0.00%	0
	Total	100%	1

Q8 - IT governance processes apply only to IT.

#	Answer	%	Count
1	Strongly Disagree	100.00%	1
2	Disagree	0.00%	0
3	Neither agree nor disagree	0.00%	0
4	Agree	0.00%	0
5	Strongly agree	0.00%	0
	Total	100%	1

Q9 - Significant technology innovations often come from groups outside of IT.

#	Answer	%	Count
1	Strongly Disagree	0.00%	0
2	Disagree	0.00%	0
3	Neither agree nor disagree	0.00%	0
4	Agree	100.00%	1
5	Strongly agree	0.00%	0
	Total	100%	1

Q10 - Successful technology innovations often bypass our formal governance process.

#	Answer	%	Count
1	Strongly Disagree	0.00%	0
2	Disagree	0.00%	0
3	Neither agree nor disagree	100.00%	1
4	Agree	0.00%	0
5	Strongly agree	0.00%	0
	Total	100%	1

Q11 - Cloud computing

#	Answer	%	Count
1	Participated in development of the technology	0.00%	0
2	Early Adopter	0.00%	0
3	Mainstream Adopter	0.00%	0
4	Late Adopter	100.00%	1
5	Plan to adopt	0.00%	0
	Total	100%	1

Q12 - Mobile computing

#	Answer	%	Count
1	Participated in development of the technology	0.00%	0
2	Early Adopter	0.00%	0
3	Mainstream Adopter	100.00%	1
4	Late Adopter	0.00%	0
5	Plan to adopt	0.00%	0
	Total	100%	1

Q13 - Social computing

#	Answer	%	Count
1	Participated in development of the technology	0.00%	0
2	Early Adopter	0.00%	0
3	Mainstream Adopter	0.00%	0
4	Late Adopter	100.00%	1
5	Plan to adopt	0.00%	0
	Total	100%	1

Q14 - Data analytics/business intelligence

#	Answer	%	Count
1	Participated in development of the technology	0.00%	0
2	Early Adopter	0.00%	0
3	Mainstream Adopter	0.00%	0
4	Late Adopter	100.00%	1
5	Plan to adopt	0.00%	0
	Total	100%	1

Q15 - Enterprise identity and access management.

#	Answer	%	Count
1	Participated in development of the technology	0.00%	0
2	Early Adopter	0.00%	0
3	Mainstream Adopter	100.00%	1
4	Late Adopter	0.00%	0
5	Plan to adopt	0.00%	0
	Total	100%	1

Q16 - Has NU made technology changes during the last five years that were perceived to be new for the institution, but which have previously been used by other institutions, within the following areas?

#	Question	Agree		Disagree		Total
1	New Services	100.00%	1	0.00%	0	1
2	New Products	100.00%	1	0.00%	0	1
3	New Processes	100.00%	1	0.00%	0	1

Q17 - Has NU made technology changes during the last five years that were perceived to be new to industries other than higher education?

#	Question	Agree		Disagree		Total
1	New Services	100.00%	1	0.00%	0	1
2	New Products	100.00%	1	0.00%	0	1
3	New Processes	100.00%	1	0.00%	0	1

Q18 - If any, list one to five of these changes that have had the most impact. 1) at this institution2) in higher education3) in industries other than higher education

ITG Maturity

Q20 - Which of the following best describes IT governance at Newman University?

#	Answer	%	Count
1	Non-Existent: IT governance processes are not applied, and the institution has not recognized the need for them.	9.52%	2
2	Initial: IT governance processes are informal and uncoordinated.	71.43%	15
3	Repeatable: IT governance processes follow a regular pattern.	9.52%	2
4	Defined: IT governance processes are documented and communicated.	9.52%	2
5	Managed: IT governance processes are monitored and measured.	0.00%	0
6	Optimized: IT governance best practices are followed, and there are provisions for amending processes.	0.00%	0
	Total	100%	21

ITG Effectiveness

Q22 - Executive Leadership Engagement

#	Question	Agree		Disagree		Total
1	IT matters are regularly on the agenda of NU's cabinet.	50.00%	6	50.00%	6	12
2	Department VPs are active participants in the IT governance process.	36.36%	4	63.64%	7	11
3	The CIO is included in all IT related matters and software/hardware procurement decisions.	35.71%	5	64.29%	9	14

Q23 - Business Unit Engagement

#	Answer	%	Count
1	Agree	63.64%	7
2	Disagree	36.36%	4
	Total	100%	11

Q24 - Faculty Engagement

#	Answer	%	Count
1	Agree	55.56%	5
2	Disagree	44.44%	4
	Total	100%	9

Q25 - Student Engagement

#	Answer	%	Count
1	Agree	7.69%	1
2	Disagree	92.31%	12
	Total	100%	13

Q26 - Decision-Making

#	Question	Agree		Disagree		Total
1	Decision-making roles are clearly defined.	0.00%	0	100.00%	12	12
2	A broad set of stakeholders have input into the decision-making process.	27.27%	3	72.73%	8	11
3	Executive leaders have input into all IT decisions.	66.67%	8	33.33%	4	12
4	People involved in IT governance are at the right level to make decisions and recommendations.	42.86%	6	57.14%	8	14

Q27 - IT governance adoption by the institution

#	Question	Agree		Disagree		Total
1	Managers understand the IT governance process.	0.00%	0	100.00%	15	15
2	IT governance principles are reflected in decision-making.	8.33%	1	91.67%	11	12
3	Roles, responsibilities, and authority are well-defined.	7.14%	1	92.86%	13	14

Q28 - IT governance management

#	Question	Agree		Disagree		Total
1	Staff effort is specifically devoted to managing the IT governance process.	7.69%	1	92.31%	12	13
2	IT governance process is regularly reviewed and assessed for effectiveness.	0.00%	0	100.00%	13	13
3	IT governance process is stable with one or fewer major changes per year.	28.57%	4	71.43%	10	14

Q29 - Are there any additional comments or clarifications you would like to share about the effectiveness of NU's IT governance processes?

Are there any additional comments or clarifications you would like to share about the effectiveness of NU's IT governance processes?
I just want to clarify that we have cabinet level members, that do not talk to IT about department IT purchases until they can't get whatever it is they bought to work. Then they inform us.
The Governance Process is not followed. if the executives decide they want a change they get around policy and do not include all those involved in purchasing new products which has caused multiple purchases of similar products and also products that are not conductive to seamless or compatible products.
I wasn't aware of the IT group or that I was a member until a couple of months ago.
No consequences for not following IT governance process.
Until you visited, most of us had no idea we were actually on this IT governance committee. People just ordered things without permission or some would go to their VP. Rarely did the IT CIO know what was going on. Your visit has certainly moved things into a different direction. Excited to see what comes from your suggestions.
In my role, I know very little about Newman's IT governance. As an end-user, I would say that our IT department is lacking knowledge of best practices and do not seem to be forward thinkers. IT policies are not clearly defined. There are not clear processes in place to report or track issues. It is not clear which IT staff member is in charge of what. Issues that arise typically happen on a continuous basis without solutions ever being made for the long term - it's just a band-aid for the day. For example, when connecting to remote classes (ITV), classrooms are not opened for students and/or equipment is not set up or turned off. This happens on a weekly basis. There is not typically someone who answers the ITV Help Desk number even though there is someone supposedly always on call. This makes for a frustrating situation for students and is bad customer service on NU's end. Additionally, the process for new students to get login information is not clearly communicated nor defined.
The IT governance committee does not meet. I, until recently, was not aware that I was "on" the committee. Decisions are most often made solely based on financial needs and not user priority. Many of our software systems were not vetted appropriately and now our IT department spend the majority of their time trying to determine and/or learn how to support said systems.

Innovation

Q31 - Innovative Activity

#	Question	Agree		Disagree		Total
1	New IT initiatives are introduced to the organization.	50.00%	6	50.00%	6	12
2	New ideas are developed and implemented by people who are engaged with others in context of the institution.	45.45%	5	54.55%	6	11
3	Sources identify multiple technology innovations that have been developed or implemented at the institution within the past five years.	50.00%	5	50.00%	5	10

Q32 - Innovation Culture

#	Question	Agree		Disagree		Total
1	Mechanisms exist for identifying and developing new ideas. Input from external groups or people is regularly sought out.	30.00%	3	70.00%	7	10
2	CIO agrees technology innovation is part of the mission. IT mission and strategy emphasize new initiatives and new ideas.	42.86%	6	57.14%	8	14
3	Innovation is explicitly funded.	15.38%	2	84.62%	11	13

Q33 - Incremental Innovation

#	Question	Agree		Disagree		Total
1	New products, services or processes are implemented that are new to the organization.	78.57%	11	21.43%	3	14
2	Innovative projects are focused on meeting near-term business needs.	46.15%	6	53.85%	7	13

Q34 - Radical Innovation

#	Question	Agree		Disagree		Total
1	New products, services or processes are implemented that are new to higher education or to outside industry and represent a large departure from existing practices.	27.27%	3	72.73%	8	11
2	Organization makes presentations or publishes articles on technology innovations developed or implemented within the institution at EDUCAUSE or publishes articles on such innovations in peer-reviewed journals.	8.33%	1	91.67%	11	12
3	Institution sells information technology products, services or processes that were developed in-house.	6.25%	1	93.75%	15	16
4	Institution is an early adopter or contributor to the development of new technologies.	0.00%	0	100.00%	13	13
5	Leadership sponsors projects but does not closely manage them. The focus of innovative projects is on exploring what is possible.	20.00%	2	80.00%	8	10

Q35 - Are there any additional comments or clarifications you would like to share about the current state of innovation at NU?

Are there any additional comments or clarifications you would like to share about the current state of innovation at NU?
New employees are comfortable with what they have used in their prior positions and will convince others that it is the best way to improve our processes WITHOUT attempting to even use the current products to see what is available.
Behind the trends
Employees will find technology that could help us, but our budget doesn't allow for many new innovated ideas or products.
The implementation of Canvas has been an absolute mess! It was set up and is managed by someone who does not have the know-how to do so. When a system is properly set up it is able to function well however Canvas is not being used as it should because of poor management. The processes to get things corrected is a nightmare. Sometimes an email suffices while other times you are required to go through a google form. You are never made aware when your issue is resolved unless you are constantly checking back. It would be helpful to have a ticket system where you can check the status of your ticket. Also, it would be nice to know a general timeframe of the response time. When we are a week away from classes starting there needs to be some more urgency on certain tasks than is currently being done.
The little bit of innovation that has occurred in my time at NU has been solely brought forth by new employees.

Appendix C – Coding Categories

Finding/Category 1: (created from ==yellow== and ==green==) IT governance committee members are unaware that a committee exists and that they are part of the committee and reported the lack of committee meetings.

Finding/Category 2: (created from ==pink==) Software systems are purchased prior to thorough vetting, which leads to wasted time because the IT department must determine how to support the system, and money if they cannot figure out how to do this.

Finding/Category 3: (created from ==red== and underlined) Any established IT governance processes are not followed, and there are no consequences for failing to follow these processes.

Finding/Category 4: (created from ==grey==, ==light grey==, ==teal==, ==olive==, and ==blue==) Innovation is impacted both negatively and positively by new employees, by budgets, and the IT governance committee fails to keep up with trends in IT innovation.

Finding 1 codes and supporting passages

- The IT governance committee does not meet
- I, until recently, was not aware that I was "on" the committee.
- Until you visited, most of us had no idea we were actually on this IT governance committee.
- I wasn't aware of the IT group or that I was a member until a couple of months ago.

Finding 2 codes and supporting passages

- Many of our software systems were not vetted appropriately and now our IT department spend the majority of their time trying to determine and/or learn how to support said systems.
- The implementation of Canvas has been an absolute mess! It was set up and is managed by someone who does not have the know-how to do so. When a system is properly set up it is able to function well however Canvas is not being used as it should because of poor management.
- People just ordered things without permission or some would go to their VP. Rarely did the IT CIO know what was going on.

- I just want to clarify that we have cabinet level members, that do not talk to IT about department IT purchases until they can't get whatever it is they bought to wk. Then they inform us.

Finding 3 codes and supporting passages

- IT policies are not clearly defined. There are not clear processes in place to report or track issues.
- There is not typically someone who answers the ITV Help Desk number even though there is someone supposedly always on call.
- No consequences for not following IT governance process.
- The Governance Process is not followed. if the executives decide they want a change they get around policy and do not include all those involved in purchasing new products which has caused multiple purchases of similar products and also products that are not conductive to seamless or compatible products

Finding 3 codes and supporting passages

- It is not clear which IT staff member is in charge of what. Issues that arise typically happen on a continuous basis without solutions ever being made for the long term - it's just a band-aid for the day. For example, when connecting to remote classes (ITV), classrooms are not opened for students and/or equipment is not set up or turned off. This happens on a weekly basis.
- This makes for a frustrating situation for students and is bad customer service on NU's end. Additionally, the process for new students to get login information is not clearly communicated nor defined.
- The processes to get things corrected is a nightmare. Sometimes an email suffices while other times you are required to go through a google form. You are never made aware when your issue is resolved unless you are constantly checking back. It would be helpful to have a ticket system where you can check the status of your ticket. Also, it would be nice to know a general timeframe of the response time. When we are a week away from classes starting there needs to be some more urgency on certain tasks than is currently being done.

Finding 4 codes and supporting passages

- The little bit of innovation that has occurred in my time at NU has been solely brought forth by new employees.

- Employees will find technology that could help us, but our budget doesn't allow for many new innovated ideas or products.

- I would say that our IT department is lacking of knowledge of best practices and do not seem to be forward thinkers

- Behind the trends

- New employees are comfortable with what they have used in their prior positions and will convince others that it is the best way to improve our processes WITHOUT attempting to even use the current products to see what is available.

- Decisions are most often made solely based on financial needs and not user priority

Appendix D – Coding by Questions and ITG Membership

Participant 5 ITG Committee Member, F

Q29. Are there any additional comments or clarifications you would like to share about the effectiveness of NU's IT governance processes?

The IT governance committee does not meet. I, until recently, was not aware that I was "on" the committee. Decisions are most often made solely based on financial needs and not user priority. Many of our software systems were not vetted appropriately and now our IT department spend the majority of their time trying to determine and/or learn how to support said systems.

Q35. Are there any additional comments or clarifications you would like to share about the current state of innovation at NU?

The little bit of innovation that has occurred in my time at NU has been solely brought forth by new employees.

Participant 6 Not Disclosed, F

Q29. Are there any additional comments or clarifications you would like to share about the effectiveness of NU's IT governance processes?

In my role, I know very little about Newman's IT governance. As an end-user, I would say that our IT department is lacking of knowledge of best practices and do not seem to be forward thinkers. IT policies are not clearly defined. There are not clear processes in place to report or track issues. It is not clear which IT staff member is in charge of what. Issues that arise typically happen on a continuous basis without solutions ever being made for the long term - it's just a band-aid for the day. For example, when connecting to remote classes (ITV), classrooms are not opened for students and/or equipment is not set up or turned off. This happens on a weekly basis. There is not typically someone who answers the ITV Help Desk number even though there is someone supposedly always on call. This makes for a frustrating situation for students and is bad customer service on NU's end. Additionally, the process for new students to get login information is not clearly communicated nor defined.

Q35. Are there any additional comments or clarifications you would like to share about the current state of innovation at NU?

The implementation of Canvas has been an absolute mess! It was set up and is managed by someone who does not have the know-how to do so. When a system is properly set up it is able to function well however Canvas is not being used as it should because of poor management. The processes to get things corrected is a nightmare. Sometimes an email suffices while other times you are required to go through a google form. You are never made aware when your issue is resolved unless you are constantly checking back. It would be helpful to have a ticket system where you can check the status of your ticket. Also, it would be nice to know a general timeframe of the response time. When we are a week away from classes starting there needs to be some more urgency on certain tasks than is currently being done.

Participant 11 ITG Committee Member, F

Q29. Are there any additional comments or clarifications you would like to share about the effectiveness of NU's IT governance processes?

Until you visited, most of us had no idea we were actually on this IT governance committee. People just ordered things without permission or some would go to their VP. Rarely did the IT CIO know what was going on.

Your visit has certainly moved things into a different direction. Excited to see what comes from your suggestions."

Q35. Are there any additional comments or clarifications you would like to share about the current state of innovation at NU?

Employees will find technology that could help us, but our budget doesn't allow for many new innovated ideas or products.

Participant 14 ITG Committee Member, M

Q29. Are there any additional comments or clarifications you would like to share about the effectiveness of NU's IT governance processes?

No consequences for not following IT governance process.

Q35. Are there any additional comments or clarifications you would like to share about the current state of innovation at NU?

No response

Participant 17 ITG Committee Member, F

Q29. Are there any additional comments or clarifications you would like to share about the effectiveness of NU's IT governance processes?

I wasn't aware of the IT group or that I was a member until a couple of months ago.

Q35. Are there any additional comments or clarifications you would like to share about the current state of innovation at NU?

Behind the trends

Participant 18 ITG Committee Member, F

Q29. Are there any additional comments or clarifications you would like to share about the effectiveness of NU's IT governance processes?

The Governance Process is not followed. if the executives decide they want a change they get around policy and do not include all those involved in purchasing new products which has caused multiple purchases of similar products and also products that are not conductive to seamless or compatible products.

Q35. Are there any additional comments or clarifications you would like to share about the current state of innovation at NU?

New employees are comfortable with what they have used in their prior positions and will convince others that it is the best way to improve our processes WITHOUT attempting to even use the current products to see what is available.

Participant 20 Non-member of the ITG committee, M

Q29. Are there any additional comments or clarifications you would like to share about the effectiveness of NU's IT governance processes?

I just want to clarify that we have cabinet level members, that do not talk to IT about department IT purchases until they can't get whatever it is they bought to work. Then they inform us.

Q35. Are there any additional comments or clarifications you would like to share about the current state of innovation at NU?

No response