

IT Services Review Report – Synopsis November 2016

INTRODUCTION

McMaster University is a highly research intensive institution (ranked # 2 in the country) with a strong reputation around the world. Positions at McMaster are highly competitive and sought after by potential students, staff and faculty. In the Fall of 2015, McMaster University determined that it was an opportune time to undertake a functional review of Information Technology (“IT”) services in order to identify how these services could better support the user community. With the MOSAIC Enterprise Resource Planning (“MOSAIC”) project transitioning to sustainment mode (the most comprehensive and costly enterprise IT project that the University had undertaken) the timing was ripe to undertake this review. The University Budget Committee had approved the University Technology Services (“UTS”) budget for 2015/16 (which includes both MOSAIC and traditional UTS administrative enterprise computing functions); however, funding for MOSAIC sustainment was primarily one-time. It was determined that a full review of all technology-related services was required to better understand needs and potential improvements that could be made to IT service delivery which would impact budget submissions going forward.

The scope was comprehensive and included all units providing or supporting IT services at the university. A committee of three internal members and three external University Chief Information Officers (“CIO”) was formed, supported by a project manager who managed the information gathering activities during the project. These activities included in person stakeholder feedback sessions with 25 groups (over 100 participants), submission of a detailed questionnaire by 75 stakeholders across stakeholder groupings, an online community survey that assessed user satisfaction with university IT services (1275 responses across staff, faculty and students), a comprehensive internal scan that captured information around IT staff, infrastructure and the provision of IT services (completed by 35 units) and the compilation of an estimate of IT expenditures across all funds and all departments. All of the information gathered was used as a basis for the committee members to understand the current environment and to make recommendations for improvement.

This report is a synopsis of the recommendations put forth by the Committee. The full report is available to those who wish to review in detail.

OVERVIEW OF CURRENT ENVIRONMENT

The current IT structure at McMaster has evolved over decades and has become quite decentralized and fragmented. There are four units (Research & High Performance Computing Support – “RHPCS”, the MacPherson Institute for Leadership, Innovation and Excellence in Teaching – “MacPherson”, the University Library “the Library” and University Technology Services – “UTS”) that provide IT services on an enterprise basis relating to research, teaching and learning and administrative/operational needs enterprise-wide. More local or specialized service delivery occurs in the faculties and other specialized units. In addition, the Computer Services Unit in the Faculty of Health Sciences (“CSU”) are providers of faculty and staff email at the university. IT staff in units across the entire enterprise are extremely dedicated and hard-working. The strength of the IT staff and their commitment to this institution is clear. IT units have been able to achieve impressive results on very limited budgets. However, an overall framework (and discipline around that framework) that would enable these units to improve upon overall delivery of IT services has not been put in place.

The McMaster community has experienced long-standing frustration with IT services; both by those who provide IT services and those who are touched by them. While users often struggle to get their IT needs met, providers also struggle to successfully meet those needs in the current environment. With the University transitioning from what has often been a challenging MOSAIC implementation phase, frustration continues to grow amongst users. Despite this frustration, the IT user and IT provider communities have demonstrated significant enthusiasm and commitment to being part of both the review process and the solution for IT at McMaster.

The following describes the current structure and culture of IT at McMaster at a high level.

Governance and Enterprise Leadership

- The IT governance structure is currently not robust and inclusive. Committees which are in place typically do not have representation from all key academic mission areas (research, teaching and learning, etc.) or do not have clear governance mandates. Because of this, many stakeholders (IT users and IT providers) feel that they do not have an adequate voice in IT decisions.
- Enterprise-wide leadership and accountability has not been clearly defined.
- The current IT strategy (Vision 2020) does not capture enterprise-wide services and does not encompass all mission areas (for example, research IT, teaching and learning technologies).
- IT budgeting is not performed on an enterprise-wide basis. IT budgets are currently prepared and reviewed at the individual unit level, or as part of larger faculty/department budgets. This makes it extremely challenging for senior leadership to manage IT holistically and have insight into potential opportunities and synergies. Currently, approximately 60% of IT expenditure occurs in the specialized and distributed units.

Structure and Service Delivery

- A strong IT community (one that shares a common vision and works together to achieve common goals) currently does not exist.
- The IT structure is decentralized and fragmented (which has evolved over decades for a number of reasons). This has resulted in a decentralized IT decision-making framework. There are an estimated 250 IT staff (on a full-time equivalent basis) across approximately 35 groups that provide or support IT services across the enterprise (not including research institutes and centres). Approximately 60% of these are in the specialized and distributed units.
- The university has not identified a level of core, basic IT services available to all users (for example, data storage and back-up, web/content management systems (“CMS”), management of software licenses etc.).
- The current IT service delivery model is not coordinated across the enterprise and there are potentially many units that are providing core or base-level services. For example, there are numerous IT services that are delivered by multiple units across the enterprise (these include virtualization services, server hosting and maintenance, data storage and back-up, web/content management systems, wired and wireless access, various IT development services and software license management). While further investigation needs to take place regarding whether duplication exists, there are very likely opportunities for better coordination and optimization of services.
- A customer service framework has not been ingrained across the institution and IT service management practices are not embedded across the enterprise. UTS has long been challenged on its customer service focus but has made progress recently with the implementation of a new ticketing tool. Many of the distributed units have been well regarded for their customer service; however, service management and enterprise computing decision-making processes (and discipline around those processes) are not in place across the organization. This structure would enable units to improve IT delivery and ultimately, customer satisfaction. Capacity constraints have limited the ability for many IT units to adopt some of these practices.
- Instructors have had challenges with basic teaching and learning IT services, such as lack of harmonized classroom audio visual (“AV”), file upload and grade submission functionality within the learning management system and challenges with accessing blended and other learning technology development services. There are several opportunities to develop more innovative tools to support teaching and learning, for example, predictive learning tools.
- Access to research IT services and to research infrastructure is a challenge, particularly with the existing cost-recovery funding model and the changing research environment.
- Over the past year, users (particularly front line users) have had challenges using the MOSAIC system; however, improvements to the sustainment framework have been made.

Funding

- Service model and process optimization opportunities do exist. However, it appears that IT has been underfunded for a number of years and strategic investment is required. Infrastructure renewal, for example, is not fully funded and significant investment in the refresh of critical infrastructure is required over the next 5 years.
- Variant funding models (full or partial cost recovery etc.) across the IT units make accessibility to IT services and infrastructure challenging for many users and have an impact on how units collaborate and work together. Accessibility is an issue particularly relating to research IT services and also teaching and learning services (where lack of funding is a barrier to access).

The University's investment in MOSAIC was a strategic choice made to improve efficiency and effectiveness in the delivery of services. Implementation of MOSAIC was UTS' first priority. We understand that the size and scope of MOSAIC meant that other technology projects were given lesser prioritization. The University's decision to prioritize MOSAIC which indirectly led to slower progress and delays on other projects created some frustration across the campus. In addition, concerns have been raised around the lack of trust in the services provided by UTS, which has continued to be a challenge. However, the frustration with IT has been at play for decades.

All of the issues above have a direct impact on customer satisfaction of IT services at McMaster. Results of the IT Services online survey (from May 2016) illustrate that there is some degree of satisfaction around IT service delivery, yet there is substantial room for improvement overall. Below are high level results from the survey for faculty, staff and graduate students and for the full student community (graduate and undergraduate students):

How Satisfied or Dissatisfied are you with McMaster's ability to meet your IT Service needs?

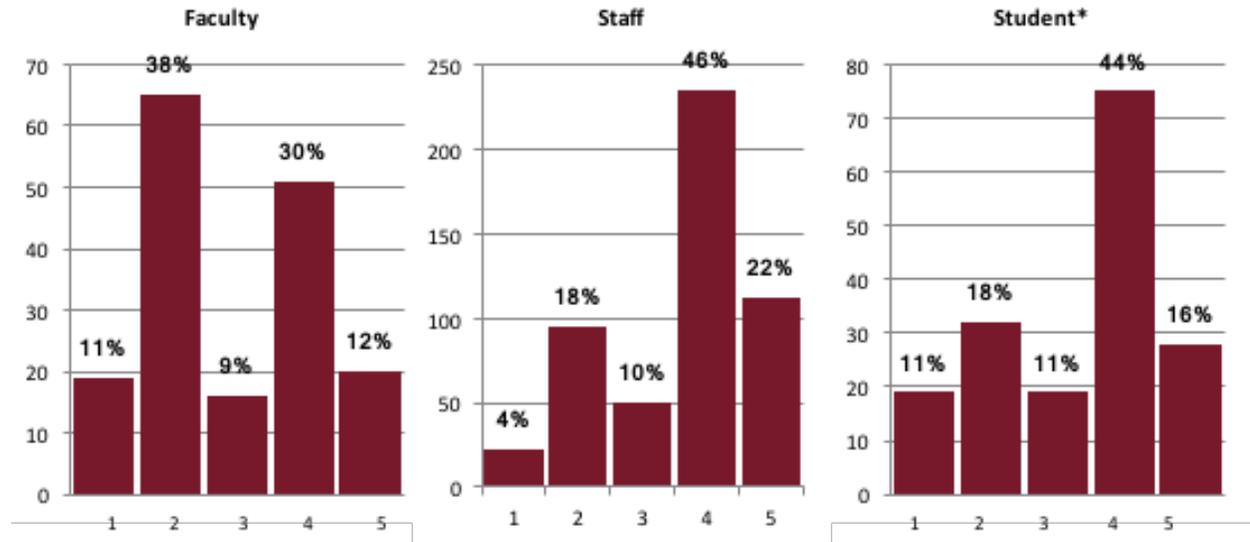


Figure 1.1. N=171, M=2.9, SD=1.26

Figure 1.2. N=514, M=3.6, SD=1.14

Figure 1.3. N=173, M=3.4, SD=1.26

- | |
|---|
| <ol style="list-style-type: none"> 1. Completely Dissatisfied 2. Somewhat Dissatisfied 3. Neither Satisfied nor Dissatisfied 4. Somewhat Satisfied 5. Completely Satisfied |
|---|

*Graduate Students only.

How well do the IT services offered by McMaster meet your needs as a student?

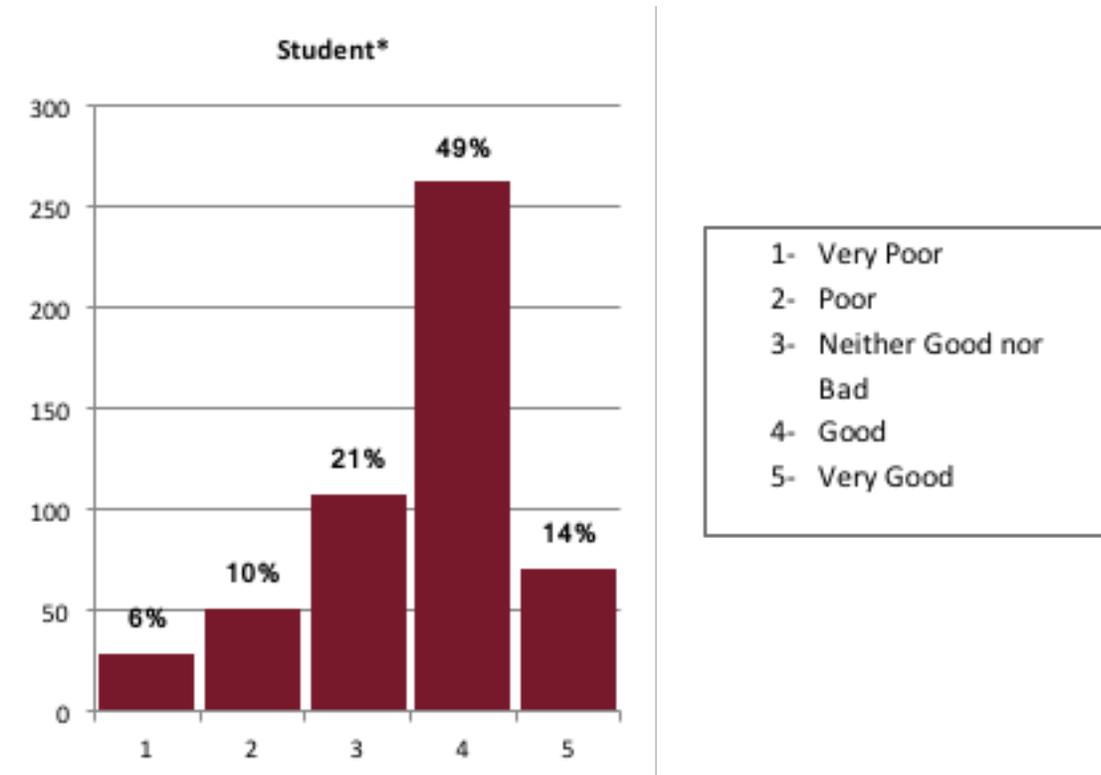


Figure 5.1. N=521, M=3.6, SD=1.02

*Graduate and undergraduate students.

Overall, there are opportunities to improve customer satisfaction around IT services, however, the current governance and leadership structures make it very difficult to manage IT on a holistic, enterprise basis. While a distributed framework is not, in itself, the reason that McMaster has experienced these challenges, it certainly increases the complexity around IT service delivery and necessitates the need for some important structures to be in place.

There are five areas that are considered to be highest priority and it is recommended that they be addressed before other initiatives are commenced. They will be discussed in further detail at the end of the synopsis and include:

1. Development of a multi-tiered governance structure – to ensure the right stakeholders participate in IT decision-making (strategic planning, budgeting, project prioritization etc.).
2. Enterprise-wide accountability and leadership for IT services – a leader to develop and implement a strong environment and community around IT.

3. Investment in critical infrastructure and services – to provide IT with the tools to be successful in IT delivery.
4. Service model optimization and core service rationalization – a consultative activity to define core services and determine how best those services are delivered across the enterprise.
5. Strategic hires (across the enterprise) to drive change around IT service management and other key areas – dedicated resources to implement the framework and processes around IT service delivery.

There are significant opportunities for improvement to the delivery of IT services at McMaster. The Committee has found real dedication by all participants in the review process to making improvements and to being part of the change. Their involvement in the review process is much appreciated by the review team and the committee members and was critical to the review process. The IT staff across the enterprise are to be commended for their dedication and hard work and for what they have been able to achieve given the existing IT structure and organization (and typically with limited funding).

CONSIDERATIONS FOR IMPROVEMENT TO IT SERVICES

The following outline the vital recommendations identified to improve IT services at McMaster in 12 areas. They include both strategic and more tactical considerations. The five priority items, identified above, are explored in further detail at the end of the synopsis.

1. GOVERNANCE AND LEADERSHIP

a. IT Governance

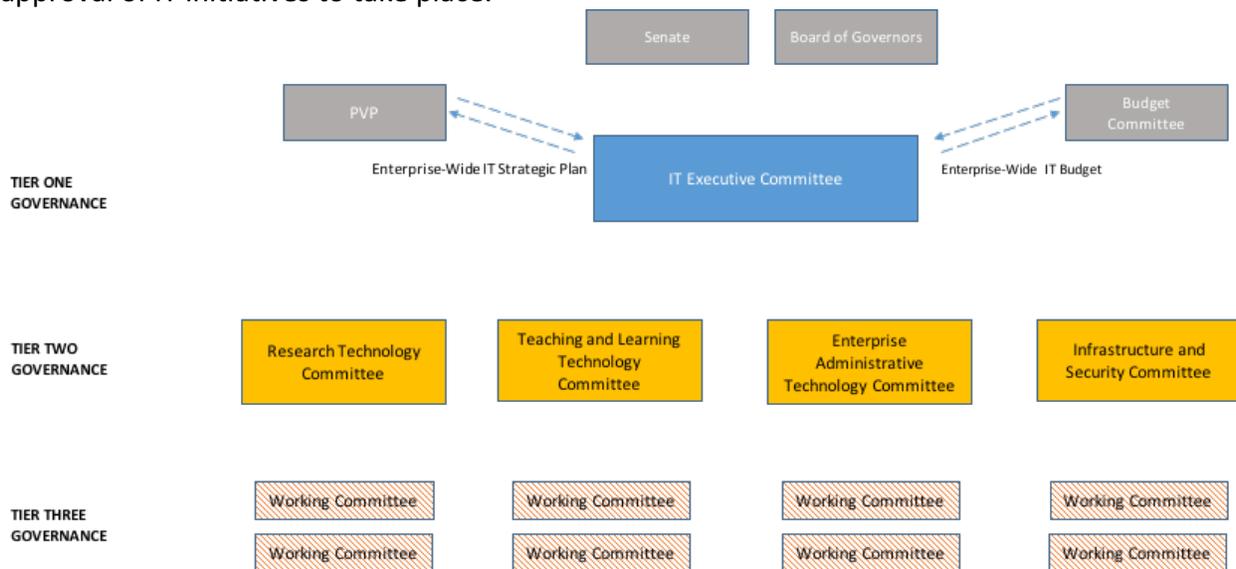
The most important consideration relating to improvement around IT at McMaster is the implementation of a robust and effective IT governance structure. This is the cornerstone for effective IT service delivery, particularly in a federated or distributed model, and will address either directly or organically, a significant number of challenges that have been raised.

The Committee has had many discussions around alternative governance models and the proposed model has proved to be successful at many institutions. At the end of the day, the final structure McMaster decides to implement will need to represent the overarching mission and vision of the University and of IT at the University. This governance structure will set the groundwork for effective, accountable and inclusive oversight and decision-making of IT activities and should enable:

- integrated and collaborative strategic planning and alignment to institutional goals and strategy
- clear accountability for IT services
- transparency in decision-making
- IT budget prioritization and control over IT spending
- appropriate stakeholder representation
- effective communication of decisions

- clearly defined roles and responsibilities
- management and reduction of IT risk

The following three-tiered governance model could be considered for McMaster and would ensure the right people are at the table for effective governance, planning and decision-making. A strong framework with embedded processes and discipline will need to be developed to ensure the committees operate effectively. This framework would ensure that necessary stakeholders (those who are close to the functions and understand user or business requirements) participate in the discussion around user needs and how IT can support and enable those needs. The various levels of governance play an important role and provide the necessary input into the higher-level governance committees in order for prioritization and approval of IT initiatives to take place.



Tier One - IT Executive Committee

It is recommended that the membership of the IT Executive Committee be expanded to include additional stakeholders and decision-makers to better represent the various communities at the University. The CIO, VP Administration and Provost & VP Academic should continue to sit on this committee. Consideration should be given to including:

- additional appropriate VPs – VP Research, at a minimum, with consideration for additional representation as appropriate
- 1-2 Deans of the various Faculties (with rotating membership terms and possible election amongst the faculty Deans)
- Executive Director, RHPCS/Special Advisor to the VP Research
- 1-2 other key IT leads

This committee’s mandate would include the approval of the enterprise IT strategic plan; oversight of integrated, enterprise-wide IT budget and prioritization of IT projects/approval of large-scale projects that exceed a certain threshold. It is important to ensure that the

committee is represented by individuals who understand the impact of the decisions they are required to make (i.e. VP's, Deans).

Tier Two Sub-Committees – Operating in an advisory capacity (chaired by a non-IT stakeholder), these committees cover the major areas that support the university's academic mission. Cross-functional representation from relevant IT leads (faculty and other university units) and other key stakeholders (Deans, AVPs of the various mission areas, students etc.) is necessary. These advisory committees provide voice and input on IT at the University. It is a forum to identify needs and issues and make recommendations to the IT Executive committee. The mandate and activity of these committees will be to focus on overall academic strategy and how IT can support and enable the overall mission areas.

Tier 3 - Future state working or sub-committees - once top tier governance committees are in place and operating effectively, a second phase of governance changes could be the creation of Tier Three sub or working committees which would report up through Tier Two level committees and comprise further representation of key stakeholders (IT providers and users).

This IT governance process would align to the existing Budget Committee process and would not change existing budget processes at the distributed unit level. A multi-year enterprise IT budget would be submitted to Budget Committee, with allocation and prioritization of projects occurring through the IT governance process. This process would allow individual IT units to continue to fund specialized, innovative projects and initiatives if they have adequate funding within their own envelopes. Any significant projects (over a certain threshold) would be included as part of the overall enterprise-wide IT budget, but would continue to be funded locally. It is critical that distributed units continue to have the authority to develop and pursue innovative IT initiatives.

McMaster should consider how to continue the good work and collaboration of the Tech Roundtable in the new governance model. Many of the TRT members would participate in the Tier Two committees, however, formalizing the TRT mandate as an effective advisory function to the CIO is one option that could be effective in this model.

A number of these committees are already in existence across the university; however, they are operating independently without being coordinated within a governance framework and without a common strategic plan. Therefore, these committees do not perform an enterprise-wide IT advisory function. Expanding some of the existing committees (for example RHPCS Advisory and MOSAIC Steering Committee) is recommended. This is an essential first step in addressing the various challenges with IT at McMaster and probably the most critical of improvements that needs to be considered.

b. Enterprise Leadership

The committee recognizes that McMaster is currently organized as a federation of faculties, department and units. A federated model for IT service delivery would work well in this environment. In these types of models, coordinated delivery of core services enterprise-wide is

balanced with more specialized services delivered in local units. There is a significant amount of collaboration in this model where the larger IT units work closely with local IT and stakeholders to ensure user needs are adequately being met and IT delivery is functioning well.

Strong leadership and discipline is necessary for a federated model to work effectively. End-to-end accountability for IT, particularly in a decentralized and distributed model, is critical for the successful delivery of IT services. This overall responsibility for IT at McMaster has not been defined nor imbedded into the governance or organization structure. As a result, campus-wide, enterprise leadership is not well defined. Based on review of other successful models and through significant discussion and deliberation the Committee members agree that this accountability should fall under the CIO who has formal accountability, which is a new leadership model for IT at McMaster. This accountability extends beyond a direct reporting relationship or direct responsibility for other units. If the scope of IT delivery is in another unit (i.e. a unit not reporting into the CIO) it is still necessary for the CIO to have accountability for the overall IT fabric, environment and discipline across the institution.

c. Strategy

The implementation of an effective IT governance framework will set the stage for a consultative, enterprise-wide strategic planning process that would encompass all mission areas (including research and teaching and learning) and allow for all key stakeholders to participate in the process.

In addition to university-wide strategies around governance, strategy, budget, funding, etc. there are other technology-related areas that would do well by articulation of strategic plans. In addition to those mentioned in previous sections, these would include:

- Cloud computing – a framework for outsourcing services to the cloud needs to be in place before outsourcing can be considered. Creation of a sourcing strategy that includes specific criteria, management of risks associated with cloud solutions and administration of cloud based options should be considered.
- Web/content management systems – development of an institutional strategy and coordinated enterprise provision of consistent Web/CMS services.
- Mobile - development of a mobile strategy to ensure the needs of stakeholders relating to mobile access are understood, standards for mobile access are identified and mobile platforms are regularly available to stakeholders.
- Data governance – this is often a challenge in both higher education institutions and the private sector. A data governance plan (which has yet to be developed) would outline the ownership and stewardship of institutional data, include data classification and acceptable use for all data types and will help to provide a body that can make critical decisions and imbed a rational decision-making process around data access.
- Data management protocol/directive – development of guidelines around the types of storage services available based on the type of data the user is looking to store. Typically, this directive would be developed by IT in conjunction with the university's in-house legal department and Privacy Officer.

- Software licensing and management – coordinated and ideally, centralized, management of software will greatly improve the current challenges that users face.
- Technology-enabled learning – to be incorporated into the overall IT strategy, development of an overall teaching and learning strategy would enable the university to focus on priority initiatives and how those services can be most effectively delivered.
- Research related IT services – to be incorporated into the overall IT strategy, and to incorporate such strategic areas as baseline data storage, security, general compute infrastructure, web services etc.
- Document management – development of an overarching strategy to address how users can easily share and manage documents across the institution that adequately addresses compliance and regulatory requirements on an enterprise basis (in conjunction with the data management protocol and cloud strategy).

Creation of these strategies through the governance framework will ensure there is a common vision in place developed by key stakeholders.

2. STRUCTURE AND SERVICE DELIVERY

a. Service model optimization, customer service and service delivery

In order to enhance customer service and better manage IT services, a more coordinated service model should be considered. It is recommended that the university undertake a service rationalization activity, managed by the governance process with involvement of key stakeholders, that defines:

- core services required by all users in order to perform their daily work that should be made available to all, with enhanced or specialized services available to those that need it.
- how best those services are delivered on an enterprise-wide, coordinated basis (this could be by any one of the IT units as determined through the governance activity or the decision may be made to outsource a service, once a clear sourcing and cloud strategy is developed).
- an enterprise-wide service catalogue (that includes all IT services regardless of who delivers the service), maintained by the CIO and well communicated across the enterprise.

Funding considerations would need to be determined once these activities were finalized. Core services could include such things as network access, Wi-Fi, MOSAIC ERP, email, desktop management, some base level of data storage, encryption, back-up and recovery, support for web pages and management of a central web server and information security, for example, but the final list should ultimately be determined through a consultative process. In order for this to be successful, enhancements to the IT service management framework and processes must take place in order for users to develop trust and confidence in IT service delivery.

Customer service needs to be at the forefront of IT service delivery across the university. UTS, while striving to make improvements in this area and having had some recent success with the implementation of the new ticketing tool, still has work to do to reach a level of service and

customer service focus that the community expects. This includes further development of enterprise IT service management processes, development of customer service standards to effectively manage customer expectations and full coverage of all IT services at the Service Desk, regardless of which unit provides the service. With the coordinated delivery model, this framework must be in place enterprise-wide for consistent and effective service delivery. Many IT units have looked to develop these practices but have not had the resources to do so. This activity will need to be adequately funded and have dedicated staff to be effective.

b. Organizational Design and Development

The current IT organization structure is reflective of the overall decentralized culture at McMaster and has evolved over decades. While this decentralized structure, in and of itself, is not necessarily a cause of current IT challenges, it certainly adds to the complexity of governance and effective management of IT at the enterprise level. A federated model for IT is recommended to ensure that the current overall structure is well supported (with a balance between the IT units responsible for enterprise-wide delivery of core services and local and specialized units that provide more specialized and enhanced services).

Outside of the redefined CIO position to accommodate enterprise leadership and accountability, any organizational changes should be an outcome of IT governance and will be dependent on service optimization/service model decisions. These changes should develop organically and it is the opinion of the committee members that any drastic change would be counterproductive at this stage. However, an “embedded staff” model, where some IT staff are placed within user-facing units, could be considered. This aligns well to a federated model where having IT staff close to stakeholders helps to understand needs and enable timely and efficient delivery of services. Having central IT or other specialized IT staff close to the stakeholders in the faculties and units (as currently occurs with RHPCS and the Faculty of Science, for example) will allow for needs to be better understood and addressed and also for more effective response times in fulfilling service requests. Depending on the outcome of the service optimization activity, any of the IT units providing an enterprise core service could be considered for this model.

From an organizational development perspective, it is suggested that IT be prioritized in terms of the new organizational development tools (workforce planning, leadership development and retention practices) being developed by HR and that units across the enterprise adopt tools currently employed in UTS (career planning and individual development plans). Regular bi-annual review of the existing human resource matrix and career path plans in UTS and other IT units would help to validate IT position salaries and identify the skillsets that will be required to meet future needs (such as more agile cloud-based skills, for example).

An important area that UTS and IT as a whole need to further develop is IT service management skills, including effective service management, project management, collaboration and relationship building skills. Resource constraints have prohibited many units from adopting these desired practices yet it is critical that IT continue to develop talent in this area across the

enterprise. Having dedicated staff to forge relationships across all of IT, bring in new business practices and enhance IT service management will be necessary.

c. Infrastructure

An enterprise architecture (“EA”) vision that addresses the entire institution should be considered to appropriately plan and manage campus-wide architecture. The existing fragmented infrastructure could then be addressed in a rational, thoughtful way and help McMaster to make more effective decisions around infrastructure and IT strategy overall.

For example, there are approximately 60 data centres that have been identified across the enterprise. This number is comprised of 25 informal centres¹ and 35 formal, both on and off-site, and does not include 20-30 individual instances of parking/security equipment, nor any that reside in Research institutes and centres that are not managed by an internal unit. There are security risks associated with this set up and also duplicative costs to manage. This is an area where McMaster should investigate opportunities for optimization.

With the significant refresh of enterprise infrastructure required over the next five years, it is important for McMaster to consider the development of an enterprise wide asset renewal plan to support the enterprise IT budget. This plan should be prioritized (identifying possible synergies and opportunities for outsourcing) and adequately funded through a capital fund.

Other specific areas where McMaster requires further investment and development include:

- Information security, from an investment perspective and in terms of an enterprise framework
- Critical investment in network infrastructure
- Investment in Wi-Fi and the development of a campus-wide strategy
- Investment in identity and access management solution and protocols
- Development of a virtualization strategy and investigation into additional opportunities
- Enterprise approach to data storage, archiving and server management

Overall, McMaster’s infrastructure needs attention, both in terms of overall vision and policies and in terms of financial investment. Significant investment is required to bring infrastructure up to date and to reduce the many operational risks that exist regarding equipment failure, service interruption and McMaster’s ability to support the academic mission from an IT perspective.

d. Professional IT Practices

The new IT governance framework and enterprise-wide leadership will set the stage for the oversight and management of enterprise-wide IT. Several key IT capabilities have already been considered in other sections of this report (budgeting, strategic planning) and are dependent

¹ Please note that a loose definition of “informal data centre” was used for this purpose and therefore this number may include individual servers and pieces of equipment.

upon the enhancements to the governance framework. Below are some remaining important IT capabilities and practices that would help all units to improve service delivery:

- IT Service delivery management – as previously mentioned, this should be a continued focus in UTS and roll out of IT service management practices (where they add value) is suggested across the enterprise. Having dedicated staff to drive this activity will allow those units that are resource constrained to effectively address this critical area.
- Human resource planning and project intake – this practice will become even more important as cross-enterprise projects increase. McMaster should implement a resource planning process to properly identify and understand resource capability and effectively manage project intake. Identifying process and delivery efficiencies will be a critical part of this exercise to improve utilization across units.
- Project management (PM) - An effective and ingrained PM framework and tools is necessary for efficient service and project delivery. A consistent, disciplined approach is required in order to ensure quality, efficiency and effectiveness of IT projects. Aligning these tools to both an agile and traditional delivery approach will be necessary and should follow the development approach to add value. This discipline should be put in place for all units and PM tools should be embedded across the IT organization.
- IT purchasing – with the changes recommended for IT governance and leadership (i.e. enterprise-wide budgeting and planning), better control of budgeting and purchasing of IT will naturally follow. McMaster’s current purchasing processes are typically not coordinated and are made on a very decentralized basis. It is recommended that more streamlined and coordinated IT processes be developed. All IT purchases can benefit from improved coordination; however, software is a key area raised by many stakeholders as requiring improvement.

The enhancement of these recommended IT practices will help McMaster to improve enterprise management of IT and ensure that the focus of all IT delivery is customer service. This is a shift from the existing environment in some cases and will require good communication around the value of implementing such practices and effective change management to assist with the development of these areas.

e. Teaching and Learning IT Services

Areas of concern that were commonly identified by stakeholders, beyond a lack of teaching and learning strategy, were typically focused on basic needs:

- Lack of harmonization of classroom technologies
- Difficulties with file upload and grade submission around the Avenue to Learn learning management system (“LMS”)
- Lack of support for less complex, blended courses or for those faculty looking to enhance existing courses with electronic resources/flipped classrooms initiatives (including instructional design and media development services)
- Lack of a forum for discussions around LMS functionality and needs.

There is little opportunity to consider the innovative tools and services available when core services are not meeting these basic requirements. However, a parallel approach can be considered so that core services are addressed while innovative tools are considered (which can include synchronous communications beyond the cohort, social media integration, where and when it makes sense, media management and video integration, for example).

In addition, there are many options that McMaster can consider regarding learning tools and learning analytics to help support student success. McMaster has access to an incredible amount of student data which can effectively be used to understand and predict student success. There are many predictive learning techniques available in this regard, which McMaster could consider in addition to Degree Audit which is already in place:

- Alerts for at-risk students (for both student and faculty)
- Personalized support and dashboards regarding student progression/success against goals/objectives and key learning indicators
- Academic planning tools, guidance around future courses (in development for Faculty of Science)

As is the theme throughout this report, the governance process will help to focus and prioritize teaching and learning initiatives. The development of an overall strategy, forums for discussion around needs etc. will all be part of the newly adopted governance structure. For teaching and learning, the overall strategy is critical; however, the basic needs of users must also be addressed.

On the whole, there are a number of opportunities for McMaster to consider in this area and while many of the issues raised by stakeholders should be addressed through the proposed governance, organization, service model optimization and strategy recommendations, there are several technologies that McMaster could be considering (outlined above) to provide services that add real value.

f. Research IT Services

Several improvements to research IT services will come as part of the overall governance, organization and service model optimization activities that have been recommended. Once core service decisions are made and funded, units providing research-specific computing services (primarily RHPCS) can then determine which priority, value-added, specialized services should be the focus of their delivery.

Better coordination of research IT services will also be an outcome of this activity. RHPCS currently performs this role to a certain degree and attempts to connect researchers where possible. However, a good understanding of existing research infrastructure should be obtained (including centres and institutes) in order to strategically address these needs and to ensure access is available by those who need it. It is likely that there will be opportunities for leveraging existing compute environments. More formalized coordination between UTS, RHPCS/CSU and the faculty units/departments may also result. For example, with the provision of baseline research services for researchers with generalized needs, more formal coordination

could occur at the faculty level with RHCPs being accessed for more specialized needs. Communication of available options for research will also ensure that users can access many options that may have otherwise been unknown.

The Research IT funding model should be reviewed in light of increasing time spent on services that are required but cannot be performed on a fee-for-service basis. Changes to the way research IT services are funded will improve access and availability to all researchers and better support research activity at McMaster. While the services that researchers currently receive are well regarded, the fee-for-service model limits accessibility to researchers, and there are numerous opportunities to improve access to these services for all researchers at McMaster.

g. Enterprise Administrative Computing

A key focus of enterprise computing today is the overall enterprise architecture vision and relevant strategic policies around service provision to help shape decisions. The following strategic policies should be developed and processes put in place to help embed standards and consistency of service provision across the organization:

- Service-oriented enterprise architecture (interfacing and integration of applications and systems, sharing of data across applications)
- Sourcing strategy (what needs to be on-premises vs. in the cloud)
- Minimum requirements and standards for the development and purchase of enterprise applications
- Integrated user experience across applications

Policies around how service provision decisions are made across the enterprise, rationalization of where they are delivered and governance around these decisions are fundamental to successful service management. There needs to be conscious decisions made around systems integration, data sharing etc. to ensure consistency and effectiveness of decision-making. This will require the right participants and a clear framework. This disciplined approach will also help improve the purchasing processes across the organization so that the number of contacts approaching vendors is reduced and savings can be leveraged.

Students have not had a strong voice from an administrative computing perspective. The lack of service focus and understanding needs of this group has been a challenge. While student services are highly integrated with IT, there has not been a focus on streamlining and consolidating the student experience.

The new governance framework will ensure that the student voice is at the table when strategy is being considered and developed. There are also several areas (beyond those common to faculty, staff and students, such as Wi-Fi, etc.) that should be considered for improvement:

- The development and implementation of a mobile strategy (discussed earlier in this report) should address the concerns around mobile access and functionality.

- Consideration of a model to provide computer support to students (beyond the assistance they do receive from UTS for email, MACID etc.). A partnership with the MSU to provide student kiosks (for example) could improve the student experience and deliver a service that would be highly appreciated by the student community.
- Investigation into the streamlining of student login/authentication.

Implementing the framework for optimal decision-making around administrative enterprise computing, as outlined above, will enable great strides to be made in this area. The service model optimization activity will also help identify those core enterprise/administrative services that could be offered on a coordinated, enterprise-wide basis.

h. MOSAIC Sustainment

The MOSAIC ERP implementation was the most substantial IT project (in terms of scope, effort and financial commitment) that McMaster has undertaken. The scope of the project included the replacement of approximately 20 systems used for student administration, finance, research administration, human resources, and business intelligence (still in progress). It has been a significant project that has required an immense amount of dedication by the staff involved.

McMaster is at varying stages of maturity with MOSAIC and the impact on the user community will continue to evolve. Some staff, faculty and student stakeholder concerns that were raised throughout the review process in March through May, include:

- Challenges with support (both on-line and in person) and a lack of specific MOSAIC module knowledge of those providing support
- Continued challenges around end-user training and business process change
- User interface and navigation difficulties
- Difficulties using and accessing the system from mobile devices
- Integration of data (several manual workarounds in place)

While it appears that satisfaction with MOSAIC has improved over the past months, there are some areas where there are challenges. The MOSAIC upgrade is intended to address several of the above areas (user interface and navigation enhancements, mobile device functionality) and performance improvements have been made throughout the year. Training and business process change however, continue to be areas of frustration amongst users. It appears that funding for these activities has been limited (or non-existent).

Good progress has been made (particularly around the development and cohesiveness of the MOSAIC Sustainment Organization, “MSO’ teams) and there are some additional enhancements that the Committee believes McMaster should consider to improve both the user experience and activity of the MSO:

- Training – the approach for providing training required by end-users should be reconsidered and a more formalized, holistic training plan developed. This is a model that has been very successful in other institutions and will enable a consistent approach

to development and provision of training to users. Working directly with end users across the enterprise to determine the types of training they need and how best to share this information will help drive this activity.

- Business Process Change – it appears that there has not been a consistent approach across modules to document and communicate the change to business processes post implementation and business process mapping activities have not occurred to the extent required. Defining a consistent approach to capturing new processes and a plan to communicate to the user community should be considered. Completing this change initiative is important to ensure users can improve their knowledge and effectively use the system and will become increasingly important as new system functionality is implemented.
- Communication – improved communication around MOSAIC status, fixes and enhancements will have a direct impact on the user community. The MOSAIC User Advisory Committee is made aware of priority issues/enhancements; however, other users may find it challenging to locate and understand current status.
- MOSAIC Sustainment and Governance
The organization structure of the MSO appears to be effective and it appears that a total team of approximately 60 technical and business staff is reasonable. However, it is suggested that the technical allocation of staff be investigated to ensure that the critical issues can be adequately addressed in a timely manner across all of the modules. While the specific module and business knowledge required would likely prohibit the sharing of technical staff across modules, the MSO should consider whether the current model is the most efficient (given the focus of work of each of the module teams – resolving high priority post-implementation issues vs. enhancements).

The proposed IT governance framework includes an Enterprise Administrative Computing Advisory committee (which could be an extension of the MOSAIC Steering Committee and include non-MOSAIC technical leads). The expansion of this committee will allow for user needs to be considered from a broader enterprise computing perspective. Tier three committees would likely include those aligned to MOSAIC modules (amongst others).

It has been noted that operational teams are working together more cohesively and the development of knowledge in the technical teams has increased over the past year. One concern around the existing model is that risks and issues may not be identified early on in the process without a formalized cross-functional or cross-module operational committee. This committee of business and technical leads from all functions would be responsible for identifying and prioritizing risks and issues on a cross-module basis and also for identifying opportunities that could be leveraged for more than one module. It is understood that business representatives are starting to attend other module team meetings to bring this cross-functional perspective; however,

this is not yet formalized. These cross-module, prioritized issues would then be brought to the MOSAIC Steering Committee for resource allocation and investment approvals.

3. FUNDING

a. IT Funding

It is important that IT be seen as a strategic function within the university, and one that is properly funded. Critical investment and commitment from senior leadership is required to demonstrate this, both in terms of infrastructure and services. While efficiencies can be gained from a coordinated delivery model and enhancement to IT practices, this will not be sufficient and strategic investment is required.

The development of an enterprise-wide IT budget will allow senior leadership to be better positioned to effectively manage IT. As previously mentioned, a multi-year, prioritized asset renewal plan for the enterprise will enable McMaster to identify areas requiring critical investment and ensure asset renewal is effectively funded. Other funding changes will also need to follow the service optimization exercise to ensure that units delivering core services are adequately funded and resourced to be successful.

The cost recovery model used in some of the units (RHPCS and CSU, for example) should be revisited to fully understand the impact of this approach. This model tends to limit access to core services and infrastructure and leads users to outsource or redundantly develop services in-house. In addition, it may result in IT service providers delivering basic core services on a cost recovery basis that detract from the value-added services they could be providing.

CONCLUSION AND KEY AREAS OF FOCUS

There are significant opportunities for improvement to the delivery of IT services at McMaster. The two most critical change considerations, on which all other recommendations in this report are dependent, are the implementation of an effective ***IT Governance Structure*** and ***overall IT Accountability and Leadership***. These are the two initiatives that must be implemented prior to all other changes and which can then lead and drive subsequent changes across the organization. Having the right stakeholders at the table to participate in the IT improvement initiative is critical and governance and leadership are the two areas that will help facilitate this.

Investment in critical infrastructure requiring urgent replacement will need to take place as soon as possible in order to demonstrate some quick wins to users of IT services at McMaster. The committee identified Wi-Fi and network as two areas of concern – Wi-Fi improvements will be a noticeable change and will address a critical concern of almost all stakeholders that participated in the review process.

One of the first activities led by IT governance should be the ***optimization of IT services***. This activity will need to be consultative and transparent and will require substantial time and effort of the IT community. Building on the data collected as part of the IT services review, this activity will need to delve further into existing services being provided, determine which services need to be available to all (i.e. core or base-level services), and which unit or third

party is best placed to provide those services (based on perceived quality of service provision and costs to deliver). Once these decisions are made, changes to existing funding models may be required to ensure that those providing the services are adequately funded to do so. Having good quality, core, base level services available to all IT users will enable IT in the local and specialized units to focus their efforts on innovation and the specialized needs of students, staff and faculty. They will no longer need to fill the gaps in commodity services which will free up their availability to focus on value-added IT services.

Given the challenges with customer service, particularly in UTS, ***development of talent within the IT organization*** is the final area that needs to be prioritized. While some of the local and specialized units are well regarded for their customer service philosophy, it will be necessary to enhance both skills and processes from an IT service management perspective (service management capabilities, relationship building, project management etc.). Many IT units looking to develop these capabilities and structures have been resource constrained and have not had the staff and financial resources to address this need. It is therefore recommended that dedicated high level staff across the organization drive and manage this change and commitment from university leadership is demonstrated as to their criticality. Embedding service management capabilities across the organization will lead to consistently provided services, improved customer service, process efficiencies and improved IT resource utilization across the organization. This will enable local and specialized units to focus on the value-added, innovative services their users need and require.

It is recommended that an Improvement Fund be established (managed by the highest-level IT governance committees) to demonstrate commitment and dedication to enhancing and improving IT at McMaster. Many of the activities identified throughout the report require dedicated funding and it is extremely important that funding is not a barrier to the implementation of recommended improvements. This funding should address areas that are clearly visible to end users and demonstrate some quick wins (for example, Wi-Fi improvements will quickly be noticeable to users with back-end infrastructure improvements and service management enhancements occurring at the same time). Therefore, it is recommended that McMaster fund these requirements first, and look to optimize at a later stage, addressing potential duplication of services, process efficiencies etc.

The IT landscape is constantly changing and the recommendations in this report will help position McMaster to provide the support that IT staff and IT units require to effectively deliver IT services. Sequencing activities as described above will best place McMaster to successfully implement IT improvement initiatives. While these activities are not overnight fixes and will take a significant amount of time, effort and financial commitment, the outcomes of these initiatives will be improved culture and trust around IT services, better management and governance of IT and ultimately, improved staff, faculty and student satisfaction.