THE FUTURE OF NUS LIBRARIES
2017-2020
HONOURING THE PAST
EMBRACING OUR FUTURE
In 2010, NUS Libraries was the first to attain the Outstanding Award for Service Excellence in the NUS Service Class (NUSSC). Achieving the first in the NUSSC and several ‘firsts’ in other areas, was not what we had set out to do. Our objective was to constantly make changes to improve library services and to help NUS accomplish its mission.

Over the years, we have been re-inventing and implementing incremental changes, but they are not highly visible. From 2017, we are taking bold steps with our strategic directions to introduce disruption, new services and new technology rich spaces to meet changes and challenges in the digital age. We want to connect you with the physical and virtual world. We want to create conducive environments to facilitate student success and teaching excellence, increase research visibility and impact, and create value for the world.

Do we still need libraries in this day and age? Certainly! Every year, we receive more than 1 million visitors and interestingly, almost 50% of the total number of accesses to our rich collection of electronic resources come from within the Central Library alone when we analysed six months’ worth of big data. NUS Libraries has always played a pivotal role in the lives of students, researchers and teachers. To many students, your lives revolve around many ‘L’s - lecture, lesson, lab, loo, lunch, love and library. You spend a large part of your time on campus and in the libraries, in between lectures, labs and lunches.

For the past few months, we engaged you to tell us how you value NUS Libraries through surveys, focus group discussions and one-on-one meetings. Many of you spared some time to provide us with feedback on what you wanted and suggested services and amenities which NUS Libraries should offer. The findings provided insights and also validated what we are aware of.

We compiled the findings and incorporated them into the Future of NUS Libraries report. NUS Libraries is determined to improve your experience when interacting with library services, staff and spaces. We are planning the changes with you in mind.

We will continue to engage with you to drive initiatives and services to equip you with the necessary skills to be ever ready and future ready. NUS Libraries will build on existing systems to build a library of legacies, library of possibilities, library of experiences and library of excellence. Our libraries will be the neutral ground to connect people to people, people to facilities and people to content.

The strategic directions will guide us to transform our services, library staff and spaces to help equip students with 21st century skills so that they can become global citizens. By providing access to quality content and digitizing rare materials, we will unlock collections for study and research – to create new knowledge for the benefit of society and future generations. Join us on this exciting journey.

Mrs Lee Cheng Ean
University Librarian
National University of Singapore
# TABLE OF CONTENTS

I. Introduction 4

II. Why Transform? 7
   Need to Demonstrate Value
   Need to Accommodate New User Needs
   Persona 1: The Academic Staff
   Persona 2: The Graduate Student
   Persona 3: The Senior Undergraduate
   Persona 4: The Junior Undergraduate
   Need to Respond to Emerging Global Trends and Challenges

III. Our Plan 16

IV. Strategic Outcomes and Impact 18
   Facilitate Student Success and Teaching Excellence
   Increase Research Visibility and Impact
   Create Value for the World
   Reimagining NUS Libraries: A Library of Legacies, Possibilities, Experiences, and Excellence

V. How Will We Get There? 6 Strategic Directions 25
   Strategic Direction 1: Enrich and Preserve Content
   Strategic Direction 2: Improve Access to Quality Content
   Strategic Direction 3: Facilitate the Creation of New Knowledge
   Strategic Direction 4: Impart New Skills to NUS Students and Staff
   Strategic Direction 5: Revitalise the Environment
   Strategic Direction 6: Build Internal Capabilities

VI. Final Recommendations 34

VII. References 42
INTRODUCTION

In 2017, NUS Libraries turns 112, the same age as the University. Starting as a small medical library at the Sepoy Lines campus in 1905, NUS Libraries has expanded to eight libraries complemented by a digital library today. We have a substantial collection of more than 3 million volumes and over 600,000 electronic titles, and serve as the de facto law and medical libraries in Singapore. Our world-renowned Singapore-Malaysia Collection also boasts over 70,000 titles, and provides a unique coverage of the economic, geographical, political, and social developments of Singapore, Malaysia, Brunei, and ASEAN. This complements our Chinese Library’s rich collection on the Chinese in Southeast Asia.

Over the past century, the Library has built up a significant heritage, comprised of many major milestones. For example, in 1955, NUS Libraries was designated the Food and Agriculture Organisation (FAO) of the United Nations depository library; this collection continues to be maintained at the Science Library. We are also a library of many firsts, such as the first in Singapore to feature a CD-ROM database (1989), an online public access catalogue (1992), and a self-service book return machine (1994). To relive NUS Libraries’ history for the last hundred years, visit http://libguides.nus.edu.sg/ds/nusltimeline
To stay relevant and better support the University in meeting rapid changes brought about by trends and challenges, NUS Libraries has been continuously re-inventing itself over the years. We play a vital role in helping NUS accomplish its mission. To do this effectively, NUS Libraries can no longer simply position itself exclusively as a gateway to resources for teaching and research. With the ubiquity of electronic resources and powerful on-line discovery tools, researchers are now less reliant on the expert assistance of a librarian. Instead, a library now has to focus on traditional as well as novel functions that are of greatest value to its constituents and its parent organization (Housewright, 2009).

It is also clear that NUS Libraries faces an increasingly complex set of challenges as user demographics change and global trends impact higher education, research activities, and the future of jobs. In this report, we will document our journey of transformation. At the same time, we will lay out the various exciting initiatives that are in store for our major user groups (i.e. academic staff, graduate student, undergraduate). In a nutshell, we hope to further drive student success and teaching excellence, increase researchers’ visibility and impact, and create value for the world through our unique and rich heritage collections.
To preview, our transformation plan is informed by three considerations. First and foremost, we want to evolve in a way that better allows us to fulfil our vision (to be a leading global academic library, impacting research, enriching learning, revitalising experiences) and mission (to actively engage and partner the NUS community in advancing scholarship and research through innovative library services). Second, we want to make sure that our changes reflect the input of our key stakeholders. Over the last six months, we gathered data through surveys and focus group discussions to better understand the needs of the groups of library users who make use of our resources and services.

Finally, to ensure that we are sensitive to important global trends, we visited leading libraries in the University of Oxford, Yale University, Harvard University, University of Melbourne, University of Auckland and others to learn the best practices in digital scholarship, scholarly communication, learning services, and other aspects of librarianship. Perhaps unsurprisingly, we found that these libraries are all undergoing transformation, with the ultimate goal of adding value to their communities.

This is the story of how we hope to become a Library of Legacies, Experiences, Possibilities, and Excellence.
WHY TRANSFORM?

Need to Demonstrate Value

For a long time, academic libraries, because of their status as the “heart of the university”, have been sheltered from the full onslaught of changes in the higher education landscape (Housewright, 2009; Oakleaf, 2010). However, in recent years, this is no longer true. Academic libraries can no longer assume that their importance to stakeholders is self-evident; instead, they have to explicitly demonstrate their value to their institution (Oakleaf, 2010).

Such demonstrations of value can take a number of forms. One, in a climate where institutional repute is weighted heavily, the library can contribute to the prestige of a university. Two, libraries could play a potential role in student learning, enrolment, retention, and graduation rates (Oakleaf, 2010).

Three, the library could pave the way for students’ future job success by providing them with resources to acquire 21st century skills, thereby making them more marketable. Such skills could in turn facilitate the securing of competitive internships, admission to graduate and professional schools, and future career success. Four, the library can serve as an important partner in supporting faculty research productivity, through supporting faculty members who are preparing grant applications, publications, presentations, and promotion and tenure dossiers. Five, librarians can contribute to faculty teaching in a range of ways, through information literacy programs, online library guides, and by collaborating with faculty on curriculum and assessment matters.

Finally, the library’s value can also be measured using indicators of a more economic nature. For example, a library can measure the savings offered to the university, by demonstrating the cost effectiveness of existing services, or even better, as a return on investment.

In summary, the yardstick for an excellent library is inextricably linked to its utility to the University, and these considerations are reflected in NUS Libraries’ mission and core values, which are informed by the NUS mission.
Need to Accommodate New User Needs

It is vital for the Library to remain relevant to our community as our stakeholders evolve, alongside changes in the research and educational landscapes. As such, it is important to understand our users’ needs and motivations, as well as be aware of how these needs might interact with emerging technologies and trends. In order to understand our users, we compiled data from three sources: 1) Customer Service Survey (N = 3,796), 2) Focus Group Discussions (N = 50), and 3) one-to-one interviews (N = 19). Our respondents included junior and senior undergraduates, graduate students, as well as research and teaching staff. All three data gathering exercises were conducted in the last quarter of 2016.

The collective findings were used to generate four personas for our four major groups of constituents, one for a tenure-track faculty member, one for a PhD candidate, one for a fourth-year student, and one for a second-year student. The trends are straightforward to summarise. Specifically, the faculty member and graduate student are mainly concerned with being more productive and impactful in research, whereas the undergraduates are concerned about doing well in coursework, getting practical work experience, and graduating with a good degree so as to be competitive in the job market. There was also a clear demand for more attractive, flexible, and cosier spaces that can be used for discussion, learning, and fun.
Please see Personas 1 – 4 for more details.

Persona 1: The Academic Staff

Choice Quotes
“One of my biggest challenges is time management, wait no, it’s time famine!”
“Collections are the cornerstone of a library – keep it responsive and powerful”
“Do not lose that human touch in our library transformation. Don’t make it cold”

Goals
- To produce impactful research
- To be an effective educator
- Balancing service against teaching & research

Concerns
- Getting more done in less time
- Obtaining grants for research & graduate students
- Publishing in suitable high-impact outlets

Demographics
Brenda Lim, 40 years old
Academic staff on the tenure track

Uses Library for...
- Books and E-Resources
- Help with queries of various nature (in-person, email, chat)
- Alternative workspace

Perspectives on the Library
- Likes:
  - Very good e-collection that meets needs
  - Librarians are responsive and helpful
  - Publishing talks & EndNote workshops
  - Services like DDS and Book Purchase
  - Time-saving tools like offsite book bins, proxy bookmarklet, etc.
- Wishlist:
  - Immediate access to articles via DDS
  - Shorter wait for new book purchase
  - More ebooks as texts
  - Book/AV collection in some areas can be improved
  - Automated, subscription-based new material alert
  - Book delivery/off-site book bins
  - More polished and attractive spaces
  - Equipment/facilities that works well

Persona 2: The Graduate Student

Choice Quotes
“The role of libraries is transforming. It’s not just for reading anymore. The roles should be more diverse and interactive”
“The librarians spent a lot of time on my question which I didn’t expect but it was really helpful. They didn’t just give me the datasets but taught me how to retrieve what I need so that I know what to do next time.”

Goals
- To successfully clear qualifying exams
- To complete dissertation in a timely manner
- To have some publications to make them more competitive in the job market

Concerns
- Writing and communication skills
- Difficulty clearing qualifying exams & dissertation
- Getting a job after graduation

Demographics
Setvik Patel, 26 years old
International PhD Candidate (Yr 2)

Uses Library for...
- Books and E-Resources
- Studying
- Help with queries of various nature (in-person, email, chat)

Perspectives on the Library
- Likes:
  - Able to access e-resources anywhere
  - Using Chat – can get help fast
  - Publishing talks & EndNote workshops
  - Services like DDS and Book Purchase
  - Quiet spaces in the library
  - Dedicated librarian to seek help from
  - Emails from Library – usually helpful
- Wishlist:
  - Orientation for new graduate students covering everything they need to know
  - Book collection in some areas can be improved
  - Cozy environment with natural light, options to relax and do fun things
  - Flexible spaces that are multi-purpose / More discussion rooms with projectors
Persona 3: The Senior Undergraduate

Choice Quotes
- "The whole landscape is so competitive – you worry about the bell curve, getting the grades you want, getting the job you like."
- "The library should be less of a mundane space and more of an inviting area. If we want to discuss with friends, that’s an area for us to do that – if we want proper study spaces, there’s an area dedicated to that, if we want food, we can get that…"

Goals
- To find a suitable supervisor and write a good thesis
- To graduate with a good honors degree
- To figure out what to do after graduation (e.g. gap year, job, further studies, etc.)

Concerns
- Prioritizing school work and social life
- Collecting good data for thesis and writing it up in time.
- Getting good grades and a good class of honors

Perspectives on the Library
- Likes:
  - Considerate, helpful, efficient staff
  - Enough books and resources to meet their needs
  - Enough quiet spaces to study alone
  - Some study spaces have nice scenery that helps him relax when he is taking breaks
  - Live chat
- Wishlist:
  - Close proximity to amenities (e.g. water coolers on every floor, have a “caffeine station”, food stand nearby)
  - Convenient library loans of ear plugs, chargers, power strips, etc.
  - More discussion rooms for use
  - Study spaces with more privacy/less distraction
  - Better internet connection

Demographics
- Samuel Tan, 25 years old
- Undergraduate (Yr 4)

Uses Library for...
- Books & E-Resources
- Photocopying & printing
- Studying
- Group discussion

Persona 4: The Junior Undergraduate

Choice Quotes
- "Google Drive, Google Docs, WhatsApp group – these are a must to set up for all my projects!"
- "This semester, many of my modules are CA-based so it’s like fighting a war every week!"
- "After the librarian shared her experiences with me, I moved from a zero to something."

Goals
- To do well in CAs and exams so as to get a good CAP
- To graduate with a good honors degree
- To get practical experience in the form of SEPs and/or internships

Concerns
- Time management – how to do everything that needs to be done
- Getting good grades that will make them competitive in the job market

Perspectives on the Library
- Likes:
  - Helpful, friendly staff
  - Enough books and resources to meet their needs
  - Additional tables set up at CL during exams
  - Can eat and drink in PerkPoint
  - Quiet spaces in the library
  - Ease of booking discussion rooms and checking availability
- Wishlist:
  - Have context-based help that is available when needed
  - Close proximity to good food
  - Environment that is not “sterile” and “stressful” with natural light, options to relax and do fun things
  - More discussion rooms with projectors – no need to book
  - Different spaces to suit their “mood”

Demographics
- Estella Ng, 20 years old
- Undergraduate (Yr 2)

Uses Library for...
- Studying
- Photocopying & printing
- RBR books
- Group discussion
Need to Respond to Emerging Global Trends and Challenges

Faced with keen competition, NUS is reinventing itself in order to continue in its upward trajectory. Student expectations put tremendous pressure on NUS to offer more high quality courses, facilities and services. Technological drivers of change impacting future employment opportunities require NUS to up its game and prepare “future-ready” graduates for the marketplace. Researchers are driven to produce more valuable translational research that will impact society. Shrinking national resource pools and rapid changes in technologies, pedagogies, curriculum and research assessment have major implications for traditional library activities. There is therefore a pressing need for an agile central administration to play a more active role in facilitating, enabling and partnering faculty and researchers in teaching, learning and research.

A survey of major global trends which will impact all academic libraries and the library profession including NUS Libraries and our staff reveal the following developments: -

- Digital Scholarship
- Research Data Management
- Ubiquity of Digital Culture in Education
- Internet of Things (IoT)
- Fast Casual Spaces

Digital Scholarship. This broadly refers to digital research activities and methodologies (e.g., data visualisation, data mining large corpora of text, developing geolocation data representations). Researchers find this research approach increasingly attractive (Lippincott, J., Hemmasi, H., & Lewis, V., 2014) and according to the Association of College and Research Libraries (ACRL), digital scholarship is one of the top academic library trends in 2016 (ACRL, 2016). In line with this, faculties in the humanities and social sciences and in the STEM (science, technology, engineering, and math) disciplines have started teaching their students new forms of research, rhetoric, expression, and data visualisation using emerging media (Wexelbaum, R., 2016).

Libraries all over the world have responded by providing space and services such as collaborative education, data management planning, collaboration on digital humanities projects, spatial data services, data curation, visualisation, etc. A number of universities have already established digital scholarship centres to support digital research projects in research, teaching, and learning. These centres serve an array of disciplines, and librarians could potentially serve as consultants or collaborators in digital research projects. Notable examples include Brown University’s Centre for Digital Scholarship1, the University of Queensland’s Centre for Digital Scholarship2, and Chinese University of Hong Kong’s Digital Scholarship Hub3.

1 http://library.brown.edu/cds/
2 https://web.library.uq.edu.au/locations-hours/centre-digital-scholarship
Research Data Management. The growth of data intensive science and increased funding mandates for data management plans and government open data have resulted in a growing emphasis on data management across all academic disciplines. As the roles of academic libraries evolve, librarians are now often integrated as partners in all aspects of the research process, from data collection to publication to preservation of the research output. The growing interest amongst researchers in open access and research data management makes it important for the library to tackle these issues more directly.

In response to the proliferation of data intensive research, academic libraries need to step up the range of research data services available (e.g., workshops on writing data management plans, consultation on data sharing, data storage and preservation). Indeed, many leading academic libraries have already started providing such services, including those at the University of Queensland⁴, and the University of Hong Kong⁵.

⁴ https://web.library.uq.edu.au/library-services/services-researchers#7
⁵ http://lib.hku.hk/researchdata/rds.htm
Ubiquity of Digital Culture in 21st Century Education. To a large extent, our students were brought up in an age of digital technology and so, are intimately familiar with computers and the Internet. These “digital natives” expect immersive personalized experiences, connected learning, and mobile connectivity. In line with the FutureSchools@SG initiative launched by the Ministry of Education (Singapore) in 2007, schools are already leveraging on the latest information technologies to deliver a more engaging learning environment, so as to make teaching come to life through game-based learning, collaborative learning, and the use of interactive, multimedia elements. Consistent with these trends, NUS has been emphasising the “blended learning” approach, which synergistically combines the best aspects of online, classroom, and mobile learning, so as to maximise student engagement and participation in a classroom (Musib, 2014). The blended learning approach is also highly compatible with the Ministry of Education’s 21st Century Competencies and Student Outcomes (see Figure 1 below), which encourages learning across different modalities, self-directed learning, and students being active contributors in the learning process.

Libraries across the globe have been pre-empting this trend by providing suitable spaces and facilities. Hunt Library (North Carolina State University) is a standout example of such a library. Specifically, Hunt Library possesses state-of-the-art teaching and visualisation facilities for supporting the projection of visual information, collaborative research, and video conferencing. The Hunt Library Makerspace also supports students, faculty, and staff in learning about emerging technologies and bringing their creations to life (e.g., using 3D printers to create prototypes).

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7 http://www.lib.ncsu.edu/do/make-at-hunt
Internet of Things (IoT). The Internet of Things (IoT) refers to a system in which “everyday objects have network connectivity, allowing them to send and receive data”. This allows things (e.g., cars, household appliances) to become intelligent. IoT is possibly the biggest technology trend at this point, with tremendous potential for disruption and opportunities. If properly utilised, IoT provides major opportunities for libraries to connect their resources and services to more people and things, in more places and ways than ever before (OCLC, 2014).

Interestingly, IoT meshes well with the “Smart Nation” initiative in Singapore, launched by Prime Minister Lee Hsien Loong in 2014. A Smart Nation is one where people are empowered by technology to lead meaningful and fulfilled lives, harnessing the power of networks, data and infocomm technologies to improve living, create economic opportunity, and build a closer community. NUS has also started a Smart Nation Research Cluster (helmed by Prof. Ho Teck Hua), whose mission is to contribute data and findings that will advance Singapore as a smart nation. Indeed, local educational institutions (e.g., polytechnics, NTU, and SUTD) have started offering IoT courses, and certain primary schools (e.g., Fuhua Primary) have allowed their students to learn programming so as to manipulate microcontrollers and robotics. It is worth noting that Hunt Library (NCSU), in its foresight, has already started providing both hardware and software tools to their students for various IoT projects (e.g., smartwatches, door locks, smart home lighting, energy monitoring, etc.)
Fast Casual Spaces. Fast casual is a new and growing concept in restaurants, positioned between fast food restaurants like McDonalds and casual restaurants like Chi-li’s. The concept is characterised by counter service, customised menus, freshly-prepared and higher quality foods, and upscale and inviting dining spaces. Fast casual also blends technology (e.g., loyalty apps, kiosk ordering, iPads at table) with a do-it-yourself casual feel. Likewise, library spaces can be carved out to provide fast casual experiences, i.e., active and social spaces, where users can hang out, enjoy themselves, and learn. Empty lobbies, formal service counters, and other traditional aspects of library spaces may be discrepant with the fast casual experience. Fast casual spaces are attractive to millennials, who enjoy living-room-like flexible spaces that accommodate both social and academic needs.

Many school libraries, in an effort to align themselves with these consumer trends, are moving toward check-out kiosks, smaller circulation desks, as well as flexible, mobile furniture. There are several good examples, both local and overseas, of fast casual spaces in academic libraries. The Laughing Goat at the Norlin Library (University of Colorado Boulder) offers library patrons natural light, Wi-Fi, and local roasted organic coffee, while the University of Queensland Library offers relaxation pods for students who need an afternoon “pick-me-up”. Lien Ying Chow Library (Ngee Ann Polytechnic) offers a lifestyle section which contains leisure magazines, fiction, game room, video-viewing room, music stations, beanbag chairs, etc. Finally, the Da Vinci Level at Singapore Polytechnic’s Library includes discussion rooms, an exhibition gallery, and study areas with floor-to-ceiling shelves (old world charm), chill-out bean bags, and mood lighting.
OUR PLAN

In response to the evolving needs of our various groups of users, alongside emerging trends and challenges, NUS Libraries has articulated a set of overarching strategic outcomes that are illustrated in the figure on the next page. As can be seen, these outcomes serve to benefit all stakeholders; we aim to both facilitate student success and teaching excellence as well as increase researchers’ visibility and impact. More generally, the Library is potentially a powerful instrument that can be harnessed to benefit broader society by creating value in the world.

"I feel that the library is constantly changing: upgrading, expanding into different kinds of service which are often very helpful to me as a user. I appreciate the constant effort in changing/upgrading at the library very much.

Teaching Staff"

In the following sections, we will elaborate on the strategic outcomes that the Library will be focusing on for the next few years, sketch our vision of the future NUS Libraries, and finally, describe the six strategic directions that will serve as our blueprint and action plan.
Library's Vision
To be a leading global academic library impacting research, enriching learning & revitalising experiences.

Library's Mission
To actively engage and partner the NUS Community in advancing scholarship and research through innovative library services.
Strategic Outcomes and Impact

NUS Libraries is motivated to add value to the University in three broad ways. One, we want to facilitate teaching excellence and student success, both academically and outside the classroom. Beyond that, we want to equip students with skills (e.g., creativity, curiosity, innovation, critical thinking) that will help mould them into successful citizens who are able to contribute to society. Two, we want to help our researchers increase the reach, visibility, and impact of their research output. Finally, the Library is able to create value for the world through the digitisation and widespread sharing of historically and culturally important rare artefacts.
Facilitate Student Success and Teaching Excellence

The Library facilitates student success and teaching excellence in a number of ways. Right from the onset of a student’s academic career, library orientations are offered that provide freshmen with an effective introduction to the various key library tools that they need to use. Next, the Library also offers regular workshops on publishing and reference management tools (e.g., EndNote, Mendeley) that will be of wide-ranging interest to undergraduates and graduate students across the University. Beyond equipping students with information literacy skills, we are also sensitive to the importance of imparting 21st century skills, which include multiple literacies, creativity, curiosity, innovation, and critical thinking (see Figure 2 below).

This requires librarians to undergo a major paradigm shift in their teaching approach. Specifically, they need to adopt diverse pedagogical strategies that are both holistic and multidimensional, so that the inculcation of these new skills can be seamlessly integrated into the library information literacy curriculum.

On another front, we also facilitate excellent teaching in the University by working closely with departments and module instructors to offer subject-specific information literacy programs (ILPs) that equip students with the knowledge needed to use the databases and other informational tools pertinent to their discipline. In consultation with instructors, these subject-specific ILPs can be customised to support the assignments students are working on. For more advanced students (e.g., honours year and graduate students), in-depth one-to-one advisory sessions can be scheduled.
Complementing these efforts, the Library can also help instructors raise their teaching to the next level by providing innovative spaces (e.g., collaboration labs, visualisation labs) and a comprehensive, updated collection. In addition, the Library will be identifying more creative ways to: 1) contribute to curriculum development, 2) support research methodologies, and 3) promote library resources and services.

**Increase Research Visibility & Impact**

The Library is highly committed to partnering and enabling faculty members in their scholarly endeavours. We support them throughout the research lifecycle (see figure below), including planning and conducting research, publishing, and archiving and preserving their works. More pertinently, it is also a priority to help researchers enhance the visibility of their output, and to guide them in sharing their impact story with all relevant stakeholders.

![Figure 3: The Research Life Cycle](image)

We run workshops and provide one-to-one advisories to academic staff to: 1) guide them in making their research more visible, and 2) help them leverage on the various research indicators (e.g., h-index, FWCI) that can be used to benchmark the quality and impact of their research output. These metrics are very valuable when faculty members undergo annual and midterm advisory report (MTAR) reviews, and when they put themselves up for promotion and tenure (P & T). We also help to “enable” faculty members’ research by providing the cutting-edge resources needed for excellent scholarship, and increasing their efficiency through responsive services and time-saving tools. Finally, in line with the goal of enhancing research visibility, we also work with researchers to deposit full-text copies of their works in ScholarBank@NUS, our institutional repository, so as to enhance the discoverability and visibility of their work. Moving forward, we anticipate fostering closer working relationships with other constituents in the NUS research ecosystem. Together, we hope to bring our researchers’ works to the next level of excellence.
Create Value for the World

The Library also hopes to create value for the world, by serving as a guardian of knowledge and resources for an unknown future. We do this in two ways. One, using Scholar-Bank@NUS, we aim to capture and archive NUS research output in as complete a manner as possible, and to make it available to the world. By providing unfettered access to this repository, we can stimulate the development of research that can benefit Singapore and even the world, while concurrently facilitating the creation of new knowledge.

Two, through the creation of important resources such as the Biodiversity Library of South East Asia and the digitisation of rare and culturally important artefacts (e.g., Commemorative publications of Chinese clan associations, schools and religious institutions in Singapore and Malaysia as well as overseas Chinese newspapers), we can also facilitate the same goals of sharing content, enriching the world, and advancing scholarship.

Three, we will increasingly collaborate with faculty members across various disciplines, to enrich their data through GIS and other digital tools. At the same time, we will facilitate access to these projects, thereby enhancing discoverability and usage of these important resources.

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Interestingly, IoT meshes well with the “Smart Nation” initiative in Singapore, launched by Prime Minister Lee Hsien Loong in 2014. A Smart Nation is one where people are empowered by technology to lead meaningful and fulfilled lives, harnessing the power of networks, data and infocomm technologies to improve living, create economic opportunity, and build a closer community. NUS has also started a Smart Nation Research Cluster (helmed by Prof. Ho Teck Hua), whose mission is to contribute data and findings that will advance Singapore as a smart nation. Indeed, local educational institutions (e.g., polytechnics, NTU, and SUTD) have started offering IoT courses, and certain primary schools (e.g., Fuhua Primary) have allowed their students to learn programming so as to manipulate microcontrollers and robotics. It is worth noting that Hunt Library (NCSU), in its foresight, has already started providing both hardware and software tools to their students for various IoT projects (e.g., smartwatches, door locks, smart home lighting, energy monitoring, etc.)
Reimagining NUS Libraries: A Library of Legacies, Possibilities, Experiences, and Excellence

In response to the foregoing trends and our user personas, NUS Libraries envisions itself as an activity hub for limitless discovery, exchange of ideas, knowledge creation, scholarly engagement, communication, and innovation. NUS Libraries will be a place where faculty teach, students learn, and researchers seed their ideas for impactful research. We will be a knowledge creation hub where diverse groups come together to generate and collaborate on innovative ideas to produce meaningful work for the benefit of society. In summary, NUS Libraries will be a neutral arena equipped with rich technology-enabled flexible spaces, where every NUS staff and student can gather and engage in diverse activities, connecting with resources, both digital and physical. This will enable and sustain the advancement of research and the creation of new knowledge.

The NUS vision is to be “a leading global university centred in Asia, influencing the future”, while its mission is “to transform the way people think and do things through education, research and service.” In line with this vision and mission, NUS Libraries seeks to exert a transformative influence on the University community through a four-pronged approach, by being a Library of Legacies, Experiences, Possibilities and Excellence.
Library of Legacies. With our roots going back to 1905 as a small medical library, NUS Libraries has expanded to eight libraries that serve over 50,000 users. NUS Libraries is a steward and repository of national and regional heritage, hosting a collection that includes treasures that date as far back as the 14th century, irreplaceable material saved from the Japanese invaders during World War 2, the world-renowned Singapore/Malaysia collection, and archival documents from the Colonial Office records. Our Chinese Library which has a strong collection on the Chinese in Southeast Asia, rare Chinese periodicals published in Republican China (1912-1949) and traditional thread-bound Chinese books dated as early as the Yuan Dynasty (1260-1368) is one of the largest Chinese academic collection outside China, Taiwan, Hong Kong and Macau. These collections are magnificent resources for researchers interested in Singapore and the region. As we honour our past through active preservation and promotion of these materials, we are also deeply sensitive to the importance of preserving and providing access to resources, so that they can be used for education and edification. In the long term, this will also help foster a common NUS identity and establish legacies for future generations.

Library of Experiences. The traditional library has emphasised physical content (i.e., books), with its space dedicated to transactions (e.g., browsing and borrowing) related to these. While these continue to be important functions, libraries across the world are undergoing a renaissance in terms of their infrastructure and the diversity of services and experiences provided (Arup University, 2015). This implies that the library of the future will need to transition from being just a centre of information to being a centre of experiences.

More specifically, NUS Libraries will offer revitalised spaces (both physical and virtual) and innovative programmes that allow users to explore hyper-connected realities and widen their repertoire of experiences. This will collectively catalyse experiential learning, research, and knowledge creation, helping our stakeholders make breakthroughs in knowledge, career, and life.
Library of Possibilities. In order to stimulate research, innovation, and collaboration, it is important for us to help users see the world and their data anew using rich, multifaceted, and multimodal representations. This helps create fertile ground for experimentation and invention, so that our researchers can be thought leaders and major players in their research arena. Furthermore, students of the future are less likely to be merely satisfied with an academic degree. Instead, they desire inspirational outlets for collaboration, entrepreneurship, creating social impact, and self-actualisation. NUS Libraries wants to be a conduit that allows our users’ aspirations to become reality.

In summary, through an environment enriched with new experiences, dynamic possibilities, and priceless legacies, NUS Libraries seeks to complement the University’s mission of bringing transformational change to our various stakeholders. In line with the NUS Educational Philosophy, we hope to be a mediator that transforms our students to become global individuals with questioning minds, and who are imbued with a resourceful and enterprising spirit.

Library of Excellence. An organisation can only be as strong as its weakest link. In order to achieve our mission, it is vital that we establish a culture of organisational excellence, reflected by a combination of highly skilled staff, robust infrastructure to support world-class services, and sensitive analytics that give us superior insights into our customers’ needs. A library of excellence is also characterised by a relentless and iterative pursuit of self-reflection and improvement. Only by doing this can we create lasting legacies, ignite possibilities, and revitalise experiences.
NUS Libraries is motivated to add value to the University in three broad ways. One, we want to facilitate teaching excellence and student success, both academically and outside the classroom. Beyond that, we want to equip students with skills (e.g., creativity, curiosity, innovation, critical thinking) that will help mould them into successful citizens who are able to contribute to society. Two, we want to help our researchers increase the reach, visibility, and impact of their research output. Finally, the Library is able to create value for the world through the digitisation and widespread sharing of historically and culturally important rare artefacts.

HOW WILL WE GET THERE?
6 STRATEGIC DIRECTIONS

I think NUS Libraries has already shown me what a first class library experience is. I never knew a library can be this resourceful and helpful at the same time.

Graduate Student
Our roadmap for the future is made up of six strategic directions that will guide us to:

1) Enrich and preserve content,
2) Improve access to quality content,
3) Facilitate the creation of new knowledge,
4) Impart new skills to NUS Students and Staff,
5) Revitalise our environment, and importantly,
6) Build our internal capabilities.

These strategic directions are key in driving the transformation of our services, library staff, and spaces, so that we are ready to embrace the challenges and possibilities of the future, connecting people to people, people to facilities and people to content.
Strategic Direction 1: Enrich and Preserve Content

We aim to establish NUS Libraries as a trusted steward of NUS academic and cultural heritage, through articulating the value of our rare and special collections. The collection will also be enriched to support teaching, learning and research focusing on emerging and digital scholarship.

Action Plan:
- Implement a cohesive preservation programme and build NUS Libraries’ unique and distinctive special collections.
- Maintain a responsive collection development policy to acquire quality materials to support emerging research.
Strategic Direction 2: Improve Access to Quality Content

We aim to enhance discovery and access to content for knowledge creation and the advancement of scholarship. To enable library users to have seamless access to our high quality content, we will build more connections to digitised collections. These connections allow information to be pushed to users when they need it most. Our spaces will be imbued with new layers of information and content that can be called for at users’ convenience. Furthermore, digital content will be customisable through user preferences or smart algorithms (Arup University, 2015).

Action Plan:
- Build a centralised digital content platform with unified discovery service.
- Enhance discovery with the implementation of universal metadata description of content in order to increase scholarly engagement.
Strategic Direction 3: Facilitate the Creation of New Knowledge

To increase our support for research, we will implement an integrated framework to support each stage of research lifecycle and position NUS Libraries as a hub for digital scholarship by providing coordinated digital scholarship services in NUS. The library cannot just be a warehouse of ideas. Instead, it has to play a more dynamic and active role as a facilitator and guide for the research activities of all its stakeholders (Vanderbilt University, 2015). Librarians will be embedded and contribute as collaborators to work alongside researchers and produce impactful research. NUS Libraries will enable researchers to increase their visibility and thus help NUS to fulfil its mission. Through these partnerships and services, researchers get the help that they need to create new knowledge, and are empowered to see novel and exciting possibilities in their research.

We will also collaborate with faculty to embed engaging content, services and tools in the curriculum of GER1000 Quantitative Reasoning so as to enhance their learning experience and improve outcomes.

Action Plan:
- Librarians with the relevant expertise (e.g., Geospatial Information Systems) can work with faculty members to visualise data in new ways and place them in different contexts.
- Librarians can also work closely with researchers at every stage of the cycle, on matters relating to grant application, research impact measurement and publishing.
- Create an information literacy module to support GER1000 Quantitative Reasoning component.
Strategic Direction 4: Impart New Skills to NUS Students & Staff

We will redesign and develop a literacy education framework to help students develop research, literacy and writing skills. Librarians will be more embedded in information literacy to arm students with research skills that would be useful in their assignments, project work and future employability. At the same time, programmes will be designed in a manner that maximises active and experiential learning, using novel approaches such as simulation- and game-based learning.

As more research funding agencies are requiring data sharing and data management plans (DMPs) in research proposals, understanding the benefits of research data sharing and how to go about doing so, have become critical skills for all researchers. Anticipating this need, we will also provide the needed research data management services and education so as to help our researchers fulfil funders’ mandates and manage their data effectively.

Action Plan:
- Explore partnerships with relevant departments to facilitate digital and data literacy, competencies that are increasingly needed in a hyper-connected and technology-enhanced climate.
- Provide research data management services to enable compliance with funding agencies’ requirements.
5. Revitalise the Environment

NUS Libraries will undergo changes starting with the Central Library, to provide both physical and virtual spaces with new features. Revitalising these spaces will catalyse experiential learning, research, discovery, knowledge creation, and collaboration. Such facilities will be highly immersive and customisable, so as to optimise the fit between a learner and his/her context. Such spaces may also inspire new teaching methodologies in faculty members, which can in turn enhance learning outcomes.

We will establish a robust and forward looking set of principles to guide us in designing rich technology-enabled collaborative spaces to support a variety of learning experience, to foster research across disciplines as well as to balance space designed for current and future needs with access to physical collections for scholarly engagement. Through these spaces, we will enable the present and future generations “to gain fluency in the new literacies of the future” (Weidinger, 2012).

Action Plan:
- Provide facilities for high-quality teaching and research, e.g., a Digital Scholarship Hub and spaces for interactive learning. Using the Fast Casual concept, there will be more discussion rooms or pods equipped with technology for collaborations and presentations. In addition, makerspaces and incubators will be provided for users to give free play to their imagination and to foster their entrepreneurial instincts.

Strategic Direction 5: Revitalise the Environment

Build connections with futuristic physical and virtual environments

Develop rich technology-enabled collaborative spaces to support a variety of learning experiences, foster research across disciplines and balance space designed for current and future needs with access to physical collections for scholarly engagement
Strategic Direction 6: Build Internal Capabilities

In order to support NUS’ priorities in an exceptional manner, we will be establishing strong, specialised teams who will have the requisite skills and knowledge to meet the needs of a new generation of users. To achieve this, staff will be trained and retrained through a series of structured programmes, designed with different levels of competencies and emerging skills in mind. While equipping existing staff with new capabilities, the Library will also prioritise the hiring of new staff who possess the specialised skills (for e.g. in the area of Digital Scholarship) needed to move our transformational plan forward.

All in all, the goal is to produce a nimble and adaptable corps of library staff who possess the core and specialised skills needed to effectively partner in the University’s research and teaching mission. Through the strategic deployment of these teams, we will establish an effective engagement and communication framework, in which librarians are positioned as trusted consultants who are able to confidently and expertly collaborate with stakeholders at all levels of the University.

At the same time, the Library is also dedicated to upgrading and strengthening its IT infrastructure (see figure below), so as to make it more agile and robust. This will allow us to more effectively support learning and research, and to make us more future-ready in the light of rapidly evolving challenges in the domains of digital content, storage, preservation, licensing, etc.
Finally, to drive better decisions, the Library will also be leveraging heavily on state-of-the-art data analytics methods and continual assessment of user responses to services. This iterative method of user assessment will ensure that the Library remains highly responsive and relevant to our stakeholders for many years to come.

Action Plan:
- Developing staff holistically with a good strong foundation in library functions with specialisation in one or more key areas, while actively fostering a culture of curiosity and bottom up experimentation for continual improvement.
- A competency matrix for each library function will also be developed and used as a basis to develop a roadmap for professional development. We will also commit to building an agile IT infrastructure to enable innovative and forward looking library services, use data analytics to guide decision making, and importantly, acquire and create high quality content to facilitate emerging research and digital scholarship.
- We will have a one-search platform that will host rich content such as digital projects, research data, digitised rare material, and NUS research output (in a variety of formats). Such a platform will optimise discoverability and reusability of said content and will contribute to the creation of new knowledge for future generations.
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